THE IMPACT OF A PRACTICE-BASED INQUIRY IN-SERVICE TEACHER EDUCATION MODEL ON TEACHERS' UNDERSTANDING AND CLASSROOM PRACTICE.

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DECLARATION

I hereby declare that this thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

ABSTRACT

The purpose of this study was to examine the core assumptions of the Namibian practice-based inquiry (PBI) in-service training model that is based on the conception of a dialectical relationship between theory and practice. The study is based on the two inquiry-based INSET courses of the Basic Education Teacher Diploma programme (BETD INSET).

The core assumption of the model is that improvement in teachers' pedagogical and theoretical understanding of their practice leads to improvement in classroom practice. The model also assumes that improved pedagogical understanding and classroom practice results from teachers reflecting critically on educational theory and practice.

The study adopted qualitative and quantitative approaches and sought to establish (a) whether the relationship between teacher understanding and practice occurs as the PBI INSET model predicts it will occur, and (b) the extent to which teachers reflect critically on educational theory and practice.

In particular, the study assesses the impact of the two inquiry-based INSET courses on: (a) teachers' understanding, (b) classroom practice, and (c) reflection.

Instruments to measure the impact of the two courses on teachers' understanding and classroom practice have been constructed based on the criteria derived from the joint objectives of the two inquiry-based courses. The instrument for measuring the impact of the two courses on teacher reflection in terms of the PBI model has been constructed based on the reflective assessment framework of the two courses.

The study's findings weakly support the assumptions made by the PBI model. The findings indicate a moderate correlation between teachers' understanding and classroom practice, a low correlation between teachers' understanding and reflection, and no correlation between classroom practice and reflection.

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ACRONYMS

AID:	Accommodating Individual Differences
AL:	Active Learning
ALPL:	Acknowledging Learners' Prior Learning
AS:	Analytical Skills
BETD:	Basic Education Teacher Diploma
CL:	Collaborative Learning
ETP:	Education Theory and Practice
ES:	Evaluation Skills
IA:	Integrated Approach
INSET:	In-service Training
LPE:	Lower Primary Education
MEC:	Ministry of Education and Culture
OS:	Observation Skills
PBI:	Practice-Based Inquiry
SS:	Strategic Skills
SSG:	Support Study Group
TERP:	Teacher Education Reform Project
TRC:	Teachers' Resource Centre
UNESCO:	United Nations Educational, Scientific and Cultural Organisation

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CHAPTER ONE:
INTRODUCTION TO THE STUDY

1. THE AIM OF THE STUDY

The aim of the study is to test the effectiveness of the core assumptions of the practice-based inquiry (PBI) in-service teacher training model which was introduced in Namibia, after independence in 1990. The core assumptions underpinning the PBI INSET model are based on the conception of a dialectical relationship between theory and practice. This conception stresses the fact that the process of professional development is a dialectical one of generating theory from practice and practice from theory (Modiba, 1997 cited Elliot 1985). The model assumes that teachers' improved pedagogical and theoretical understanding of their practice leads to an improvement in classroom practice. The model also assumes that improved understanding and classroom practices result from teachers reflecting critically on their educational theory and practice. The notion of critical reflection is at the centre of the PBI INSET model, because it is regarded as a tool for mediating theory and practice.

The study aims to assess: (1) whether the relationship between understanding and practice as the PBI INSET model predicts will occur and, (2) the extent to which teachers reflect critically on their theory and educational practice. The study assesses these by examining the impact of the two inquiry-based INSET courses on teachers' understanding, classroom practice of the model, and teachers' reflection in terms of the model.

The study focuses on examining the impact of the two inquiry-based INSET courses on: (a) teachers' understanding of the PBI model for teaching; (b) teachers' practice of the PBI model in the classroom and; (c) teachers' reflective skills.

2. RATIONALE FOR THE STUDY

Since the design and implementation of the inquiry-based in-service courses based on the PBI model, no evaluation had been carried out to determine the effectiveness

of the PBI model in the Namibian context. Neither have there been many studies done on the effectiveness of inquiry-based models for in-service teacher education in less developed countries generally. This study aims to fill this gap.

3. BACKGROUND TO THE STUDY

3. In-service Teacher Education in Namibia

3. 1. The Characteristics of In-service Teacher Education Prior to Independence

In the years leading up to independence, the in-service upgrading programs were offered by the College for Out of School Training and the Department of Distance Teaching at the Academy of Namibia (the predecessor of the University of Namibia). The main instructional guides were Study Guides. The text of the Study Guides was focused mainly on educational theory. There was no room provided for reflection and development of understanding (Callewaert & Kallos, 1989: 38).

The design of in-service courses was based on the conception of the 'traditional' relationship between theory and practice. This conception is based on the assumption that theory informs practice. The following assumptions had underpinned the 'traditional' theory-practice relation: (a) educational theory enhances professional development of teachers, (b) exposing teachers to theoretical ideas enables teachers to improve their practice. The in-service courses were designed without taking into account what teachers actually needed. The emphasis was exclusively on theoretical and academic knowledge at the expense of professional development (Swarts, 1999).

Thus, the in-service teacher education programmes prior to Namibian independence were perceived to be too theoretical and distant from teachers' concerns, needs and the classrooms (Lauriala, 1998).

Immediately prior to independence, initiatives were embarked upon to establish an alternative in-service upgrading programme to theory-driven programmes, which

took into account the needs of the serving teachers. Early initiatives included: (a) the Lusaka Conference on teacher education in Namibia; (b) the UNESCO Mission Report on the survey of in-service training needs of serving teachers in Namibia; and (c) the Five Year Plan on teacher education.

3. 2. Initiatives which led to the birth of the Basic Education Teacher Diploma INSET programme (BETD INSET)

3. 2. 1 The 1989 Lusaka Conference

In 1989, one year before Namibian independence in 1990, the teacher education conference for Namibia was held in Lusaka, Zambia. Some of the objectives of the conference were: (a) to examine teacher education in Namibia, especially programmes and their implementation, (b) to produce a set of conference reports with conclusions and recommendations.

The following were some of the recommendations and conclusions from the Lusaka conference regarding in-service education for teacher upgrading: (a) a general reorientation of the pedagogical methodology towards promoting learning through understanding and practice directed towards autonomous mastering of living conditions; (b) intensive upgrading of subject matter knowledge in specific subjects for specific groups (Callewaert & Kallos, 1989); (c) a conclusion that in-service courses should focus on both methodology and content; and (d) that distance courses should be written by experienced and highly qualified teaching practitioners to ensure that trainees obtain full benefit both from their academic content and their pedagogical applications (Dodds, 1989).

3. 2. 2 The UNESCO Mission Report

The situation at Namibian independence in 1990 was that 16 percent of the nation's 13, 000 teachers had had no professional training. This posed a major challenge for the newly established Ministry of Education and Culture (MEC). The Ministry of Education and Culture with its new pedagogy has put in-service teacher education at the top of its priority list because of the large proportion of unqualified and under-qualified teachers. To realise their educational vision, the Ministry of Education and

Culture commissioned UNESCO to carry out a survey on the in-service training needs of the serving teachers.

Some of the objectives of the survey were: (a) to collect background information on teachers, in terms of type and level of formal education and preparation for teaching; (b) to determine the demands made on teachers and the extent to which they are presently able to meet such demands; (c) to use the information from the survey to develop draft INSET proposals (Auala, 1989). The UNESCO Mission report (1991) recommended the following: (a) the INSET programme should begin with those who had no in-service training; (b) the elements of a learner-centred philosophy must be at the heart of any in-service teacher training programme; (c) a curriculum for in-service teacher education should comprise the following areas of study: modern teaching methods, child psychology, education foundations, and skills for teaching in the subject area concern (ibid).

3. 3. 3 The 1991 Five Year Plan

The Ministry of Education and Culture "Think Tank" on in-service teacher education prepared a Five Year Plan to set up the parameters of training serving teachers, which were reviewed as comprising three components: (a) basic training for all teachers on a new philosophy of education; (b) formal upgrading for teachers who were not yet full certified; and (c) new educational opportunity for qualified teachers (MEC, 1991).

Thus, the Lusaka Conference on teacher education, the UNESCO Mission Report and the Five Year Plan (1991) on in-service teacher education led to the birth of the Basic Education Teacher Diploma in-service programme (BETD INSET).

3. 3 The Basic Education Teacher Diploma INSET Programme (BETD INSET)

The BETD INSET programme is a distance learning programme which targets unqualified and partly qualified teachers in Basic Education. It is a programme based on the philosophy and principles of the reform as expressed through the four national educational goals of access, equity, quality and democracy, which are to be realised through the educational principles of learner-centred education. It aims to

strike a balance between theory and practice in that professional studies are both a separate component throughout the programme and integrated in different subject areas.

The BETD INSET programme was introduced in 1994 as a one-year pilot project, co-ordinated by UNESCO. It has both face-to-face and distance modes of delivery. The face-to-face mode provides assistance and support to teachers through contact sessions that are held three times a year. The distance mode is conducted through distance teaching methods including the distribution of a series of instructional module guides.

In 1995, the co-ordination of the BETD INSET became the responsibility of the Ministry of Basic Education and Culture. The period between 1996 and 1998 was characterized by major revision of the BETD INSET curricula. It was felt that the instructional module guides should reflect a closer link with the daily work of the INSET teachers. A shift in pedagogical approaches was required in order to link the courses to the experiences of the INSET teachers and to assist them in transforming their pedagogical practices to be consistent with the national educational goals. The Ministry chose a reflective approach because it stresses the acknowledgement of teachers' existing knowledge and understanding as a basis for teaching and learning (Swarts, 1999).

The instructional module guides of the two courses Education Theory and Practice (ETP) and Lower Primary Education (LPE) were the first BETD INSET courses to be revised based on reflective practice approaches. The responsibility of facilitating the production of the instructional module guides of Lower Primary Education (LPE) and Education Theory and Practice (ETP) was given to the Teacher Education Reform Project (TERP), Umea University in Sweden. The TERP contracted two British universities, the University of Manchester and the University of East Anglia, to produce modular, distance materials for ETP and LPE courses.

The module guides were based on a 'practice-based inquiry' model. The practice-based inquiry approach has been regarded as a 'process through which educational

ideas get translated into forms of practice within particular historical and social contexts' (Elliot, 1997:1).

The modular material was developed based on the view that teaching is not an instrumental and mechanical process, but a process of active inquiry about practice (Modiba, 1997). It was assumed that teachers will develop their knowledge, skills and understandings by engaging in inquiry activities that relate theory to practice (Ministry of Basic Education and Culture, 1997). The modular material consists of an activities booklet, which follows a practice-based inquiry methodology, and a support material booklet to which relevant theoretical reading is attached.

4. SUMMARY

This chapter clarifies the aims of the study, the shift in paradigm and the content of in-service teacher education in Namibia. It explores the characteristics and assumptions underpinning the in-service teacher education prior to Independence, the initiatives for establishing an alternative in-service teacher education programme for independent Namibia, and the characteristics and assumptions of the in-service Basic Education Teacher Diploma (BETD INSET). The chapter also describes the model and the assumptions on which the design of the two BETD INSET courses were based. The following chapter will examine the core assumptions of the model in terms of critical theory, constructivism, and the reflective practice movement.

CHAPTER TWO:
THE THEORETICAL UNDERPINNINGS OF THE PRACTICE BASED INQUIRY INSET MODEL

Introduction

This chapter discusses the core assumptions of the practice-based inquiry (PBI) INSET model. The chapter has two sections. The first section attempts to clarify the core assumptions underlying the practice-based inquiry INSET model by examining the concepts of 'a dialectical relationship between theory and practice', and 'critical reflection', as central concepts of the PBI model, and by positioning the model within a theoretical framework. These concepts are central in the thinking of critical theories, and have influenced the constructivist and reflective practice movements.

The second section focuses on the analyses of and research studies about reflective teacher education.

1. THE THEORETICAL FRAMEWORK OF THE PRACTICE-BASED INQUIRY INSET MODEL

1. 1 Critical Theory

Critical theory challenges positivist thinking, which is said to emphasise: (a) direct observation as a way of understanding the world; (b) scientific knowledge as the only valid form of knowledge; and (c) the fact that scientific knowledge forms the basis for prediction and control of natural and social processes (Giddens 1974). Critical theorists have opposed a conception of science that insists on the separation of facts from values and the reduction of human experience to scientific facts (Gibson, 1986: 26). From the critical theorist point of view, these assumptions are seen as distorting a real understanding of society (ibid).

Critical theorists have also rejected interpretative social science's hermeneutic approach to understanding social phenomena. Critical theorists argue that although the hermeneutic approach acknowledges human capacity or creativity, it does not

encourage critical thinking. Critical theorists argue that people need to be aware of the conditions that inhibit one's self-understanding and one's understanding of society (Wallace, 1987: 108). They argue that self-understanding as well as understanding of society is achieved once the causes of distortions to such understandings are clarified, explained and eliminated. They see the notions of critique, analysis, and communication as central to a person's self-understanding (Gibson, 1986).

Critical theorists argue that positivist and interpretivist perspectives on the relation of theory to practice is linear, and they argue for a 'recursive' view. They adopt a totalising approach to the study of social reality and argue for a dialectical relationship between thought and action. This means that from the critical theorist point of view, thought and action are indivisible. The concept 'praxis' which consists of action and reflection, is central to the thought-action view:

> 'Theory and practice represent a particular alliance, not a unity in which one dissolves into the other' (Gibson, 1986: 20)

Critical theorists argue that the notion of dialectical thought embodies the concept of critical thinking. Critical thinking or critical reflection is seen as a tool for self-emancipation and social change. It helps people to question taken-for-granted assumptions, beliefs and conventional practices and to act upon this reflective knowledge (Giroux, 1983: 2).

Critical theorists place emphasis on the process of critique or critical reflection upon conditions that may inhibit one's self-understanding and the understanding of society. The notions of critical reflection and communication are important in overcoming constraints on thought and action:

> 'The conditions for establishing truth and rationality are fundamentally connected to the conditions for free, democratic communication and action' (Carr, 1995: 12).

Critical theorists believe that theory is embedded in practice, and is actively constructed from practice through the process of critical reflection. The critical theorist view of theory and practice is related to its view of knowledge. Critical theorists argue that knowledge is historically and socially rooted and interest bound. Jurgen Habermas, a member of the Frankfurt School's version of critical theory, develops a theory of knowledge- constitutive interests in order to show the

relationship of knowledge to human activity. Habermas believes that the historical-material conditions in which people develop, will condition the constitution of knowledge. Habermas sees critical reflection into these conditions as central to the constitution of knowledge (Roderick, 1986: 53). He identifies three knowledge-constitutive interests: the technical, the practical and the emancipatory. *Technical interest* is bound to instrumental and technical reasoning. *Practical interest* goes beyond technical rationality and refers to the human capacity to recognise and eliminate conditions that distort communication. *Emancipatory interest* is based on the human capacity to act rationally, to be self-determining and self-reflective (ibid).

From the critical theory point of view, the processes of critical reflection and self-reflection are central in both mediating between theory and practice, and in knowledge construction.

It is not appropriate to develop a full critique of critical theory here, but it can be pointed out that critical social science has been criticised for being too abstract and for not articulating what the practice of critical social science might look like (Wallace, 1987: 109). In other words, paradoxically, critical theory is charged with being too theoretical and not practical enough.

1. 2 Constructivism

Constructivism is a pedagogical theory derived from the tenets of critical theory. The notions of the 'interrelatedness between theory and practice', and critical reflection have dominated constructivist thinking.

Drawing on the psychological works of Jean Piaget, Jerome Bruner and Lev Vygotsky, constructivism has emerged as a theory of knowledge and learning. Constructivists reject the positivist view of knowledge, and the understanding of theory and practice as separate entities. As a theory of knowledge and learning, constructivism stresses that knowledge is constructed in the mind of the individual and learning takes place through the processes of transformation and self-regulation.

Constructivism is underpinned by the following assumptions:

- Individuals create their own unique new understanding based upon the interaction of what they already know and believe, and the phenomena or ideas with which they come into contact (Richardson, 1997: 3).
- Learning is an active process whereby individuals are encouraged to construct meaning for themselves, create knowledge by sharing experiences with others through collaborative interaction.
- Knowledge is seen as subjective and saturated with values and beliefs (Crebbin, 1997: 1).
- Theory and practice are seen as inseparable (ibid).
- Systematic reflection is an essential activity if personal experience is to facilitate deeper understanding.

The practice-based inquiry INSET model (which is the focus of this study) is embedded in the above–mentioned assumptions. The second section of this chapter will highlight some limitations of these assumptions.

1. 3. Reflective practice movement

Like constructivist theory, the reflective practice paradigm is derived from the tenets of critical theory. The practice-based inquiry INSET model has its roots in the reflective practice paradigm. This paradigm has emerged as a reaction against a view that regards teachers as "technicians" who are required to apply theoretical knowledge to practical situations uncritically (Core & Zeichner, 1995: 205). The notion of reflective practice recognises that teachers too have theories that can contribute to the knowledge that informs the work of practitioner communities (ibid). From the perspective of the reflective practice movement, improvement in teachers' pedagogical understanding and teaching practice is embedded in teachers' thinking and reflection.

Reflection is a broad concept, and has been interpreted differently by different people. The concept reflection has been variously defined as:

> 'a systematic and deliberate thinking back over one's action' (Loughran, 1996);

'a systematic inquiry into one's own practice to improve that practice and to deepen one's understanding' (McIntyre, 1993, Cook 1998); and

'a vehicle for bridging the gap between theoretical and practical thought' (Doll 1993: 140).

The last two definitions inform the practice-based inquiry INSET model. The next section on perspectives of reflective practice expands on this idea.

1. 3. 1 Perspectives of reflective practice

Adler (1991: 139) identifies three perspectives of reflective practice described by different scholars: 'Reflective teaching' (Cruikshank, 1987), 'reflection-in-action' (Schon, 1987) and reflection as 'critical inquiry' (Zeichner, 1987).

1. 3. 1. 1 Reflective teaching

Cruikshank's notion of reflective teaching refers to teachers' ability to analyse their teaching practice. Cruikshank sees reflection as 'instrumental in enabling teachers to replicate teaching behaviours which are as a result of empirical research, to be deemed effective' (Adler, 1991: 140). This notion of reflective teaching has been developed further by Zeichner & Liston (1990) and Tabachnick & Zeichner (1991).

Drawing on the work of Zeichner & Liston (1990), Tabachnick & Zeichner (1991) highlight four conceptions of reflective teaching practice:

- The first view is referred to as the *academic tradition of reflective teaching*. What is seen as important here is the pedagogical knowledge of a teacher. The academic conception emphasises the teachers' ability to translate subject matter knowledge to promote student understanding. This ability results in the formulation of a model for pedagogical reasoning and action. The model formed includes six aspects of the teaching act: comprehension, transformation, instruction, evaluation, reflection and new comprehension (Tabachnick & Zeichner, 1991).

- The second conception of reflective teaching is *the social efficiency tradition of reflective teaching*. This view emphasises the abilities of teachers to exercise

judgement about the use of various teaching skills suggested by researchers and theorists (ibid: 6).

- The *developmentalist tradition of reflective teaching* has been identified as a third conception of reflective teaching. This view emphasises the role of teachers as researchers whereby teachers are encouraged to have ongoing inquiries in their classrooms about the learning of children to inform their practice (Tabachnick & Zeichner 1991: 7).

- The fourth view of reflective teaching is referred to as the *social reconstructionist tradition of reflective teaching*. This conception of reflective teaching puts emphasis on a total transformation of the whole society through the process of critique. Teachers are required to critically examine the social conditions in which their practices are situated. Another characteristic of a social reconstructionist conception of reflective practice is 'its democratic and emancipatory approaches, whereby teachers are required to question moral and social issues' (Tabachnick & Zeichner 1991: 8).

1. 3. 1. 2 Reflective practitioner

The concept of reflective practitioner has come from the work of Schon (1987). The notion emphasises action processes during one's professional practice as opposed to learning sequential theoretical knowledge and then applying this knowledge to practice.

Schon sees thought and action as inseparable. Central to his arguments are the notions of 'knowledge-in-action', 'reflection-in-action' and 'reflection-on-action
From Schon's point of view, *knowledge-in -action* implies that practitioners can develop their professional knowledge from practice and experience (Adler, 1991). *Reflection-in-action* involves the exercise of analysis, judgement and action while practitioners engage in action (Bell & Gilbert, 1996: 64). *Reflection-on-action* is a version of reflection-in-action, whereby practitioners think about what happened during reflection-in-action to come up with new resolutions or reinforce similar resolutions (ibid: 65). The notions of reflection-in-and on-action are mechanisms

through which practitioners develop and learn from their experience (Zeichner & Liston, 1996: 16). Schon sees reflection as a spiral process in which practitioners frame and interpret, reframe and reinterpret their situation on the basis of their experience in trying to change it (ibid: 17).

1. 3 .1. 3 Critical inquiry

The work of Kenneth Zeichner (1981, 1987) represents a third perspective of reflective practice. This perspective is based on three levels of reflection: the technical, practical and emancipatory levels.

The technical level refers to teachers' ability to reflect on the effectiveness of teaching strategies. This level of reflection is based on instrumental reasoning, 'because it only concerns with the means to deliver education, without examining the purposes, values and goals of schooling' (Valli, 1993:13).

The practical level places teaching within its situational and institutional contexts. It goes beyond questions of proficiency at achieving particular ends towards a thoughtful examination of how contexts influence teaching and learning (Adler, 1991: 141).

The emancipatory level of reflection is concerned with moral and ethical issues. This level requires practitioners to reflect on how their efforts are shaped by the institutional and societal structures within which they work and by the ideologies which support these structures (McIntyre, 1993:45).

Zeichner's perspective takes up most of the elements of critical theory and therefore is promoted by most reflective practitioners. This perspective forms the roots of action research, a form of reflective practice that will be focused on in the following sub-section.

1. 4 Action research as practical inquiry in teacher education

Action research as a methodology for social inquiry has a long history. It goes back over 50 years in the United States to Kurt Lewin in the 1940s, who used the term to

describe his approach to dealing with social problems. According to Lewin, if meaningful social theories are to be developed, they must address problems that are "grounded in the life circumstances of the inquirer" (Kemmis, 1982: 20).

The notion of 'action research' developed as a way of challenging the positivist view of gaining knowledge about practice by trying to overcome the separation of theory and practice. Lewin envisioned a version of social science that would integrate social theory and social action (Noffke, 1997). He argued that "advances in theory" (knowledge about practice) and "needed social changes" (practice) might "simultaneously be achieved through action research." (Kemmis, 1982: 13).

Action research refers to a cycle of inquiry involving identifying issues or areas of interest or concern that can be improved or changed through planning, acting, observing, reflecting and evaluating the changes or improvements effected by action taken (Noffke, 1997).

Action research is underpinned by the following assumptions:

- Systematic self-reflective inquiry helps practitioners to understand and improve practice[1];
- Improved practices result from practitioners reflecting critically on their educational practices (Stevenson, 1991: 279);
- Critical reflection requires practitioners to evaluate their educational intentions, examine the relationship between these intentions and the consequences of classroom actions, and to consider ways to resolve contradictions that are revealed (ibid);
- Action research attempts to improve the quality of life in social situations (Elliot, 1982);
- Action research provides a means for facilitating practitioners' systematic reflection on educational practices (ibid);
- Action research is both an individual and a collaborative or participatory activity.

The goal of action research is to develop understanding in order to improve practices (Carr & Kemmis 1986).

Action research as a practical inquiry has three essential aims in in-service teacher education:

- the improvement of educational practices;
- the improvement in practitioners' understanding of educational practice; and the improvement of the situations in which practice is carried out (ibid: 280).

The above discussion on reflective practice highlights the claims of reflective practice regarding teacher development. The limitations of these claims about teacher development will be discussed in detail in the second section of this chapter, which highlights the limitations of reflective practice in the literature.

The previous sub-sections have presented an examination of the theoretical assumptions on which the PBI INSET model is based. Central concepts underlying the core assumptions of the PBI model were analysed from the perspectives of critical social science, constructivism and the reflective practice paradigm. These theoretical ideas have contributed to the development of the practice-based inquiry INSET model in Namibia.

2. THE PRACTICE-BASED INQUIRY (PBI) INSET MODEL

Like action research, practice-based inquiry refers to the concept of a cycle of inquiry involving a spiral of identifying issues or areas of interest that can be improved or changed through planning, acting, observing, reflecting and evaluating the changes or improvements effected by the action (Pomuti & Howard, 1997). The central aim of PBI is to find out more about, and to improve a practical situation by understanding it (Ebbut, 1997).[2]

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[1] Carr and Kemmis (1986: 162) defines action research as: 'A form of self-reflective inquiry undertaken by participants in social situations to improve the rationality and justice of their practices, their understandings of these practices and the situations in which the practices are carried out'.

[2] The design of the PBI INSET model was influenced by the British tradition of action research which focuses on increasing practitioners' understanding of their practices and improvement of classroom practices (Wallace, 1987)

2. 1 Characteristics of the practice-based inquiry INSET model

- PBI is both individual and collaborative. Teachers are supposed to benefit from a supportive and safe learning network made up of peers who are engaged in the same process and teacher educators who inquire into their own roles as facilitators of PBI (Elliot, 1997).
- The notion of critical reflection is at the centre of the PBI model. It is regarded as a tool for mediating between educational theory and classroom practice.

2. 2 Assumptions about practice-based inquiry and in-service teacher education

- PBI aims to improve educational practice, practitioners' understanding and the situations in which practice is carried out.
- Practitioners are assumed to be capable of reflecting upon and interpreting their own practice, and to be able to generate their own practical theory from inquiry activities.
- PBI is assumed to be able to provide teachers with the opportunity to transform their pedagogical practice in schools in order to be consistent with the goals of education (Elliott, 1997: 1).

The above sub-section describes the claims of the PBI INSET model. Earlier in this chapter it was mentioned that the PBI model has its roots in the reflective practice paradigm. The following section of this chapter focuses on the limitations of the reflective practice paradigm as highlighted in the literature.

3. REVIEW OF ANALYSES AND RESEARCH STUDIES ON REFLECTIVE TEACHER EDUCATION

3. 1 Review of analyses on reflective teacher education

3. 1. 1 Ambiguity of the concept reflection

Many of the discussions on inquiry-based in-service teacher education have not yet reached consensus on the role of inquiry and reflection in improving classroom practice. As Lampert (1997: 85) says, 'there are many different conceptions of the 'teacher-researcher' and arguments about the role of inquiry and reflection in competent practice.

There is a diversity of meanings of reflective practice and confusion regarding the term reflective teaching (Day 1993, Waks 1999)

3. 1. 2 Implementation problems of reflective practice

Reflection on one's practice has been documented as being difficult for teachers. At least two conditions make it a difficult task (Pultorack (1993) cites Richert, 1990, Nemser & Buchman, 1985, Shulman 1988). First, the skill of looking back and learning from one's experiences within a classroom environment is extremely complex and difficult to acquire (Pultorack, 1993). A second condition is organisational in nature: lack of time, and insufficient enthusiasm and support from school supervisors (ibid). Without time and support, active reflection is impossible to sustain over a long period.

Newman highlights practical problems in the implementation of reflective practice. In a school a reflective practice would demand greater flexibility in the school timetable to enable each teacher to vary the length of their lessons to follow the logic of reflection-in-action (Newman, 1996: 297). This is rarely possible, for a range of administrative reasons.

Stevenson (1991: 290) also highlights the difficulty of engaging in professional development work associated with action research. He argues that such activity

demands conditions that require teachers to have the time and resources to reflect systematically on their practice and to communicate extensively with each other. Flanagan (1991) argues that planning an in-service teacher education program around forms of reflective teaching is demanding, requires slow, small scale inception and demands intense facilitation. In developing countries, the resources are rarely available to sustain such facilitative conditions over time.

3. 1. 3 Problems in the theory-practice relation

Russell (1993) highlights issues around the relationship between theory and practice within the context of the reflective practice paradigm. He argues that being reflective and being successful may not necessarily go hand in hand (Russell, 1993: 146). He points out that one may give impressive views about teaching and learning but, these may not necessarily be reflected in classroom behaviour. He argues for consistency between one's teaching practice and one' beliefs and perceptions about teaching and learning (ibid). He also argues that a convincing account of how reflection facilitates improvement has been lacking.

Day (1993) also raises a concern about theory-practice relations within the reflective practice paradigm. He points out that we need to learn more about the links between reflection and "better" teaching. There is not enough information on how teachers make decisions based on reflection or how to judge the quality of the decision in action. Indeed, this constitutes a serious problem for the reflective practice paradigm. Studies, also in Southern Africa as we shall see below, repeatedly find a disjuncture between teachers' reflections on their practice, and what they actually do in the classroom (Taylor and Vinjevold, 1999).

3. 2 Review of research studies

The nature of this disjuncture has not been properly dealt with in the reflective practice literature. The following studies highlight the various problems discussed above.

3. 2. 1 International studies

Stevenson (1991) examined the impact of a graduate course in action research that was designed to engage in-service education students as participant inquirers into their own professional practices. The students who participated were enrolled in masters level, administrator certification programs on a part-time basis. Stevenson found that the majority of students could only reflect at the technical level. His study revealed that the students were unable to articulate the relationship between educational principles or theory and practice, or to examine the social and institutional conditions that mediate that relationship (1991: 289). His study indicated that students did not have confidence in developing their own theories because academic theory was given more status.

Brickhouse (1990) studied the effects of teachers' beliefs about the nature of science on their classroom practice. He interviewed and observed three science teachers to assess their understanding of science and the teaching of science. He found that only one out of three teachers who had a strong academic background in science displayed consistency between her understanding of science and her teaching of science, while those with low academic knowledge and less teaching experience displayed inconsistency between their beliefs and classroom practices.

Lampert (1997) examined the effect of a professional development project for teachers, whose design was based on a constructivist model. The project intended to result in a change in classroom instructional practices, whereby teachers were required to do inquiries into their students' ways of thinking about subjects such as science, mathematics and music. Teachers were also expected to construct learning theories by reflecting on how they generated knowledge while they were doing activities with their students as well as to develop appropriate action strategies. The study revealed that teachers seemed to find difficulties in moving from being teachers to being teacher-researchers. Teachers had difficulty in understanding the significance of learning about their practice as a useful way of knowing, and which could potentially serve as a base on which teaching strategies could be built. Lampert concluded that teachers did not and perhaps could not develop the

realisations or insight necessary for making connections between their inquiry activities and their actual classroom teaching.

From these studies, it is clear that the connections between various forms of knowing and doing in the classroom do not function as unproblematically as the reflective practice paradigm, and indeed as critical theory, assume they should.

3. 2. 2 Southern African studies

As in the case of the international studies discussed previously, the following Southern African studies highlight unexpected complexities in the implementation of the reflective practice paradigm.

Walker (1991) examined her role in facilitating a reflective practice teacher development project of 34 teachers from four African primary schools in Cape Town between 1987 and 1989. In this project, teachers were regarded as active producers of pedagogical knowledge, shaping the curricula through engagement in a process of reflection-on-practice. The study indicated that although teachers could articulate their theories about effective teaching, their ability to develop an 'understanding of why one method is better than another and thus moving beyond fossilised situation specific techniques is a slow and continuing process' (Walker, 1991: 444). Walker also found that critical analysis without practical skills is not sufficient to transform classrooms.

Flanagan (1991) examined the impact of the Primary Education Project, designed to foster reflective practice among primary teachers in ex-DET schools. She indicated that reflective teaching could not operate effectively without a library and a minimum of resources.

Reeves (1998) examined the impact of a transformative action reflection INSET model on teachers' understanding and classroom practice. The study revealed that even though

> 'very few teachers demonstrated that they have not benefited in terms of understanding and practice of the model, only a small band of

teachers' understanding and practice was rated as adequate' (1998: 219).

The study also revealed that there seems to be no congruence between teachers' understanding of teaching and learning and their classroom practices. The study concluded that although the transformative action model for INSET is effective in terms of its objectives, it assumes ideal conditions, which are not available in most South African schools.

4. SUMMARY

This chapter examines the core assumptions of the PBI INSET model from the theoretical perspective of critical theory, constructivism and the reflective practice movement. The chapter also discusses the analyses and research studies that are related to the focus of this study. From the review of analyses and studies on reflective teacher education, it can be concluded that the theory-practice divide does not seem easily bridgeable. Both the analyses and the research studies stress the fact that practitioners have difficulty in relating theory and practice, and that there is not yet consensus reached on the role of inquiry and reflection in improving classroom practice.

This study not only extends the work done so far on the inquiry-based models for in-service teacher education, in order to contribute to the knowledge-base in the field of in-service teacher education, but will also inform further development of in-service teacher education in Namibia. The study will assess the impact of the PBI model on teachers' understanding, classroom practice and reflection by examining the extent to which teachers relate theory to practice and/or practice to theory, and the extent to which teachers reflect critically on their educational theory and practice.

CHAPTER THREE:
METHODOLOGY

Introduction

This chapter clarifies the research design, the instruments for collecting data, the sample of participants in the study, the data collection and analysis procedures.

The research methodology adopted here aims at establishing (a) whether the relationship between understanding and practice occurs as the PBI INSET model predicts it will occur, and (b) the extent to which teachers reflect critically on their educational practice.

1. THE RESEARCH DESIGN

The research design involved an analysis of the intended curriculum for both ETP and LPE courses in order to identify what aspects should have been learnt; and operationalising measures which would make it possible to construct instruments for assessing the extent of that learning. The research design entails:

- identifying conceptual categories derived from the joint objectives of ETP and LPE courses **(see 1. 1 & 1. 1.1)**
- constructing vignettes based on the identified conceptual categories **(see 1. 2)**.
- developing criteria (derived from the conceptual categories) with indicators to allow the impact on teachers' understanding and the practice of the model to be graded across a continuum of competencies **(see 1. 3)**
- constructing instruments to infer and measure the impact of the INSET courses on teachers' understanding and the practice of the model (see Appendix A, B & C).

These are discussed further below.

1. 1. Identifying the conceptual categories

The conceptual categories were identified from the joint objectives of the ETP and LPE. The objectives listed below were selected from a more extensive list of objectives of the two courses, because they are based on the key principles and teaching approaches of ETP and LPE courses.

The following are the joint objectives of ETP and LPE from the courses module descriptors:

- To develop teachers' appreciation that the starting point of a learning process is each learners' existing knowledge, skills, interests and understandings derived from previous experiences in and out of school.
- To develop teachers' knowledge, skills and understanding of creating learning opportunities which meet the needs and abilities of individual learners.
- To focus investigation on the interdependency of the separate subjects of the lower primary curriculum and the ways the different subject matter can be integrated for the benefit of the learner.
- To create opportunities to help teachers develop skills and understanding of assisting learners to develop competencies for active learning.
- To further develop teachers' understanding of classroom organizational strategies which promote learning as an interactive, shared and productive process.

1. 1. 1 The conceptual categories

Based on the analysis of the joint objectives of the two courses, five categories were derived: (a) acknowledging learners' prior learning; (b) adopting an integrated approach to teaching and learning; (c) accommodating individual differences; (d) assisting learners to develop competencies/skills for active learning; (e) promoting collaborative learning among learners.

1. 2 Constructing vignettes

Six vignettes were constructed for use in interviews with teachers (see Appendix D). The vignettes were constructed based on the categories derived from the joint objectives of ETP and LPE courses. The primary aim of the vignettes is to test teachers' understanding of the LPE and ETP approaches. Four of the six vignettes were adapted from the literature of lower primary teaching. Two of the descriptions are based on the teaching of Environmental Studies. Three descriptions are based on the teaching of lower primary Mathematics and one was based on the teaching of lower primary science.

In order to test for consistency in teachers' responses to questions about vignettes in interviews, the vignettes have been constructed in three categories of practices. Two of the six vignettes represent best practices, the other two representing good practices and the other two represent poor practices in terms of the PBI model.
The vignettes were matched to more than one conceptual category.
For example, the following two vignettes (B & E) representing best practices have been matched to most of the conceptual categories:

B

Mr Witbooi is a grade 2 teacher. He teaches learners to count and compare using the family tree. He begins his lesson by drawing his family tree. He draws his father on the left and his mother on the right hand side. He labels the picture, ordering the members of the family so that the first born is on the left hand side. He also draws himself as a member of the family. He asks the children the following questions: How many children in the family? How many boys? How many girls? Are there more boys than girls? He asks, each child in the class to draw a picture of his own family tree. He also asks them to write short sentences about their own families, indicating how many brothers and sisters, as well as indicating whether there are more males than females. He assists those who have difficulties and gives additional tasks to those who are fast in completing the task. After the learners have completed their tasks, the teacher emphasises the main points of the lesson.

(Adapted from Gibbs, W & P. Mutunga 1991: 7)

E

Mr Theo is a grade 4 teacher. He plans his lesson to help children understand the concept of electricity. He has arranged all the materials necessary for the lesson, during the morning break. He puts at each desk, a collection of bulbs, wire, batteries and switches. When the children enter the class from the break, they jump to their desks. He calms them down. He first explains some difficult words regarding electricity. He also asks the class to mention any objects which are related to electricity. He divides learners in pairs, gives out a work sheet in which the children have to complete some sentences regarding things about electricity. He assists each pair to come up with ideas through asking them questions and explaining certain words. He asks each pair to exchange with another pair so that others can see what others have done, he then summarises the main points of the lesson.

(Adapted from J. Moyles, 1997: 13)

The following other two vignettes (A & D) representing good practices have been matched to some of the conceptual categories. The other two vignettes below (C & F) representing poor practices include descriptions which contain negative elements which the PBI model wants to replace.

C

It is a grade 4 Math class. The teacher reminds the learners what they have done the previous day. She then rapidly writes 4 sums on the chalkboard. She asks 4 learners to solve the sums. While they are working out the answers, she writes another set of sums on another chalkboard. When the first group have finished, she asks the rest of the class to check if the answers are correct. While this is taking place, the second group of learners are working on the next set of sums. This sequence continues until every learner has a turn at the chalkboard. Towards the end of the lesson, the teacher gives a chance for learners to ask questions.

(Adapted from Galton, M 1997:108)

F

Mrs Tjiteo is a grade 1 teacher. It is a Maths lesson:

Mrs Tjiteo:	Children, today we are going to learn to count up to ten.
Jerry:	I know how to count. Can I start?
Mrs Tjiteo:	No, no Jerry I must teach you how to count first. Ok, children, say the numbers after me. One, two, three.
Class:	One, two, three.
Mrs Tjiteo:	Four, five, six.
Class:	Four, five, six.
Mrs Tjiteo:	Seven, eight, nine.
Class:	Seven, eight, nine.
Mrs Tjiteo:	Ten.
Class:	Ten.
Mrs Tjiteo:	Very good children, but I did not hear everybody's voice. Let's count again.
Class:	(The entire exercise is repeated)
Mrs Tjiteo:	She sings a song with numbers.

(Adapted from McNergney R. & Carrier C. 1981: 101)

1. 3 The measuring criteria

Fourteen criteria have been formulated to assess the kind of impact of the courses on teachers' understanding and the practice of the PBI model. The criteria have been formulated in the form of skills and/or knowledge-based questions (Reeves, 1997).

Ten criteria are based on the conceptual categories, derived from the joint objectives of the two courses and *four* categories were adapted from the reflective- assessment framework for the courses.

The following *five criteria* below have been designed to assess the impact of the two courses on teachers' understanding of the PBI model:

- To what extent does the teacher understand what is meant by linking learners' prior learning to new learning?

- To what extent does the teacher understand what is meant by adopting an integrated approach to teaching and learning?
- To what extent does the teacher understand what is meant by accommodating learners with individual differences?
- To what extent does the teacher understand what is meant by assisting learners to develop competencies/skills for active learning?
- To what extent does the teacher understand what is meant by collaborative learning?

The following *five criteria* have been designed to assess the impact of the two courses on teachers' teaching practice in terms of the PBI model:

- To what extent does the teacher's teaching practice show recognition of acknowledging learners' previous knowledge by linking learners' prior learning to new learning?
- To what extent does the teacher's teaching practice show recognition of adopting an integrated approach to teaching and learning?
- To what extent does the teacher's teaching practice show recognition of accommodating individual differences?
- To what extent does the teacher's teaching practice show recognition of assisting learners develop competencies/skills for active learning?
- To what extent does the teacher's teaching practice show recognition of promoting collaborative learning among learners?

The following *four criteria* have been designed to assess the impact of the two courses on teachers' reflective skills in terms of the PBI model:

- To what extent does the teacher's description show a systematic observation of the inquiry activities/process?
- To what extent does the teacher analyse the information gathered from the inquiry activities?
- To what extent does the teacher evaluate the information gathered from the inquiry activities?

- To what extent does the teacher construct action strategies for incorporating into action plans?

Indicators

In order to assess the degree of impact of the model on teachers' understanding, teaching practice and teacher reflection for each criterion, three indicators for each criterion have been formulated, so that the degree of teacher competence in terms of each of the criteria can be measured (Reeves, 1997). For example, the three indicators have been formulated to assess the extent to which teachers' teaching practices show recognition of acknowledging learners' previous knowledge by linking learners' prior learning to new learning:

1. Teacher begins with what learners already know from home, community and school. Teacher assists learners to connect and apply new learning to what they already know.
2. Teacher invites ideas from learners - but does not link these ideas to new learning.
3. Teaching is not linked to learners' prior learning.

In other words, indicators have been formulated to assess teachers' degree of competence in terms of understanding, teaching practice of the model and teachers' reflection in terms of the model.

1. 4 Research instruments

The three instruments used were: (a) a classroom observation schedule; (b) a teacher understanding assessment schedule; and (c) a teacher reflective assessment schedule (see Appendixes A, B & C).

1. 4. 1 The classroom observation schedule

The classroom observation schedule was designed to record teachers' classroom behaviour. It consists of the criteria plus indicators discussed above. The three indicators, formulated for each criterion in order to measure the degree of teachers' teaching competencies in terms of each criterion is illustrated by the following example below from the classroom observation schedule:

Classroom practice

TO WHAT EXTENT DOES THE TEACHER'S TEACHING PRACTICE SHOW RECOGNITION OF LINKING LEARNERS' PRIOR LEARNING TO NEW LEARNING?

ALPL= acknowledging learners' prior learning

CRITERION CODE	INDICATOR	RATING OR SCORES
ALPL 1	Teacher begins with what learners already know from home, community and school. Teacher assists learners to connect and apply their learning to what they already know.	5 or 6
ALPL 2	Teacher invites ideas from learners- but does not link these ideas to new learning.	3 or 4
ALPL 3	Teaching is not linked to learners' prior learning.	1 or 2

The descriptions of the indicators on the classroom observation schedules were adapted from Tharp (1999) and Reeves (1997).

The three indicators on the observation schedule have been organised on a continuum from top to bottom. Indicators on top of the instrument represent classroom practices that the PBI model aims to foster (Reeves, 1997). Indicators in the middle of the continuum on the instrument indicate that teachers are at the developing stage. Indicators on the bottom indicate a low level of teaching competence in terms of the model.

A six- point scale consisting of a rating or scores for each of the indicators is included on the instrument so that the impact of the model on teacher's classroom practice can be rated numerically according to each criterion.

A rating (score) of 5 or 6 indicates that the impact of the model on teachers' classroom practice, in terms of a particular criterion is adequate. A rating (score) of 3 or 4, indicates that the impact of the model on teachers' classroom practice, in terms of a particular criterion is barely adequate. A rating (score) of 1 or 2 indicates that the impact of the model on teacher's classroom practice in terms of a particular criterion is inadequate. The instruments contain a section for 'comments' for noting issues or constraints.

1. 4. 2 The teachers' understanding assessment schedule

The teachers' understanding assessment schedule was designed to be used with the *vignettes* to capture the categories during the interviews with teachers.

The interview questions were formulated as open-ended in order to allow for probing and clarification:

1. Explain the approach used by the teacher in this lesson?
2. What were the strengths of the lesson?
3. What were the weaknesses of the lesson?
4. Do you think the lesson was successful (Yes/ No)
5. Why? (If the answer is no) Can you think of another way you might have taught this lesson?

The teacher understanding assessment schedule consists of criteria plus indicators. The three indicators, formulated for each criterion in order to measure the degree of teachers' understanding competencies in terms of each criterion is illustrated by the following example from the teacher understanding assessment schedule on the next page:

Teacher understanding

TO WHAT EXTENT DOES THE TEACHER UNDERSTAND WHAT IS MEANT BY LINKING LEARNERS' PRIOR LEARNING TO NEW LEARNING?

ALPL= acknowledging learners' prior learning

CRITERION CODE	INDICATOR	RATING OR SCORES
ALPL 1	Teacher shows understanding of the need to appreciate learners' prior knowledge and recognises the need to link learners' prior learning to new learning.	5 or 6
ALPL 2	Teacher shows some understanding of appreciating knowledge and experience that learners bring to the learning situation, but shows little/ no recognition of the need to connect the learners' prior knowledge to new learning.	3 or 4
ALPL 3	Teacher shows no/ very little understanding of what is meant by acknowledging learners' prior knowledge or the need to connect learners' previous knowledge, experience and understanding to new learning.	1 or 2

The descriptions of the indicators on the teacher understanding assessment schedule were adapted from Tharp (1999) and Reeves (1997).

Three indicators on the teacher understanding assessment schedule have been organised on a continuum from top to bottom. Indicators on top of the instrument indicate a high level of understanding in terms of the model. Indicators in the middle of the continuum on the instrument indicate that teachers are at the developing stage. Indicators on the bottom indicate a low level of understanding in terms of the model. A six- point scale consisting of a rating or scores for each of the indicators is included on the instruments so that the impact of the model on teachers' understanding competencies can be rated according to each criterion.

A rating (score) of 5 or 6 indicates that the impact of the model on teachers' understanding, in terms of a particular criterion is adequate. A rating (score) of 3 or 4, indicates that the impact of the model on teachers' understanding in terms of a particular criterion is barely adequate. A rating (score) of 1 or 2 indicates that the impact of the model on teachers' understanding in terms of a particular criterion is inadequate. The instruments contain a section for 'comments' for noting issues or constraints.

1. 4. 3 The teacher reflective assessment schedule

The teacher reflective assessment schedule was designed to assess the impact of the model on teachers' reflective skills. It consists of criteria plus indicators. The three indicators formulated for each criterion in order to measure the degree of teachers' reflective skills in terms of each criterion is illustrated by the following example from the teacher reflective assessment schedule:

Teacher reflective assessment schedule

TO WHAT EXTENT DOES THE TEACHER ANALYSE THE INFORMATION GATHERED FROM THE INQUIRY ACTIVITIES?

AS = analytical skills

CRITERION CODE	INDICATOR	RATING OR SCORES
AS 1	Teacher presents a critical analysis of issues emerging from inquiry activities, and states new understandings and discoveries from the inquiry activities.	5 or 6
AS 2	Teacher presents a descriptive account of the inquiry process, but there is little/no discussion of new understandings and discoveries.	3 or 4
AS 3	Teacher's description is a surface description of activities being carried out.	1 or 2

The descriptions of the indicators on the teacher reflective assessment schedule were adapted from reflective practice literature and the reflective-assessment framework for ETP and LPE courses.

Three indicators on the teacher reflective assessment schedule have been organised on a continuum from top to bottom. Indicators on top of the instrument indicate a high level of reflection in terms of the model. Indicators in the middle of the continuum on the instrument indicate that teachers are at the developing stage. Indicators on the bottom indicate a low level of reflection in terms of the model. A six- point scale consisting of a rating or scores for each of the indicators is included

on the instruments so that the impact of the model on teachers' reflective skills can be rated according to each criterion.

A rating (score) of 5 or 6 indicates that the impact of the model on teachers' reflection, in terms of a particular criterion is adequate. A rating (score) of 3 or 4, indicates that the impact of the model on teachers' reflection in terms of a particular criterion is barely adequate. A rating (score) of 1 or 2 indicates that the impact of the model on teachers' reflection in terms of a particular criterion is inadequate. The instruments contain a section for 'comments' for noting issues or constraints.

2. THE SAMPLE FOR THE STUDY

A sample of 30 practising teachers from a population of 187 teachers who enrolled in the BETD INSET programme in 1997 for the Lower Primary specialisation was selected for this study. The teachers were the first cohort to be introduced to the PBI model and have covered six modules out of twelve based on this model.

2. 1 Selection of the sample

The number of teachers enrolled for the BETD INSET programme in the Lower Primary specialisation in 1997 at the six BETD INSET centres are as follows: Windhoek INSET Unit (16), Ongwediva INSET Unit (100), Katima Teachers' Resource Centre (TRC) (7) Rundu TRC (45), Keetmanshoop TRC (3) Khorixas TRC (16).

The above-mentioned centres are situated in the following seven educational regions: Windhoek, Keetmashoop, Rundu, Katima , Khorixas, Ondangwa West and Ondangwa East. Ongwediva INSET Unit serves the BETD INSET teachers whose schools fall in the two Ondangwa regions.

The criteria for selection of the sample were as follows: (a) Centres with less than 10 teachers were not considered to be part of the sample; (b) teachers enrolled at the Rundu TRC were excluded from the sample, due to unrest during the time-frame of the study; (c) although Windhoek INSET Unit and Khorixas TRC have the same number of INSET teachers, the 1997 Lower Primary intake at the Windhoek INSET Unit were considered to be part of the sample because it was more efficient and

accurate in terms the distance; (d) because of limited resources and time constraints, only teachers in schools within a radius of 30 km from Windhoek, Oshakati and Ondangwa (Ondangwa and Oshakati are two of the main towns in the northern part of the country) were considered to be part of the sample. In others words, 30 sample teachers were drawn from the 1997 Lower Primary intake of the Windhoek INSET Unit and the Ongwediva INSET Unit, whose schools fall within a radius of 30 km of Windhoek , Ondangwa and Oshakati respectively.

Teachers selected for the sample are based in a total of 23 schools. Six schools are urban and 17 are rural schools. The tables below provide the details of the teachers in the sample:

Table 1: Sample Teachers: Existing Qualifications

No professional qualification	Less than Grade 10 + two years of Teacher Certificate	Grade 12 + one year of Teacher Certificate	Grade 12 + 2 years of Teacher Certificate
6	20	2	2

Table 2: Sample Teachers: Number of Years of Teaching Experiences

Years of Teaching experience	0 - 9	10 - 15	16 - 20	21 - 30
Number of teachers	9	12	7	2

The majority of teachers in the sample were therefore experienced, but under-qualified.

3. DATA COLLECTION AND ANALYSIS PROCEDURES

Access to schools and classrooms of BETD INSET teachers was negotiated with the regional offices. Each observation was conducted by myself and a co-observer. To ensure consistency in the data collection, a debriefing session was arranged with the co-observer who has substantial experience in social science research.

A pilot study with three teachers, testing the *classroom observation schedule*, the *teacher reflective assessment schedule* and *teachers' understanding assessment schedule* (used with the vignettes in the interview), was conducted prior to the

research study. The three instruments were administered to all three teachers. The observation and teachers' understanding assessment schedules were modified slightly, while major changes were made on the reflective assessment schedule.

Prior to the research study, teachers who could be reached telephonically were apprised of the purpose of the study. Unfortunately it was not possible to reach all the teachers in this way.

3. 1 Data collection

Collection of data on the impact of the model on teachers' understanding, reflection and teaching practice took place from the end of January up to the middle of February 2000. *Five* schools in the Windhoek region were visited in January, while 18 schools in Ondangwa West and East regions were visited in February. Between two and three schools were visited per day. Appointments for visits to schools in the Windhoek region were made by the researcher, while appointments for visits to the schools in Ondangwa West and East were made by regional offices via school inspectors.

3. 1. 1 Classroom observation

Initially, teachers were supposed to be observed teaching a lesson in one of the following subjects: Mathematics, Environmental Studies and Science. Due to communication problems, especially with teachers in remote areas, some teachers were observed teaching other lower primary subjects.

The initial idea was that teachers would be interviewed, before their lessons were observed so that the teachers could prepare their lessons based on the discussions about the vignettes. This idea was tried out during the piloting of the instruments where we saw that it took us two days to collect data on each teacher. Because of time and resource constraints, this was discontinued. In most cases, teachers were observed before being interviewed. Only three lessons of three grade one teachers ("T2", "T16", and "T10") could not be observed, before being interviewed, because these teachers are in isolated schools and by the time the researchers arrived at the schools, the classes were already over; grade one classes in most schools in

Namibia finish at 12h00 midday. Due to time constraints they were interviewed a day before the researchers observed their lessons.

During lesson observations, each observer had a copy of the observation schedule, in order to record each teacher's classroom behaviour against a particular criterion and indicator by making a cross (×) on the space provided as well as to make notes on the 'comments section'. The duration of lesson observation ranged between 20 to 30 minutes per lesson.

The language of instruction used in lessons in the two rural schools in the Windhoek region were local languages: Koekoegowab and Otjiherero, while in three urban schools, lessons were taught in English. This did not cause any communication difficulties, because the co-observer is fluent in both Khoekhoegowab and Otjiherero.

The language of instruction used in most of the lessons in lower grades in three urban and 15 rural schools (grade one to three) was Oshiwambo. Some teachers in grade four used English and Oshiwambo. Both the researcher and the co-researcher are Oshiwambo speaking.

3. 1. 2 Interviews

Face-to-face interviews using the vignettes and the teachers' understanding assessment schedules were conducted with each teacher. Interviews were conducted under the trees in school yards, in classrooms, and in staffrooms during the school day or during break. Generally, there were few interruptions, because in most cases learners were sent out into the playgrounds during breaks, though occasionally some learners entered the classrooms to pick up things. In a few cases teachers entered the staffrooms in the middle of the interviews.

Interviews took approximately 30 -40 minutes. At the beginning of each interview session, the researcher spent a few minutes establishing rapport to reduce tension and anxiety during the interview. At the beginning of each interview, the interview respondent was given a sheet of the vignettes. The researcher gave each teacher the same information on the procedure in which the interview would follow.

Each vignette was read twice to the respondent by the researcher. Teachers were asked the same questions, in the same order, after each vignette had been read. Responses were probed and followed up until clarity was reached. Descriptions were in English and teachers responded in English. Since English is not their mother tongue, some teachers had difficulties in understanding the vignettes. Some teachers reread some of the vignettes for a third time and some teachers asked the researcher to explain some of the descriptions. The researcher responded in such a way that the descriptions were not rephrased.

Even though the researcher tried to establish rapport at the beginning of each interview session, most of the teachers were nervous during the discussions of the first two or three vignettes and then usually grew more confident as they became more familiar with the procedure.

Some teachers were not consistent in answering the questions, making it difficult to take the opinions given about the practice as a true indicator of the teacher's understanding.

In order to collect information as completely and objectively as possible, all interviews were tape-recorded and detailed notes were taken by the co-researcher.

3. 1. 3 Collection of data on teachers' reflections

In order to collect data on the impact of the ETP and LPE courses on the practice of the model in terms of reflective skills, a sample of teacher reflections from each teacher's ETP and LPE portfolios was collected. Due to time constraints, a sample of teachers' reflections from module: four, five and six was collected from each teacher's ETP and LPE portfolios. These modules were selected, because it was assumed that the teachers had by then gained some experience in reflective writing, since these are second year modules. Although the teachers in the sample are in their third academic year, third year modules were not selected, because teachers were still busy with inquiry activities of these modules.

The pilot study revealed that all three teachers completed the writing up of the reflections for the second year modules and were still busy with the writing up of the reflections for the third year modules.

In order to collect complete and objective information from teachers' reflections, the researcher studied the modules selected prior to the reading of the reflections in order to become familiar with the purposes and possible outcomes of inquiry activities and wrote down key ideas from each inquiry activity.

3. 2 Data analysis

Data analysis for this study involves assessing the impact of ETP and LPE courses on *teachers' understanding, teaching practice* and *teachers' reflective skills* in terms of the PBI model.

3. 2. 1 Analysis of the impact of ETP and LPE courses on teachers' understanding, classroom practice and reflection

Data analysis for the impact of the ETP and LPE courses on teachers' competence according to criteria designed for this study, focused on quantitative and qualitative data obtained through the use of the three research instruments for measuring the impact on teachers' understanding, teaching practice and teachers' reflective skills in terms of the model.

Data analysis was based on lesson observations, transcripts of the audio recordings and field notes of teachers' responses to the questions from the teacher understanding assessment schedule about the vignettes, and from teachers' reflections in their portfolios.

Analysis of the impact on teacher understanding, teaching practice and teachers' reflection in terms of the model involved awarding each teacher a rating or score based on the continuum of indicators for each criterion on the research instruments.

In order to analyse the impact on teachers' *classroom practice* of the model, the researcher and the co-researcher analysed and compared the coding and notes on the lesson observations for each of the sample teachers against each criterion on the observation schedules, and awarded one of a possible six ratings (scores) for a particular criterion on the instruments.

In analysing the data on the impact on teachers' *understanding* of the model, the researcher and co-researcher analysed each of the sample teachers' responses from the interview transcripts and field notes against each criterion on the teacher understanding assessment schedules and awarded one of a possible six ratings for a particular criterion on the instruments.

In analysing the data on the impact on teachers' *reflective skills* involved the researchers studying the teachers' reflections and the notes on key ideas of each activity in the portfolios from the selected three modules. The researchers analysed the reflections of each of the sample teachers several times considering the purposes and possible outcomes of each activity against each criterion on the measuring instruments and awarded one of a possible six ratings for a particular criterion on the instruments.

For the purpose of further data analysis as well as for inferring the impact on teachers' understanding, teaching practice and teachers' reflective skills in terms of the model, the ratings or scores from lesson observations, teachers' responses to the questions from assessment schedules about the vignettes, and from teachers' reflections were grouped and entered on three separate summary sheets (see Appendixes E, F & G).

The ratings (from lesson observations, teachers' responses to the questions from assessment schedules about the vignettes) have been used to explore the relationship between the impact on teachers' understanding and teaching practice and to identify which teachers have adequately demonstrated equivalent understanding and teaching skills in terms of the model.

In order to assess the assumptions of the PBI INSET model, the results of the analysis have been fed into 3 x 3 matrixes which correlate the impact on teachers' understanding with the impact on teachers' teaching practice.

The ratings from teachers' reflections have been used to examine the extent to which teachers reflect critically on their educational theory and practice. The model claims that teachers who critically reflect on their educational practice improve their pedagogical understanding and classroom practice. If the claims of the model are correct, it is likely that the results of the analysis of teachers' reflective skills will correlate with the assessment of the inadequacy/adequacy of teachers' understanding and teaching skills.

4. SUMMARY

This chapter discusses the research methodology, which includes the sample of participants in the study, the research instruments and the data collection and analysis procedures.

CHAPTER FOUR:
THE IMPACT OF THE ETP AND LPE INSET COURSES ON TEACHERS' UNDERSTANDING, CLASSROOM PRACTICE AND REFLECTION

Introduction

This chapter focuses on the analysis of the impact of the two INSET courses on teachers' competence in terms of pedagogical understanding, teaching and reflective skills informed by the PBI model.

The impact of ETP and LPE INSET courses on teachers' understanding and practice (classroom practice and reflection) of the model is analysed using the summary of ratings on the three summary sheets (see Appendixes E, F & G) drawn from the ratings of each of the sample teachers according to the criteria and indicators in the measuring instruments. Each teacher has been given a score (ranging from "6" the highest and "1" the lowest score).

The results of the analysis are presented in tables. Each table has a title representing each of the measuring criteria, three indicators for each measuring criterion, teachers' scores (from the three summary sheets: Appendixes E, F & G) and the 'interpretation' section for highlighting the findings. In other words, each table was constructed to show the teaching practice, pedagogical understanding and reflective competencies of each of the sample teachers (in terms of the model) in relation to each of the measuring criteria and indicators. The scores awarded to each sample teacher indicates the extent of the impact of ETP and LPE courses on teachers' classroom practice, pedagogical understanding and reflection in relation to each of the measuring criteria and indicators.

The impact analysis of teachers' understanding and teacher reflective skills in terms of the PBI model which follows, includes some examples (drawn from audio recordings and the interviews and teachers' reflections from portfolios) of evidence of

'inadequate', 'barely adequate' and 'adequate' understanding/reflection in terms of the model.

However, not all analyses include examples of evidence of all levels of teachers competencies in terms of understanding/ reflective skills of the model as these were completely absent or totally inappropriate.

The impact analysis of the teachers' classroom practice in terms of the model does not include examples of observed lessons, but some references to teachers' teaching practices are included in the 'conclusion' section for each criterion.

1. THE IMPACT OF THE LPE AND ETP COURSES ON TEACHERS' CLASSROOM PRACTICE OF THE PBI MODEL

According to the pedagogical principles of the LPE and ETP courses, good teaching practices are underpinned by the following teaching approaches: (a) acknowledging learners' prior knowledge by linking learners' previous learning to new learning; (b) promoting collaborative learning among learners; (c) assisting learners to develop competencies/ skills for active learning; (d) adopting integrated approach to teaching and learning; (e) accommodating individual differences.

These approaches form the criteria on the instruments to measure the impact of both LPE and ETP on teachers' classroom practice in teachers' teaching of lower primary subjects.

In order to assess teachers' teaching competence in terms of the PBI model, criteria measure whether teachers' classroom practices incorporates each of the approaches listed above.

1. 1 Acknowledging learners' prior knowledge by linking learners' previous learning to new learning

Unit Four, Activity Nine of ETP Module Two (Activities Booklet) focuses on engaging teachers in a practice based inquiry activity to find out 'what learners already know,

can do, or are interested in'. The module provides teachers with guideline examples of how to find out and/or use the knowledge learners already have about a topic (Ebbutt, 1997: 35). Table 3 below illustrates the extent to which teachers are linking learners' prior learning to new learning.

Table 3: The extent to which teachers are acknowledging learners' previous knowledge by linking learners' prior learning to new learning

INDICATOR	TEACHERS' SCORE		INTERPRETATION
Teacher begins with what learners already know from home, community and school. Teacher assists learners to connect and apply their learning to what they already know.	Teacher 02 Teacher 05 Teacher 08 Teacher 021 Teacher 030 5 teachers scored None of the teachers scored the maximum of	5 5 5 5 5 5 6	5 lessons show evidence of teachers trying to link learners' previous learning to new learning.
Teacher invites ideas from learners- but does not link these ideas to new learning.	Teacher 04 Teacher 06 Teacher 09 Teacher 013 Teacher 014 Teacher 016 Teacher 01 Teacher 03 Teacher 07 Teacher 010 Teacher 011 Teacher 012 Teacher 015 Teacher 017 Teacher 018 Teacher 019 Teacher 020 Teacher 022 Teacher 024 Teacher 026 Teacher 027 Teacher 029 6 teachers scored 16 teachers scored	4 4 4 4 4 4 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 4 3	22 lessons show some evidence of teachers trying to link learners' previous learning to new learning.
Teaching is not linked to learners' prior learning	Teacher 023 Teacher 025 Teacher 028 3 teachers scored	1 1 1 1	3 lessons show no evidence of teachers trying to link learners' previous learning to new learning.

Conclusion:

Only five lessons show evidence of teachers acknowledging learners' previous knowledge by asking them what they already know and building on learners' existing knowledge and understanding. The majority of the lessons show evidence of teachers being aware of the need for appreciating learners' existing knowledge and understanding, but there is little evidence of teachers trying to build on learners' previous learning or of encouraging learners to apply their learning to what they already know. For example, teachers invite ideas from the learners, but do not connect them to new lessons or when presenting lessons, they do not refer back to what learners have mentioned at the beginning of the lesson. In most cases, teachers' teaching practices relative to linking learners' prior learning to new learning are barely adequate in terms of the model.

1. 2 Promoting collaborative learning among learners

Unit Three, Activity Six of LPE Module Six, (Activities Booklet) focuses on engaging INSET teachers in a practice-based inquiry activity in which they plan learning environments to engage learners in co-operative group activities (Howard, 1998: 50). The activity requires teachers to provide opportunities for learners to assess co-operative group work and for teachers to 'list factors which contribute to effective co-operative group work.' (ibid). Table 4 below illustrates the extent to which teachers are promoting collaborative learning among learners.

Table 4: The extent to which teachers are promoting collaborative learning among learners

INDICATOR	TEACHERS' SCORE		INTERPRETATION
Classroom arrangement/ learning task suitable for collaborative learning. Teacher provides opportunities for learners to work in small groups and /or in large groups. Learners interact with one another. Teacher monitors and supports learning	Teacher 08 1 teacher scored None of the teachers scored the maximum of	5 5 6	1 lesson shows evidence of promoting collaborative learning among learners.
Classroom arrangement suitable for collaborative learning. Less learner interaction. Poor monitoring of learner interaction.	Teacher 03 Teacher 021 Teacher 025 Teacher 04 Teacher 05 Teacher 07 Teacher 09 Teacher 010 Teacher 011 Teacher 012 Teacher 013 Teacher 014 Teacher 015 Teacher 016 Teacher 019 Teacher 022 Teacher 023 Teacher 027 Teacher 029 Teacher 028 3 teachers scored 17 teachers scored	4 4 4 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 4 3	20 lessons show some evidence of promoting collaborative learning among learners
Whole class teaching all the time- No learner interaction.	Teacher 01 Teacher 020 Teacher 030 Teacher 02 Teacher 06 Teacher 017 Teacher 018 Teacher 024 Teacher 029 3 teachers scored 6 teachers scored	2 2 2 1 1 1 1 1 1 2 1	9 lessons show no/very little evidence of promoting collaborative learning among learners.

Conclusion:

Only one lesson shows evidence of a teacher promoting collaborative learning among learners by assisting learners to work together to accomplish joint activities. In this lesson the teacher asked learners to work in groups to classify books. Learners took in classifying books and gave ideas to one another on how to classify.

The majority of lessons show evidence of teachers being aware of the need for collaborative learning, but there is little/ no evidence of teachers trying to assist learners to work collaboratively rather than just sitting in groups. For example, one teacher asked learners to sit in groups to fill in words in blank spaces and said: 'Please discuss in your groups'. Learners looked at another, because they were not provided with guidelines on how to begin or work out the activity.

In all but one case, teachers' teaching practices relative to promoting collaborative learning among learners are barely adequate in terms of the model.

1. 3 Assisting learners to develop competencies/skills for active learning

Unit Four, LPE Module Three, (Activities Booklet) engages teachers in practice-based inquiry activities to plan for learning activities to help learners develop competencies to interpret, investigate, communicate, participate and apply knowledge. The module provides an example of a lesson plan which gives guidelines on how to plan and organise learning activities which provide opportunities for learners to engage in problem-solving activities (Aitken, 1997: 33 - 37).

Table 5 below illustrates the extent to which teachers are assisting learners to develop competencies/ skills for active learning.

Table 5: The extent to which teachers are assisting learners to develop skills/competencies for active learning

INDICATOR	TEACHERS' SCORE		INTERPRETATION
Teacher involves learners in learning activities such as observing, classifying, communicating. Teacher assists learners through eliciting, probing, clarifying	Teacher 08 1 teacher scored None of the teachers scored the maximum of	5 5 6	1 lesson shows evidence of teachers trying to assist learners to develop skills/ competencies for active learning.
Teacher involves learners in problem-solving activities, but s/he directs the learning process most of the time.	Teacher 01 Teacher 03 Teacher 04 Teacher 05 Teacher 06 Teacher 09 Teacher 013 Teacher 020 Teacher 030 Teacher 02 Teacher 010 Teacher 011 Teacher 012 Teacher 014 Teacher 015 Teacher 017 Teacher 018 Teacher 021 Teacher 029 9 teachers scored 10 teachers scored	4 4 4 4 4 4 4 4 4 3 3 3 3 3 3 3 3 3 4 3	19 lessons show evidence of teachers trying to assist learners to develop skills/ competencies for active learning.
Teacher directs the learning process all the time - No attempt is made to encourage learners to work independently.	Teacher 07 Teacher 023 Teacher 026 Teacher 016 Teacher 017 Teacher 020 Teacher 023 Teacher 024 Teacher 027 Teacher 028 3 teachers scored 7 teachers scored	2 2 2 1 1 1 1 1 1 1 2 1	10 lessons show very little/ no evidence of teachers trying to assist learners develop skills/ competencies for active learning.

Conclusion:

Only one lesson shows evidence of a teacher trying to assist learners to develop competencies/ skills for active learning by engaging learners in activities which encourage thinking and analysis. The majority of lessons show evidence of teachers being aware of the need for engaging learners in active learning, but there is little/ no

evidence of teachers trying to assist learners to apply or interpret information, and/or provide instructions in critical thinking or problem-solving strategies. Most teachers did not engage learners in challenging activities. Some teachers who tried to engage learners in problem-solving activities, directed learners most of the time.

In all but one case, teachers' practices relative to assisting learners to develop competencies/skills for active learning are barely adequate in terms of the model.

1. 4 Adopting an integrated approach to teaching and learning

LPE Module Three, (Activities Booklet) focuses on engaging teachers in practice-based inquiry activities to plan for a project which integrates various curriculum areas. The module provides examples of how teachers can plan a variety of activities/ tasks from different learning areas in one project.

Table 6 below illustrates the extent to which teachers adopt an integrated approach to teaching and learning.

Table 6: The extent to which teachers are adopting an integrated approach to teaching and learning

INDICATOR	TEACHERS' SCORE		INTERPRETATION
Teacher uses cross-curricular themes/topics to draw several curricular ideas into common focus.	None of the teachers scored 5 or 6		
Teacher involves learners in activities across learning areas- No explanation is given for learners to understand the interrelatedness of one content area to another.	Teacher 04 Teacher 014 Teacher 01 Teacher 03 Teacher 05 Teacher 06 Teacher 09 Teacher 020 Teacher 021 Teacher 027 Teacher 030 2 teachers scored 9 teachers scored	4 4 3 3 3 3 3 3 3 3 3 4 3	11 lessons show some evidence of teachers trying to adopt the integrated approach to teaching and learning.
Teacher presents information or knowledge as fragmented facts.	Teacher 023 Teacher 024 Teacher 02 Teacher 07 Teacher 06 Teacher 08 Teacher 010 Teacher 011 Teacher 012 Teacher 013 Teacher 015 Teacher 016 Teacher 017 Teacher 018 Teacher 019 Teacher 022 Teacher 025 Teacher 028 Teacher 029 2 teachers scored 17 teachers scored	2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1	19 lessons show very little/ no evidence of teachers trying to adopt the integrated approach to teaching and learning.

Conclusion:

None of the lessons show evidence of teachers trying to adopt an integrated approach to teaching and learning. Most of the lessons show very little/no evidence of teachers trying to adopt an integrated approach to teaching and learning. In most cases, teachers present information in isolation without making any cross-curricular links with other subject areas. Those who involved learners in some cross-curricular

activities, could not assist learners to understand why such activities are carried out. For example, in some classes learners sang with vowels or numbers before and after literacy or mathematics lessons. In most cases, teachers' teaching practices relative to adopting an integrated approach to teaching and learning are inadequate in terms of the model.

1. 5 Accommodating individual differences

Unit Three, Activity Six of ETP Module Two (Activities Booklet) provides teachers with opportunities to engage in a practice-based inquiry activity to reflect on their personal experiences of teaching strategies that can be used to meet the needs of different learners. The module provides examples of teaching strategies on how to meet the needs of different learners (Ebbutt, 1997: 23).

Table 7 below illustrates the extent to which teachers are accommodating learners with individual differences.

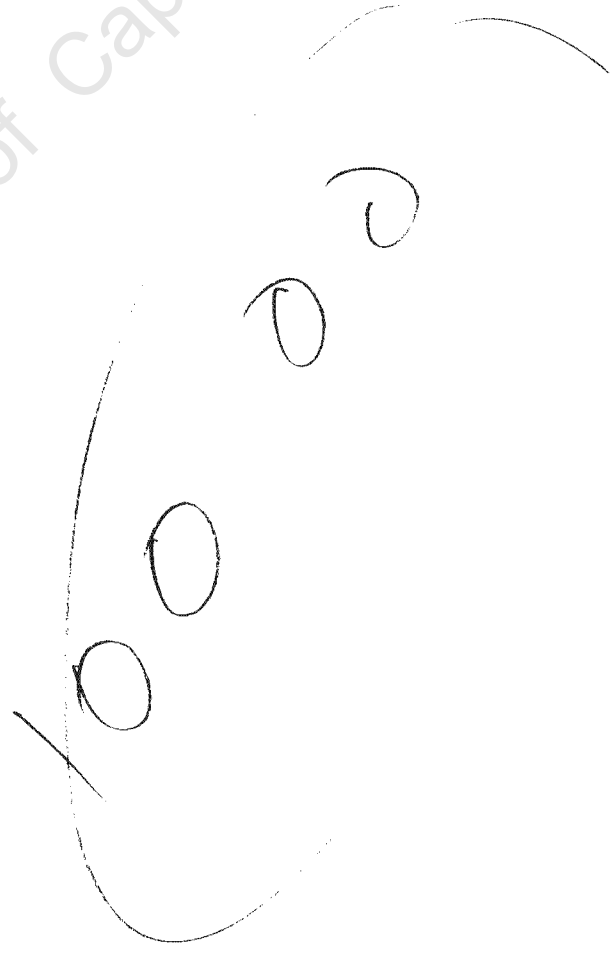

Table 7: The extent to which teachers are accommodating learners with individual differences

INDICATOR	TEACHERS' SCORE		INTERPRETATION
Teacher adopts learning content to different individuals. Teacher assists those with learning difficulties. Teacher assists high achievers.	None of the teachers scored 5 or 6		
Teacher responds to learners who need additional assistance.	Teacher 01 Teacher 03 Teacher 05 Teacher 06 Teacher 08 Teacher 09 Teacher 019 Teacher 012 Teacher 014 Teacher 015 Teacher 021 Teacher 022 None of the teachers scored 4 12 teachers scored	3 3 3 3 3 3 3 3 3 3 3 3 3	12 lessons show some evidence of teachers trying to accommodate individual differences.
Teacher does not pay attention to individual differences	Teacher 011 Teacher 016 Teacher 024 Teacher 028 Teacher 02 Teacher 04 Teacher 07 Teacher 013 Teacher 017 Teacher 018 Teacher 019 Teacher 022 Teacher 023 Teacher 025 Teacher 026 Teacher 027 Teacher 029 Teacher 030 4 teachers scored 14 teachers scored	2 2 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1	18 lessons show very little/ no evidence of teachers trying to accommodate learner individual differences.

Conclusion:

None of the lessons show adequate evidence of teachers trying to accommodate individual differences. Most of the lessons show very little/ no evidence of teachers trying to accommodate individual differences. In most cases, teachers concentrate only on high achievers or on the whole group, leaving out low achievers, rather than

employing teaching strategies which meet the needs of different learners. For example, five learners were left out in both English and Mathematics lessons, because they could not finish drawing on time and the teacher just went on with the following lesson.

In most cases, teachers' teaching practices relative to accommodating individual differences are inadequate in terms of the model.

1. 6 Concluding comments

Generally, teachers were aware of the need to incorporate the LPE and ETP approaches in their teaching, but it seems that they did not have the skills or will to do so. Most teachers observed, tried to invite ideas from learners, but did not build on what the learners had suggested. In most of the lessons observed, teachers did not seem to have skills to assist learners apply or interpret information or help learners accomplish tasks collaboratively. Most of the teachers did not engage learners in challenging activities or provided instructions in critical thinking. Where they tried to engage learners in problem-solving activities, teachers directed learning most of the time.

In most of the lessons observed, teachers tended to concentrate only on high achievers or on the whole group, while leaving out individual low achievers.

In most cases teachers observed presented information in isolation without making any cross-curricular links with other subjects. Those that did involve learners in some cross-curricular activities, did not assist learners in understanding why such activities were carried out.

It is fair to conclude that, at this stage of the course, the PBI model underlying the courses has so far had a negligible impact on the teaching practices of these teachers.

2. THE IMPACT OF THE LPE AND ETP COURSES ON TEACHERS' UNDERSTANDING OF THE PBI MODEL

Teachers' responses on questions about the vignettes (based on categories derived from the joint objectives of ETP and LPE) in the interviews were used to display the impact of the two courses on teachers' theoretical and practical understanding of teaching approaches informed by the PBI model.

In order to infer the degree of impact of the model, criteria and their indicators on the instruments were used to assess teachers' understanding of what is meant by: (a) acknowledging learners' prior knowledge by linking learners' previous learning to new learning; (b) promoting collaborative learning among learners; (c) assisting learners to develop competencies/ skills for active learning; (d) adopting an integrated approach to teaching and learning; (e) accommodating individual differences.

2. 1 Acknowledging learners' previous knowledge by linking learners' prior learning to new learning

Support Sheet Nine of ETP Module Two, (Support Materials Booklet) provides teachers with theoretical ideas about different perspectives which put emphasis on acknowledging learners' prior learning (Ebbutt, 1997: 9).

Teachers' responses to vignettes B & D from the assessment schedule (see Appendix D) were used to infer the extent to which teachers understand what is meant by acknowledging learners' previous knowledge by linking their previous learning to new learning:

Table 8 below illustrates the extent to which teachers understand what is meant by linking learners' previous learning to new learning.

Table 8: The extent to which teachers understand what is meant by acknowledging learners' previous knowledge by linking learners' prior learning to new learning

INDICATOR	TEACHERS' SCORE		INTERPRETATION
Teacher shows understanding of the need to appreciate learners' prior knowledge and recognises the need to link learners' prior learning to new learning.	Teacher 02 Teacher 05 Teacher 06 Teacher 07 Teacher 08 Teacher 09 Teacher 010 Teacher 011 Teacher 015 Teacher 016 Teacher 017 Teacher 021 12 teachers scored None of them scored the maximum of	5 5 5 5 5 5 5 5 5 5 5 5 5 6	12 teachers demonstrated adequate understanding of what is meant by acknowledging learners' prior learning by linking it to new learning.
Teacher shows some understanding of appreciating knowledge and experience that learners bring to the learning situation, but shows little/ no recognition of the need to connect the learners' prior knowledge to new learning.	Teacher 01 Teacher 03 Teacher 04 Teacher 013 Teacher 023 Teacher 025 Teacher 018 Teacher 019 Teacher 022 Teacher 026 Teacher 029 Teacher 030 6 teachers scored 6 teachers scored	4 4 4 4 4 4 3 3 3 3 3 3 4 3	12 teachers demonstrated barely adequate understanding by recognising the need to acknowledge learners' prior learning, but show little recognition of the need to connect the learners' prior knowledge to new learning.
Teacher shows no/ very little understanding of what is meant by acknowledging learners' prior knowledge or the need to connect learners previous knowledge, experience and understanding to new learning	Teacher 024 Teacher 012 Teacher 014 Teacher 020 Teacher 027 Teacher 028 1 teacher scored 5 teachers scored	2 1 1 1 1 1 2 1	6 teachers demonstrated inadequate understanding by showing very little/ no recognition of the need to connect the learners' prior knowledge to new learning

The following are examples of extracts from teachers' responses which show teachers' understanding of the need to acknowledge learners' previous knowledge by linking learners' prior learning to new learning.

Examples drawn from transcripts of the audio recordings of the interviews:

Examples of responses which show adequate understanding

'Teacher find out learners' previous knowledge. Moving from what the learners know to unknown'.

'The teacher bring the real objects so that learner can see the connection between what they already know'.

'Teacher uses learners' previous knowledge and building on what already know'.

Examples which show barely adequate understanding

'He applies the learners' understanding'.

'The teacher asks the learners about what they know about their own community'.

Examples which show inadequate understanding

'It is good to ask learners what they do in their community, then you know what they know'.

'When the teacher ask learners about villages... because learners learn first from home'.

Conclusion:

Twelve teachers in the sample demonstrated adequate understanding of the model by recognising the need to acknowledge learners' previous knowledge by linking it to new learning.

The same number of teachers in the sample demonstrated some understanding of the model by showing some recognition of the need to acknowledge learners' prior learning. The remaining 6 teachers demonstrated inadequate understanding of the model. In terms of the model, the majority of cases, teachers' understanding of acknowledging learners' previous learning is barely adequate or inadequate and teachers show little recognition of the need to connect learners' prior knowledge to new learning.

2. 2 Promoting collaborative learning among learners

Support Sheet Four, of LPE Module Six (Support Materials Booklet) engages theoretical ideas about co-operative learning strategies. The module provides guideline examples of co-operative group activities (Howard, 1998: 11).

Teachers' responses to vignettes E & A (see Appendix D) from the assessment schedule were used to infer the extent to which teachers understand what is meant by promoting collaborative learning among learners. Table 9 below illustrates the extent to which teachers understand what is meant by promoting collaborative learning among learners.

Table 9: The extent to which teachers understand what is meant by promoting collaborative learning among learners.

INDICATOR	TEACHERS' SCORE		INTERPRETATION
Teacher shows understanding of the need to promote collaborative learning among learners by recognising the need to encourage learners to communicate and assist one another.	Teacher 06 Teacher 07 Teacher 08 Teacher 09 Teacher 016 5 teachers scored None of the teachers scored the maximum of	5 5 5 5 5 5 6	5 teachers demonstrated adequate understanding by recognising the need to encourage learners to communicate and assist one another.
Teacher shows understanding of the need to promote collaborative learning among learners, but show little recognition the need to encourage learners to communicate and assist one another.	Teacher 03 Teacher 010 Teacher 011 Teacher 012 Teacher 021 Teacher 04 Teacher 013 Teacher 014 Teacher 023 Teacher 029 5 teachers scored 5 teachers scored	4 4 4 4 4 3 3 3 3 3 4 3	10 teachers demonstrated barely adequate understanding by showing little recognition of the need to encourage learners to communicate and assist one another.
Teacher shows very little/ no understanding of what is meant by collaborative learning. Teacher shows no/very little recognition of the need to encourage joint activities and interaction among learners.	Teacher 014 Teacher 017 Teacher 018 Teacher 019 Teacher 025 Teacher 026 Teacher 027 Teacher 028 Teacher 01 Teacher 02 Teacher 05 Teacher 015 Teacher 020 Teacher 022 Teacher 030 8 teachers scored 6 teachers scored	2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 2 1	15 teachers demonstrated inadequate understanding by showing no/very little recognition of the need to encourage joint activities and interaction among learners.

Table 10: The extent to which teachers understand what is meant by adopting an integrated approach to teaching and learning.

INDICATOR	TEACHERS' SCORE		INTERPRETATION
Teacher shows understanding of what is meant by using integrated approach by recognising the need of using cross-curricular activities to develop learners' understanding of the relationship between things.	Teacher 01 1 teacher scored	5 5	1 teacher demonstrated adequate understanding of what is meant by using an integrated approach by recognising the need of using cross-curricular activities to develop learners' understanding of the relationship between things
Teacher shows some understanding of what is meant by using an integrated approach by recognising the need to encourage learners to engage in cross-curricular activities, but shows little recognition of the need to develop learners' understanding of the relationship between things.	Teacher 02 Teacher 03 Teacher 05 Teacher 06 Teacher 09 Teacher 08 Teacher 012 5 teachers scored 2 teachers scored	4 4 4 4 4 3 3 4 3	7 teachers show barely understanding of what is meant by using an integrated approach by recognising the need to encourage learners to engage in cross-curricular activities, but show little recognition of the need to develop learners' understanding of the relationship between things
Teacher shows very little /no understanding of what is meant by using an integrated approach by showing no recognition of relationship of concepts/ ideas in different learning areas.	Teacher 014 Teacher 016 Teacher 020 Teacher 024 Teacher 04 Teacher 07 Teacher 010 Teacher 011 Teacher 013 Teacher 014 Teacher 016 Teacher 017 Teacher 018 Teacher 020 Teacher 021 Teacher 024 Teacher 025 Teacher 026 Teacher 027 Teacher 028 Teacher 029 Teacher 030 4 teachers scored 18 teachers scored	2 2 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1	22 teachers demonstrated inadequate understanding of what is meant by using an integrated approach by showing very little /no understanding of what is meant by using an integrated approach by showing no recognition of relationship of concepts/ ideas in different learning areas.

The following are some examples of extracts from teachers' responses which show their understanding of what is meant by adopting an integrated approach to teaching and learning.

Examples drawn from transcripts of the audio recordings of the interviews:

Example of responses which show adequate understanding

'Teacher integrates the skills of speaking, writing and counting. In one lesson you can develop different skills. In every subject you develop learners' skills and integrate the curriculum. You integrate the curriculum, you develop learners' knowledge'.

Examples of responses which show barely adequate understanding

'He was teaching Maths and also teaching how to write sentences. The learner know the number and know the words and can read the sentence'.

'Teacher teaches drawing and counting at the same time. In the new approach the subjects have to be integrated'.

Example of responses which show inadequate understanding

'Teacher teaches drawing and counting at the same time. It is good to do so'.

'Teacher sings a song, it makes the learners to remember the numbers easier'.

Conclusion:

Only one teacher demonstrated an adequate understanding of what is meant by using an integrated approach by recognising the need for using cross-curricular activities to develop learners' understanding of the relationship between things.

Most teachers in the sample demonstrated very little/ no understanding of what is meant by using an integrated approach to teaching and learning and show very little/ no recognition of relationship of concepts/ ideas in different learning areas.

2. 4 Assisting learners to develop competencies/skills for active learning

Support Sheet 'POG' of LPE Module Three (Support Materials Booklet) as well as Support Sheet Eight of ETP Module Three (Support Materials Booklet) provides teachers with theoretical ideas about active learning. The Support Sheet Eight of ETP Support Materials Booklet introduces teachers to types of learning. Active learning is explained as an approach to learning which 'does not only involve memorisation, but learning with understanding, whereby learners actively think for themselves' (Ebbutt, 1997: 8).

Support Sheet 'POG' of LPE Support Materials Booklet provides theoretical ideas about learning through inquiry and the role of the teacher in guiding and assisting learners to inquire and experiment (Aitken, 1997: 4). Teachers' responses on vignettes E & B (see Appendix D) from the assessment schedule were used to infer the extent to which teachers understand what is meant by assisting learners to develop competencies/skills for active learning. Table 11 on the following page illustrates the extent to which teachers understand what is meant by assisting learners to develop competencies/ skills for active learning.

Table 11: The extent to which teachers understand what is meant by assisting learners to develop competencies/ skills for active learning

INDICATOR	TEACHERS' SCORE		INTERPRETATION
Teacher shows understanding of what is meant by teaching learners to develop thinking skills and processes for independent and active learning by recognising the need to develop learners' abilities to: observe, classify, communicate.	Teacher 04 Teacher 09 Teacher 010 3 teachers scored None of the teachers scored the maximum of	5 5 5 5 6	3 teachers demonstrated adequate understanding of what is meant by teaching learners to develop thinking skills and processes for independent and active learning by recognising the need to develop learners' abilities to: observe, classify, communicate.
Teacher shows some understanding of what is meant by motivating learners to learn with understanding, but shows little understanding of what is meant by actively involving learners in a lesson, and by assisting learners to learn processes/ skills for independent learning.	Teacher 03 Teacher 021 Teacher 026 Teacher 029 Teacher 01 Teacher 06 Teacher 07 Teacher 08 Teacher 011 Teacher 012 Teacher 013 Teacher 015 Teacher 023 Teacher 024 Teacher 030 4 teachers scored 11 teachers scored	4 4 4 4 3 3 3 3 3 3 3 3 3 3 3 4 3	15 teachers demonstrated barely adequate understanding of what is meant by motivating learners to learn with understanding, but show little understanding of what is meant by actively involving learners in a lesson, and by assisting learners to learn processes/ skills for independent learning.
Teacher shows very little/ no understanding of the need to teach learners to think or learn with understanding and or skills/ processes necessary for active learning.	Teacher 017 Teacher 020 Teacher 022 Teacher 02 Teacher 05 Teacher 014 Teacher 016 Teacher 018 Teacher 019 Teacher 025 Teacher 027 Teacher 028 3 teachers scored 9 teachers scored 1	2 2 2 1 1 1 1 1 1 1 1 1 2	12 teachers demonstrated inadequate understanding by showing very little/ no recognition of the need to teach learners to think or learn with understanding and or skills/ processes necessary for active learning.

The following are some examples of extracts from teachers' responses which show their understanding of what is meant by assisting learners to develop competencies/skills for active learning.

Examples drawn from transcripts of the audio recordings of the interviews:

Examples of responses which show adequate understanding

'Teacher tries to develop learners' thinking by asking them to do things on their own'.

'Teacher assists learners to give ideas through asking them questions'.

'Teacher assists learners to give ideas through asking question and complete their sentence and get go in details than the learners'.

Examples of responses which show barely adequate understanding

'The teacher needs to encourage learners to come up with ideas by asking other learners to help'.

'Teacher ask learners to do their work on their own'.

Examples of responses which show inadequate understanding

'Teacher give learner a task to do'.

'Teacher give exercise to the learners'.

Conclusion:

Three teachers demonstrated adequate understanding of what is meant by teaching learners to develop thinking skills and processes for independent and active learning by recognising the need to develop those skills in learners. Half of the remaining teachers in the sample have some understanding of what is meant by motivating learners to learn with understanding, half do not. In terms of the model, in most cases, teachers' understanding of active learning is barely adequate because teachers show no/ little recognition of the need to design learning tasks which encourage learners to think for themselves. Most teachers show no/little recognition of the role of a teacher in assisting learners to learn processes/ skills for independent learning.

2. 5 Accommodating individual differences

Support Sheet Six of ETP Module Two (Support Materials Booklet) provides teachers with theoretical ideas about teaching for differentiation. The module introduces teachers to theoretical ideas about learners with different learning needs (Ebbutt, 1997: 6).

Teachers' responses on the vignettes B & D (see Appendix D) from the assessment schedule were used to infer the extent to which teachers understand what is meant by accommodating individual differences. Table 12 below illustrates the extent to which teachers understand what is meant by accommodating learners with individual differences.

Table 12: The extent to which teachers understand what is meant by accommodating learners with individual differences.

INDICATOR	TEACHERS' SCORE		INTERPRETATION
Teacher shows understanding of what is meant by varying learning according to individual differences and shows recognition of the need to create learning activities that accommodate learners with varied learning.	Teacher 01 Teacher 03 Teacher 04 Teacher 06 Teacher 09 Teacher 016 6 teachers scored None of the teachers scored the maximum of	5 5 5 5 5 5 5 6	6 teachers demonstrated adequate understanding of what is meant by varying learning according to individual differences by showing recognition of the need to create learning activities that accommodate learners with varied learning.
Teacher shows some understanding of what is meant by encouraging assisting learners with special needs, but shows little recognition of what is meant by accommodating learners with varied learning abilities.	Teacher 02 Teacher 021 Teacher 027 Teacher 05 Teacher 07 Teacher 08 Teacher 010 Teacher 011 Teacher 012 Teacher 014 Teacher 017 Teacher 018 Teacher 020 Teacher 024 Teacher 030 3 teachers scored 12 teachers	4 4 4 3 3 3 3 3 3 3 3 3 3 3 3 4 3	15 teachers demonstrated barely adequate understanding of what is meant by encouraging assisting learners with special needs, but show little recognition of what is meant by accommodating learners with varied learning abilities.
Teacher shows very little/ no understanding of what is meant by accommodating learners with varied learning abilities.	Teacher 019 Teacher 023 Teacher 027 Teacher 028 Teacher 012 Teacher 015 Teacher 022 Teacher 025 Teacher 029 4 teachers scored 5 teachers scored	2 2 2 2 1 1 1 1 1 2 1	9 teachers demonstrated inadequate understanding by showing very little/ no understanding of what is meant by accommodating learners with varied learning abilities.

The following are some examples of extracts from teachers' responses that show their understanding of what is meant by accommodating individual differences.

Examples drawn from transcripts of the audio recordings of the interviews:

Examples of responses which show adequate understanding
'The teacher assists those with difficulty and gives additional tasks to the fast learners'.
'He also make remediation and enrichment'.
'This teacher helps those with learning problems and also extend the knowledge of those who are learning very fast'.
Examples of responses which show barely adequate understanding
'The teacher give remedial teaching to those who have difficulties'.
'The teacher help those with difficulties'.

Conclusion:

Six teachers demonstrated adequate understanding of what is meant by varying learning according to individual differences by showing recognition of the need to create learning activities that accommodate learners with varied learning. Most teachers in the sample have some understanding of what is meant by encouraging learners with different learning needs. However, in terms of the model, in most cases teachers' understanding of accommodating individual differences is barely adequate because teachers show no/little recognition of the need to employ teaching strategies to meet the different learning needs of learners.

2. 6 Concluding comments

Most teachers in the sample demonstrate barely adequate understanding of the model in relation to most of the criteria, except the criterion: 'adopting an integrated approach to teaching and learning,' in which most teachers in the sample demonstrated an inadequate understanding.

The analysis and interpretation of teachers' responses to the questions about the vignettes was constrained by the fact that teachers were interviewed and responded in English. Teachers had difficulty in understanding the descriptions and expressing themselves well in English. In most cases, teachers do not use their own words in responding to questions about vignettes, but just cite phrases as they occur in the vignettes.

3. THE IMPACT OF ETP AND LPE COURSES ON TEACHERS' REFLECTIVE SKILLS IN TERMS OF THE PBI MODEL

The principles and processes of LPE and ETP courses are based on a PBI methodology and seek to establish a critically reflective approach to learning. The modular material for ETP and LPE engage teachers in cycles of inquiries about their daily practice. In other words, the learning processes in both ETP and LPE follow a spiral of inquiry, based on a 'plan-act/observe - reflect -& evaluate' pattern:

> 'Teachers begin with activities that help them to explore their own context and understanding, they are asked to read about what others say about that issue. After reading they are asked to reflect on how the information from the reading fits with their own knowledge and understanding. Sometimes teachers are expected to try out certain activities aimed at helping them reflect on what the written received knowledge means in their own contexts' (Howard, et al, 1997: 6).

The learning processes which follow a spiral of inquiry, based on a 'plan-act/observe - reflect -& evaluate' pattern constitute criteria to measure the impact of the ETP and ETP courses on teachers' practice of the model in terms of reflective skills and to assess the extent to which teachers: (a) engaged in systematic observation of

inquiry activities; (b) critically analysed information from inquiry activities; (c) evaluated information gathered from inquiry activities; (d) constructed action strategies for incorporating into action plans.

The analysis of teachers' reflections in the portfolios, based on the criteria and their indicators on the measuring instrument was used to infer the impact of LPE and ETP on teachers' reflective skills.

3. 1 Engaged in a systematic observation of inquiry activities

The ETP and LPE modular material provides opportunities for teachers to engage in systematic inquiry activities. The modular material gives instructions that guide teachers to carry out activities in sequence. Table 13 below illustrates the extent to which teachers engaged in a systematic observation of the inquiry activities in their portfolios.

Table 13: The extent to which teachers engaged in a systematic observation of the inquiry activities

INDICATOR	TEACHERS' SCORE		INTERPRETATION
Teacher presents a holistic description of the inquiry activities. Teacher's description shows evidence of systematic inquiry. The description is based on the focus of the inquiry activities. Teacher shows clearly the findings and evidence of the inquiry activities.	None of the teachers scored 5 or 6		
Teacher presents a list of activities being carried out. The description has connection with the focus of the inquiry activities. Teacher does not make connection between activities. Teacher presents findings of the activities, but there is little/ no evidence of what has been found out.	Teacher 011 Teacher 016 Teacher 02 Teacher 03 Teacher 04 Teacher 07 Teacher 010 Teacher 012 Teacher 013 Teacher 021 Teacher 025 Teacher 028 Teacher 030 2 teachers scored 11 teachers scored	4 4 3 3 3 3 3 3 3 3 3 3 3 4 3	13 teachers' reflections show evidence of barely adequate reflection.
Teacher's description shows little/no connection with the focus of the inquiry activities.	Teacher 05 Teacher 01 Teacher 06 Teacher 08 Teacher 09 Teacher 013 Teacher 015 Teacher 017 Teacher 018 Teacher 019 Teacher 020 Teacher 022 Teacher 023 Teacher 024 Teacher 026 Teacher 027 Teacher 029 1 teacher scored 16 teachers scored	2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1	17 teachers' reflections show evidence of inadequate reflection.

The following are some examples of extracts that show their reflections on engaging in systematic observation of inquiry activities.

Examples drawn from teachers' reflections:

Examples of extracts which show barely adequate reflection

'I made a formative reading assessment in my classroom. I use the information to find out where my learners are now. I used the following information the background data about the learner. Name, grade, age, mother tongue and what the learners are reading e.g words and sentences.
I found that some learners read very well and some of them didn't know how to read it. The evidence of my finding are record the miscues, interpret record sheet and miscue analysis'.

'I did the method of sociometrie to gathering data to explore ways to make the learning environment in my classroom more learner-centred than previously. I decided each learner response sheet to choose which learner prefers to work with.
I used systematic timed observation and interview method for helping me to gather data. I found out that learners felt very happy about their new groups. They did their work with happy and discussed well while they are doing activities. They show their interesting in activities and gain more marks and knowledge than late'.

Examples of extracts which show inadequate reflection

'Recall on assessment, homework, I thought about different ways that I was reporting about my learners to parents. What I found out there was certain good method. Others method I would not use'.

Conclusion:

Most sample teachers' reflections show very little/ no evidence that teachers engaged in systematic observation of inquiry activities, by not presenting a holistic description of inquiry activities. Teachers usually presented a list of activities that did not show any connection between them. Descriptions that do not show any links between activities are inadequate in terms of the model.

3. 2 Analysing information from inquiry activities

The ETP and LPE modular material provides opportunities for teachers to engage in analysis of data they gather through carrying out inquiry activities. The modular material gives instructions that guide teachers on how to analyse data. Table 14 below illustrates the extent to which teachers critically analyses information from inquiry activities.

Table 14: The extent to which teachers critically analyse information from inquiry activities

INDICATOR	TEACHERS' SCORE		INTERPRETATION
Teacher presents a critical analysis of issues emerge from inquiry activities, and state new understandings and discoveries from the inquiry activities	None of the teachers scored 5 or 6		
Teacher presents a descriptive account of the inquiry process, but there is little/no discussion on new understandings and discoveries.	Teacher 04 Teacher 016 Teacher 030 Teacher 02 Teacher 03 Teacher 05 Teacher 09 3 teachers scored 4 teachers scored	4 4 4 3 3 3 3 4 3	7 teachers' reflections show evidence of barely adequate reflection
Teacher's description is a surface description of activities being carried out.	Teacher 07 Teacher 011 Teacher 013 Teacher 022 Teacher 025 Teacher 028 Teacher 01 Teacher 06 Teacher 08 Teacher 010 Teacher 012 Teacher 014 Teacher 015 Teacher 017 Teacher 018 Teacher 019 Teacher 020 Teacher 021 Teacher 023 Teacher 024 Teacher 026 Teacher 027 Teacher 029 6 teachers scored 17 teachers scored	2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1	23 teachers' reflections show evidence of inadequate reflection

The following are some examples of extracts that show how teachers analyse issues emerging from inquiry activities.

Examples drawn from teachers' reflections:

Examples of extracts which show barely adequate reflection

'I learned that I have improved my level of understanding and further in-depth my knowledge and experience. I gained the best ways to interact with learners with special needs. I strongly feel that learners learn best when they are given a chance to demonstrate and share idea freely. They also need to feel that they are part and parcel of the lesson and they not just there to hear what the teacher is talking or telling'.

'I have learned that before I start with reading explain to the learners about their reading and that they work together to make it even better. And as the learners reads systematically record of my observation of what and how they read. Its relate LCE very good. I can assess learners in pairs and groups.'

'I learned that if a learner use in pairs for peer assessment they check much less than me.
These things relate to the learners centred education and national goals because as a teacher we aim to work in partnership with parents to involve learners to assess in peer assessment'.

Conclusion:

Most sample teachers' reflections show very little/ no evidence of teachers engaging in critical analysis of issues emerging from inquiry activities by not discussing new understandings and discoveries from the inquiry activities. Most teachers present descriptive accounts of the inquiry processes with little/no discussion of new understandings and discoveries. Analyses that do not show understandings of issues and contexts are inadequate in terms of the model.

3. 3 Evaluating information from inquiry activities

The ETP and LPE modular material provides opportunities for teachers to evaluate information gathered from inquiry activities. The modular material gives instructions that guide teachers on how to evaluate information.

Table 15 below illustrates the extent to which teachers evaluate information from inquiry activities.

Table 15: The extent to which teachers evaluate information from inquiry activities

INDICATOR	TEACHERS' SCORE		INTERPRETATION
Teacher draws on theory and evidence from the inquiry activities to support his/her own reflections and use it to develop his or her own thinking.	None of the teachers scored 5 or 6		
Teacher draws on theory and inquiry activities , but does not develop his or her own thinking.	Teacher 04 Teacher 09 Teacher 12 Teacher 026 Teacher 028 Teacher 030 1 teacher scored 5 teachers scored	4 3 3 3 3 3 4 3	6 teachers' reflections show evidence of barely adequate reflection
There is little/no evidence of use being made of theory and inquiry activities or of critical reflection.	Teacher 016 Teacher 020 Teacher 022 Teacher 01 Teacher 02 Teacher 03 Teacher 05 Teacher 06 Teacher 07 Teacher 08 Teacher 010 Teacher 011 Teacher 013 Teacher 014 Teacher 015 Teacher 017 Teacher 018 Teacher 019 Teacher 021 Teacher 023 Teacher 024 Teacher 025 Teacher 027 Teacher 029 3 teachers scored 21 teachers scored	2 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1	24 teachers' reflections show evidence of inadequate reflection

The following are some examples of extracts that show teachers' reflections on how to evaluate information from inquiry activities.

Examples from teachers' reflections:

Examples of extracts which show barely adequate reflection

'I enjoyed units 1, 2, 3 and 4 because I learned how to assess learners based on what is reflected in the curriculum. Likewise, using the community experts in my classroom broadens our knowledge and enhances our communication that we all feel that this was an important an excellent idea as a result we agreed to maintain this relationship. It also helps a lot in self-evaluation that I have to contact at the end of every module that I have covered'.

'I learned that learners had opportunity to participate in activities. When I read Support Sheet 1, I realised that I would like to be like teacher in the second story, supportive, friendly learner centred and basing her/his teaching on the national educational goals'.

'I learned different ways of assessing for formative assessment which can help me to assess my learners successfully. This supported by the Support Sheet 5 of Lower primary module 4 which says that formative assessment is the integral part of the teaching and learning process'.

Examples of extracts which show evidence of inadequate reflection

'I learned many things in this activities and it encourages me to give freely chance among learners to work with one's he want'.

Conclusion:

Most sample teachers' reflections show very little/ no evidence of teachers evaluating information from inquiry activities by not drawing on theory and inquiry activities to support their own reflections and using it to develop their thinking. Most teachers presented descriptive accounts of inquiry processes with little/no evidence of use being made of theory and inquiry activities. Reflections that do not relate theory to practice are inadequate in terms of the model.

3. 4 Constructing action strategies for incorporating into action plans

The ETP and LPE modular material provides opportunities for teachers to construct action strategies for incorporating into action plans. The modular material gives instructions that guide teachers on how to develop action plans for bringing improvement to a situation. Table 16 below illustrates the extent to which teachers are constructing action strategies for incorporating into action plans.

Table 16: The extent to which teachers are constructing action strategies for incorporating into action plans

INDICATOR	TEACHERS' SCORE		INTERPRETATION
Teacher critically presents different action strategies and develop a plan suitable for bringing improvements to the situation.	None of the teachers scored 5 or 6.		
Teacher produces an action plan and justifies it with reasons but there is little or no discussions of action strategies.	Teacher 06 Teacher 05 Teacher 07 Teacher 011 Teacher 030 1 teacher scored 4 teachers scored	4 3 3 3 3 4 3	5 teachers' reflections show evidence of barely adequate reflection
There is little/no evidence of any action strategies to effect improvements.	Teacher 015 Teacher 016 Teacher 019 Teacher 021 Teacher 023 Teacher 027 Teacher 01 Teacher 02 Teacher 03 Teacher 04 Teacher 08 Teacher 09 Teacher 010 Teacher 012 Teacher 013 Teacher 014 Teacher 017 Teacher 018 Teacher 020 Teacher 022 Teacher 024 Teacher 025 Teacher 026 Teacher 028 Teacher 029 6 teachers scored 19 teachers scored	2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1	25 teachers' reflections show evidence of inadequate reflection

The following are some examples of extracts that show teachers' reflections on how to construct action strategies for incorporating into action plans suitable for bringing improvements to a situation.

Examples drawn from teachers' reflections:

Examples of extracts which show barely adequate reflection

'Plan to implement:

I will choose homework - sent out letters - have evidence letters. Explain to the parents the purpose of the homework.

I will have regular remedial classes with my learners to upgrade their progress.

I will call in parents and have discussions about the learners' progress.

I will have home visits to find out more about my learners' backgrounds.

'The action plan:

I will create more communication patterns in the classroom.

I will organise a reading corner which will attract learners attention and also to encourage the learners to collect magazine and to put it on the reading corner'.

'To produce a plan to implement, observe, monitor and evaluate the proposed action: My plan are I have to draw up a time table, organise my classroom, divide the learners in small group of 4 or in pairs'.

Conclusion:

Most sample teachers' reflections show very little/ no evidence of teachers trying to develop action strategies for incorporating into action plans suitable for bringing improvements to a situation. Most teachers present action plans without justifying them, and with no clear action strategies for bringing improvements to a situation. Action strategies in terms of the model should aim at bringing improvements to a situation.

3. 5 Concluding comments

Most sample teachers' reflections show low levels of reflection. Teachers here did not yet display reflection which involves critical thinking. Teachers' reflections show evidence of teachers having difficulty in following instructions and/or understanding them. Most teachers in the sample did not recognise the cyclical nature of the inquiry activities. They did not present holistic descriptions of inquiry activities. Instead, they focused on one activity or presented a list of activities that did not have any connection between them. Most teachers reported only about common issues and personal experiences with little or no discussion on new understandings and discoveries developed from inquiry activities or without linking their experience to theory (that is, to readings in the support material booklet). Teachers are not yet familiar with technical ways of 'research-based writing'. They are also not yet familiar with some technical words such as 'data', 'action plan', 'analysis' and 'evidence'.

4. SUMMARY

This chapter examines the impact of the LPE and ETP courses on teachers' understanding, classroom practice and reflective skills in terms of the PBI model. The impact analysis involved awarding each teacher a rating score or score based on the continuum for each criterion on each research instrument.

The ratings have been used to explore the extent to which teachers understand, practice and reflect critically on their educational theory and practice.

In order to assess the assumptions of the PBI INSET model, the results of the analysis have been fed into 3 x 3 matrixes which correlate teachers' understanding scores with teachers' practice scores. The following chapter will examine the extent of the correlations between teacher understanding and classroom practice, teachers' understanding and reflection, and classroom practice and reflection.

CHAPTER FIVE:
CORRELATION OF DATA ON TEACHERS' UNDERSTANDING, CLASSROOM PRACTICE AND REFLECTION

Introduction

This chapter explores the core assumptions of the PBI INSET model by assessing the degree of correlation between teachers' understanding, their classroom practice and their reflection scores.

In order to correlate the data, on teachers' understanding and classroom practice the ratings from the summary sheets (see Appendixes E & F) for understanding and classroom practice for each criterion were compared.

The correlation of the data on *teacher understanding and classroom practice* was done in the following ways: *First*, *five* matrices were constructed to examine which teachers' understanding and classroom practice scores were congruent, by comparing each teacher's understanding and classroom practice scores according to each of the criteria. *Secondly*, the congruence between teachers' understanding and classroom practice was assessed using the total scores of understanding and classroom practice of each teacher. In other words, *one* matrix (matrix 6) was used to assess the overall congruence between teachers' understanding and classroom practice based on the total scores. *Thirdly*, the relationship between teachers' understanding and classroom practice scores was analysed using the Spearman rank-order correlation coefficient to assess the statistical significance of the degree of correlation between the scores.

The correlation of the data on *teachers' understanding and reflection, classroom practice and reflection* was analysed using the Spearman rank-order correlation coefficient to assess the statistical significance of the degree of correlation of each teacher's total scores on understanding and reflection, and classroom practice and reflection.

1. CORRELATING THE DATA ON TEACHERS' UNDERSTANDING AND CLASSROOM PRACTICE

1. 1 Correlation of data per each measuring criteria

The five matrixes below correlate teachers' understanding and classroom practice scores according to each of the measuring criteria. The asterisk (*) on the matrices indicates congruency between teachers' understanding and classroom practice scores.

Matrix 1: Acknowledging learners' prior learning

UNDERSTANDING

CLASSROOM PRACTICE	Score of 1 - 2 Inadequate	Score of 3 - 4 Barely adequate	Score of 5 - 6 Adequate
Score of 1 - 2 Inadequate	Teacher 012 Teacher 014 Teacher 020* Teacher 023 Teacher 024* Teacher 025 Teacher 027* Teacher 028*	Teacher 025 Teacher 030 Teacher 023	Teacher 06 Teacher 07 Teacher 09 Teacher 010 Teacher 011 Teacher 015 Teacher 016 Teacher 017
Score of 3 – 4 Barely adequate	Teacher 06 Teacher 07 Teacher 09 Teacher 010 Teacher 011 Teacher 012 Teacher 014 Teacher 015 Teacher 016 Teacher 017	Teacher 01* Teacher 03* Teacher 04* Teacher 013* Teacher 029* Teacher 018* Teacher 019* Teacher 022* Teacher 026*	
Score of 5- 6 Adequate	Teacher 030		Teacher 02* Teacher 05* Teacher 08* Teacher 021*

Comment:

According to Matrix 1 above, 17 teachers out of 30 exhibit congruence between their understanding and classroom practice competencies on the criterion of acknowledging learners' prior learning, while 13 teachers exhibit non-congruence between their understanding and classroom practices competencies. This matrix reveals that only four teachers scored consistently at the adequate level on both dimensions. The matrix also reveals that eight teachers demonstrated adequacy in understanding of what is meant by acknowledging learners' prior learning, but did not demonstrate adequacy in putting it into practice. One teacher demonstrated adequacy of practising the skill of acknowledging learners' prior learning, but not adequate understanding of its principles.

Matrix 2: Promoting collaborative learning among learners

UNDERSTANDING

CLASSROOM PRACTICE	Score of 1- 2 Inadequate	Score of 3 – 4 Barely Adequate	Score of 5 – 6 Adequate
Score of 1 –2 Inadequate	Teacher 01* Teacher 02* Teacher 05 Teacher 06 Teacher 015 Teacher 017* Teacher 018* Teacher 020* Teacher 024* Teacher 026* Teacher 030* Teacher 019 Teacher 025 Teacher 027	Teacher 04 Teacher 05 Teacher 07 Teacher 09 Teacher 011 Teacher 012 Teacher 015 Teacher 016 Teacher 021 Teacher 028	Teacher 06 Teacher 07 Teacher 09 Teacher 016
Score of 3 – 4 Barely Adequate	Teacher 04 Teacher 011 Teacher 012 Teacher 021 Teacher 028 Teacher 019 Teacher 025 Teacher 027	Teacher 03* Teacher 010* Teacher 013* Teacher 014* Teacher 023* Teacher 029* Teacher 022*	
Score of 5- 6 Adequate			Teacher 08*

Comment:

According to Matrix 2 above, 16 teachers out of 30 exhibit congruence between their understanding and classroom practice competencies on the criterion of promoting collaborative learning, while 14 teachers exhibit non-congruence between their understanding and classroom practice competencies. This matrix reveals that only one teacher, Teacher 08 scored consistently at the adequate level on both dimensions. The matrix also reveals that four teachers demonstrated adequacy in understanding of what is meant by promoting collaborative learning among learners, but did not demonstrate adequacy in putting it into practice.

Matrix 3: Adopting an integrated approach to teaching and learning

UNDERSTANDING

CLASSROOM PRACTICE	Score of 1 – 2 Inadequate	Score of 3 – 4 Barely adequate	Score of 5 – 6 Adequate
Score of 1 – 2 Inadequate	Teacher 04 Teacher 07* Teacher 02 Teacher 08 Teacher 010* Teacher 011* Teacher 012* Teacher 013* Teacher 015* Teacher 014 Teacher 016* Teacher 017* Teacher 018* Teacher 019* Teacher 021 Teacher 022* Teacher 023* Teacher 024* Teacher 025* Teacher 026* Teacher 027 Teacher 028* Teacher 029* Teacher 030	Teacher 02 Teacher 06 Teacher 08 Teacher 012	Teacher 01
Score of 3 – 4 Barely adequate	Teacher 01 Teacher 04 Teacher 06 Teacher 014 Teacher 020 Teacher 021 Teacher 027 Teacher 030	Teacher 03* Teacher 05* Teacher 09*	
Score of 5 – 6 Adequate			

Comment:

According to Matrix 3 above, 20 teachers out of 30 exhibit congruence between their understanding and classroom practice competencies on the criterion of adopting an integrated approach to teaching and learning, while 10 teachers exhibit non-congruence between their understanding and classroom practice competencies. This matrix reveals that none of the teachers scored consistently at the adequate level on both dimensions. The matrix also reveals that only *one* teacher demonstrated adequacy in understanding of what is meant by adopting an integrated approach to teaching and learning, which is puzzling, since this is a central feature of the PBI model. It is perhaps less puzzling that teachers exhibit low levels of putting it into practice (8 teachers out of 30 demonstrated barely adequate teaching). As the Review Committee Report (2000) of Curriculum 2005 in South Africa shows, integrated teaching is notoriously difficult to implement, and perhaps even impossible to implement well, especially with the large classes prevalent in Namibia.

Matrix 4: Assisting learners to develop competencies/ skills for active learning

UNDERSTANDING

CLASSROOM PRACTICE	Score of 1 – 2 Inadequate	Score of 3 – 4 Barely adequate	Score of 5 – 6 Adequate
Score of 1 –2 Inadequate	Teacher 07 Teacher 016 Teacher 017* Teacher 020* Teacher 022* Teacher 023 Teacher 014 Teacher 024 Teacher 05 Teacher 025* Teacher 018 Teacher 026 Teacher 019 Teacher 028* Teacher 02 Teacher 027*	Teacher 06 Teacher 07 Teacher 08 Teacher 016 Teacher 023 Teacher 024 Teacher 026	Teacher 04 Teacher 09 Teacher 010
Score of 3 – 4 Barely adequate	Teacher 02 Teacher 04 Teacher 05 Teacher 06 Teacher 09 Teacher 010 Teacher 014 Teacher 018 Teacher 019	Teacher 01* Teacher 03* Teacher 011* Teacher 012* Teacher 013* Teacher 015* Teacher 021* Teacher 029* Teacher 030*	
Score of 5 –6 Adequate	Teacher 08		

Comment:

According to Matrix 4 above, 15 teachers out of 30 exhibit congruence between their understanding and classroom practice competencies on the criterion of assisting learners develop competencies/skills, while 15 teachers exhibit non-congruence

between their understanding and classroom practice competencies. This matrix reveals that none of the teachers scored consistently at the adequate level on both dimensions. The matrix also reveals that three teachers demonstrated adequacy in understanding what is meant by assisting learners to develop competencies/skills for active learning, but did not demonstrate adequacy in putting it into practice. One teacher, 08 demonstrated adequacy in teaching skills, but did not demonstrate adequacy in understanding the principles of assisting learners to develop competencies for active learning.

Matrix 5: Accommodating individual differences

UNDERSTANDING

CLASSROOM PRACTICE	Score of 1 –2 Inadequate	Score of 3 –4 Barely adequate	Score of 5 – 6 Adequate
Score of 1 –2 Inadequate	Teacher 04 Teacher 02 Teacher 07 Teacher 011 Teacher 013* Teacher 016* Teacher 017 Teacher 018* Teacher 019 Teacher 022* Teacher 023* Teacher 024 Teacher 025* Teacher 026 Teacher 027* Teacher 028* Teacher 029* Teacher 030	Teacher 02 Teacher 07 Teacher 011 Teacher 014 Teacher 017 Teacher 019 Teacher 024 Teacher 026 Teacher 030	Teacher 01 Teacher 03 Teacher 04 Teacher 06 Teacher 09 Teacher 016
Score of 3 – 4 Barely adequate	Teacher 01 Teacher 03 Teacher 09 Teacher 014 Teacher 020	Teacher 021* Teacher 012* Teacher 010* Teacher 08* Teacher 20* Teacher 06* Teacher 05*	
Score of 5 – 6 Adequate			

Comment:

According to Matrix 5 above, 16 teachers out of 30 exhibit congruence between their understanding and classroom practice competencies on accommodating individual differences, while 14 teachers exhibit non-congruence between their understanding and classroom practice competencies. This matrix reveals that none of the teachers scored consistently at the adequate level on both dimensions. The matrix also

reveals that six teachers demonstrated adequacy in understanding of what is meant by accommodating individual differences, but did not demonstrate adequacy in putting it into practice. Seven teachers demonstrated barely adequate understanding and classroom practice.

Overall comment

There is relatively stable congruence between teachers' understanding and classroom practice, with the range between 15 and 20 out of the sample of 30 displaying congruence across the five criteria. However, the congruence is mainly at the barely adequate level, and virtually none of the teachers perform adequately in line with the expectations of the model. This result is borne out when the scores are combined in the matrix below.

1. 2 Correlation of data based on total scores

Matrix 6 below shows the degree of congruence between teachers' understanding and classroom practice based on the total scores. The asterisk (*) on the matrix indicates congruency between teachers' understanding and classroom practice scores.

Matrix 6: Combined scores for teachers' understanding and classroom practice

UNDERSTANDING

CLASSROOM PRACTICE	Score 1-10 Inadequate	Score of 11-20 Barely adequate	Score of 21 – 30 Adequate
Score of 1 –10 Inadequate	Teacher 028* Teacher 016 Teacher 017 Teacher 018 Teacher 027* Teacher 021 Teacher 022* Teacher 023 Teacher 024* Teacher 020 Teacher 025* Teacher 026	Teacher 026 Teacher 023 Teacher 021 Teacher 018 Teacher 017 Teacher 016	Teacher 03 Teacher 06 Teacher 09
Score of 11 –20 Barely adequate	Teacher 03 Teacher 06 Teacher 09 Teacher 020	Teacher 02* Teacher 01* Teacher 04* Teacher 05* Teacher 07* Teacher 08* Teacher 010* Teacher 011* Teacher 012* Teacher 013* Teacher 014* Teacher 015* Teacher 019* Teacher 029* Teacher 030*	
Score of 21 –30 Adequate			

Comment:

According to Matrix 6 above, 20 teachers out of 30 exhibit congruence between their understanding and classroom practice competencies across all the criteria, while 10 teachers exhibit non-congruence between their understanding and classroom

practice competencies. This matrix reveals that none of the teachers scored consistently at the adequate level on both dimensions. The matrix also reveals that three teachers demonstrated adequate understanding only. It also reveals that 15 teachers demonstrated barely adequate understanding and skills in terms of the model.

1. 3 A statistical analysis of the relationship between teachers' understanding and classroom practice

In order to determine the statistical significance of the relationship between teachers' understanding and classroom competencies, a Spearman rank-order correlation test was used. The total scores of each teacher's understanding and classroom practice were used to calculate the Spearman rank-order correlation coefficient. A coefficient value of 0.52 was obtained (see Appendix H). In order to determine the significance of this coefficient with *n* of 30, the obtained value of rho was compared with the critical values of rho at the 0.01 level, df = 28 (*n*-2).

Correlations ranging from 0.35 to 0. 65 are statistically significant beyond the 1 per cent level (Cohen & Manion, 1994: 139). It may be therefore concluded that teachers' understanding and their classroom practice indeed are correlated, even though the level of correlation is relatively low.

2. THE RELATION BETWEEN TEACHER REFLECTION, UNDERSTANDING AND CLASSROOM PRACTICE

The PBI INSET model assumes that teachers' improved pedagogical understanding and classroom practice results from teachers reflecting critically on their educational theory and practice. According to the PBI assumption, it is likely that data on teachers' reflective skills will correlate with understanding and teaching skills.

2. 1 A statistical analysis of the relationship between teachers' understanding, classroom practice and reflection

In order to determine the statistical significance of the relationship between teachers' understanding, reflection and classroom practice, a Spearman rank-order correlation test was used. The understanding, reflection and classroom practice total scores for each teacher were used to calculate the Spearman rank –order correlation coefficient between teachers' total scores of understanding and reflection, and reflection and classroom practice. The coefficient value of 0.33 was obtained between teachers' understanding and reflection scores, and the coefficient value of 0.25 was obtained between classroom practice and reflection scores (see Appendices I and J). According to Cohen & Manion, (1994: 139) "correlations ranging from 0.20 to 0.35 show a very slight relationship between variables, although they may be statistically significant". The coefficient value between teachers' understanding and reflection, and reflection and classroom practice fall within the above range. However, when the 0.01 and 0.05 levels of significance was adopted, a weak relationship was found to exist between reflection and teachers' understanding, with no relationship between reflection and classroom practice.

3. SUMMARY

This chapter correlates the data on teachers' understanding, classroom practice and reflection, in order to explore the core assumptions of the PBI model. The first core assumption of the model is that improvement in teachers' pedagogical understanding of their practice leads to improvement in classroom practice. The second core assumption is that improved pedagogical understanding and classroom practice result from teachers reflecting critically on their educational theory and practice.

These assumptions can be taken to speculate that:

a) teachers who demonstrate an adequate pedagogical understanding should demonstrate the equivalent level of teaching skills;
b) teachers who reflect on educational theory are likely to improve their pedagogical understanding of their educational practice;
c) teachers who are reflect on their educational practice are likely to improve their classroom practice.

These speculations were tested by means of assessing the degrees of congruence in scores between:

a) teachers' pedagogical understanding (theory) and classroom practice
b) teachers' reflective skills and teachers' pedagogical understanding (theory)
c) teachers' reflective skills and classroom practice

The results of the statistical analysis were as follow:

Relation of congruence	**Coefficient value**	**Level of significance**
Theory and Practice	0.52	0.01
Reflection and Theory	0.33	0.05
Reflection and Practice	0.25	-

The conclusions from this analysis are:

1. A moderate relationship was found to exist between teachers' understanding and classroom practice. However, such a relationship is not a guarantee of adequacy, which was nevertheless found to be low in both understanding and classroom practice.
2. A low relationship was found to exist between reflection and teachers' understanding. However, such a relationship is not a guarantee of adequacy in understanding.
3. A negligible relationship was found to exist between reflection and classroom practice.

CHAPTER SIX:
CONCLUSIONS AND RECOMMENDATIONS

This chapter discusses the conclusions to be drawn from this study and some recommendations based on the findings.

1. AIM OF THE STUDY

The aim of the study was to test the effectiveness of the core assumptions underpinning the PBI INSET model by (a) assessing the impact of the LPE and ETP courses on teachers' understanding of the model; (b) teachers' classroom practice of the model; and (c) the extent to which teachers reflect critical on their educational theory and practice. In other words, the study assesses the extent to which teachers are relating their pedagogical understanding of the LPE and ETP approaches to their classroom practice, and the extent to which teachers reflect critically on their educational theory and practice.

2. LIMITATIONS OF THE STUDY

The following points should be borne in mind:

(a) The study took place while the teachers had just completed the second year of the four year Diploma programme.

(b) The sample was limited to schools within a radius of 30 km of Windhoek, Ondangwa and Oshakati.

(c) The Four BETD INSET centres out of six centres were excluded from the sample for reasons of accessibility.

(d) No baseline data was available prior to the commencement of the course, which could be used to make strong inferences of the impact of the LPE and ETP courses on teachers' understanding, classroom practice and reflection.

(e) The sample of 30 teachers is small.

All the points mentioned above limit the generalisability of the conclusions.

3. CONCLUSIONS OF THE STUDY

Despite the limitations in the methodology, the findings of this study have indicated the following:

3. 1 The assumptions of the PBI model

The core assumption of the model is that improvement in teachers' pedagogical and theoretical understanding of their practice leads to improvement in classroom practice. The model also assumes that improved pedagogical understanding and classroom practice result from teachers reflecting critically on their educational theory and practice. The findings indicate a moderate correlation between teachers' understanding and classroom practice, a low correlation between teachers' understanding and reflection, and a negligible correlation between classroom practice and reflection. Nevertheless, there is no indication that the congruence between teachers' understanding and classroom practice has had any impact on improving either understanding or practice.

3. 2 The impact of the model

From the results of this study, none of the teachers in the sample demonstrated a link between understanding and skills at an adequate level of accomplishment. Only three teachers demonstrated adequate understanding. The study also reveals that teachers did not reach high levels of reflection. While the model assumes that teachers will relate theory to practice or practice to theory, the study indicates that teachers have difficulties in making a connection between theory (readings in the support material) and practice (inquiry activities). Teachers interpreted the inquiry activities simply as exercises or questions to be answered. Consequently, teachers filled in the empty boxes in the activities booklet without really relating the activities to the linked readings in the support materials. They seemed to have read the support material without reflecting back to the inquiry activities. Teachers are not likely to relate theory to practice if there is no mediation and they have no analytical tools. Gultig (1999) points out that strong and directed mediation is important in facilitating the integration between theory and practice. Engaging teachers in material that requires critical thinking is not likely to benefit teachers who were not exposed to critical thinking in the past. Gultig also emphasises the fact that putting theory and

practice side by side does not solve the issue of the theory-practice divide, if the teachers do not have the tools to interrogate theory or practice.

The findings of this study confirm the findings from other research studies and analyses discussed in chapter two, on the difficulties teachers are facing in making connections between theory and practice (Brickhouse, 1990, Stevenson, 1991, Russell, 1993, Day, 1993, Lampert, 1997, Reeves, 1997).

The study indicates that, even though inquiry activities are designed to help teachers reflect in a systematic way, teachers could not reflect to the level required in the courses. Teachers' reflections indicate that they misinterpreted the focus of inquiry activities. In most cases, teachers reported on common issues instead of focusing on what is expected of them in the inquiry activities. Teachers' writing up of their reflections is constrained by the fact that they are not familiar with research-based writing.

Even though teachers have been engaged in reflective inquiry activities, they are not likely to benefit much from the reflective activities if they lack thinking skills or are without ongoing support to help them develop advanced skills of reflection.

The findings of this study about the complexity of reflecting on one's practice confirm the analyses of reflective teacher education in chapter two that the ability to look back and learn from one's experiences within a classroom environment is extremely complex and difficult to acquire (Pultorack, 1993). It may be surmised that the expectations of teachers made by the PBI model, derived from critical theory, are unrealistic.

Teaching conditions, teachers' previous experience of schooling and limited professional support seem to be some of additional barriers for teachers' performance in terms of classroom practice, pedagogical understanding and critical reflection in terms of the model. Only a few schools visited have a library and some have book boxes. Most classrooms are physically inadequate. Some classrooms did not have enough chairs for learners or some chairs are broken. Most of the

lower primary classes are overcrowded, there are insufficient teaching and learning materials such as workbooks for learners, textbooks, crayons and pencils. In some classes visited, not all learners were able to do exercises and finish on time, having to wait for others to finish because they are sharing crayons and pencils. Teachers also could not provide much individual attention because classes are over-crowded and teaching time was limited.

Most teachers in the sample had poor academic and professional backgrounds. They had been exposed to a school system that was mainly based on factual recall of information. Skills for active learning or critical thinking were largely absent from their school curriculum. Most teachers observed lacked creativity and skills to interpret subject matter in order to make it more meaningful for learners.

It may further be surmised that a strong professional support network is essential for success of in-service courses based on the model assessed in this study. From the researcher's experience and observations, many teachers are working in isolation. There is a lack of professional support provided by school management and peers. Some principals/heads of departments do not have enough skills to offer professional support to teachers. The PBI INSET model requires support structures so that teachers can benefit from the experiences/support from peers and other professionals. Even though the BETD INSET programme incorporates the system of support structures through the School-based Activities course and Support Study Groups (SSG), some teachers do not get enough support from school management and their peers. Most teachers could not meet regularly in SSG because they live far from one another and there is not enough time to meet after school hours. The BETD INSET programme does not have permanent tutors to provide ongoing school-based support to teachers in the programme.

Over and above these inadequacies, however, this research provides further evidence that the assumptions embedded in the PBI model are not realistic, and are not realised by teachers. This research therefore supports the findings about the inadequacies of critical theory-derived teacher education models elsewhere (Reeves, 1997).

4. RECOMMENDATIONS

4. 1 Recommendations in terms of the curriculum of the INSET courses

The findings of this study suggest that in-service training courses based on the model assessed in this study may not be the most appropriate intervention for both distance learning and teacher development in Namibia in the short term. In order for the intervention to have significant impact on teacher development, a review of the existing curriculum for the two INSET courses is needed.

The recommendations of this study are as follow:

(a) The modular material for ETP and LPE courses should be reviewed in terms of the current needs of the target group.

(b) Practical-on-job support should be planned in terms of the results of the review.

(c) The major component of the revised modular material should focus on helping teachers acquire teaching methods and skills directly related to the content in the existing curriculum.

(d) The modular material should include practical examples to show teachers exactly what is required to meet explicitly defined learning outcomes.

4. 2 Recommendations for future research

Recommendations can be drawn from this study to serve as a basis for future research on the impact of the inquiry-based in-service models on teacher understanding, classroom practice and reflection:

(a) Although this research confirms previous research findings, its generalisability is still limited and should be further investigated.

(b) This study only focused on the assessment of the core assumptions of the PBI model as a model for teacher development, but did not assess the improvement of quality of teaching and learning. Future studies should assess how such INSET models impact on the quality of teaching and learning.

(c) This study did not have baseline data that could be used to make strong inferences about the impact of the model on teachers' understanding,

classroom practice and reflection. Future research should carry out baseline assessment before teachers begin with INSET courses.

5. CONCLUDING COMMENTS

It may safely be concluded that:

a) the LPE and ETP courses have so far had only a very small impact on both teachers' understanding and classroom practice;

b) teachers may well reflect on their practice in terms of their understanding, but this does not significantly improve their practice as the PBI model expects.

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APPENDIX A: CLASSROOM OBSERVATION SCHEDULE

DATE: _____

TEACHER'S NAME: _____

SCHOOL: _____ **NO. OF LEARNERS:** _____

GRADE: _____ **LOCATION: RURAL:** _____ **URBAN:** _____

CRITERION CODE	INDICATORS	RATING
ALPL 1	Teacher begins with what learners already know from home, community and school. Teacher assists learners to connect and apply their learning to what they have already known.	
ALPL 2	Teacher invites ideas from learners- but does not link these ideas to new learning	
ALPL 3	Teaching is not linked to learners' prior learning	
CL 1	Classroom arrangement/ learning task suitable for collaborative learning. Teacher provides opportunities for learners to work in small groups and /or in large groups. Learners interact with one another. Teacher monitors and supports learning.	
CL 2	Classroom arrangement suitable for collaborative learning. Less learner interaction. Poor monitoring of learner interaction.	
CL 3	Whole class teaching all the time- No learner interaction.	
IA 1	Teacher uses cross-curricular themes/topics to draw several curricular ideas into common focus.	
IA 2	Teacher involves learners in activities across learning areas- No explanation is given for learners to understand the interrelatedness of one content area to another.	
IA 3	Teacher presents information or knowledge as fragmented facts	
AL 1	Teacher involves learners in learning activities such as observing, classifying, communicating. Teacher assists learners through eliciting, probing, and clarifying.	
AL 2	Teacher involves learners in problem-solving activities, but s/he directs the learning process most of the time.	
AL 3	Teacher directs the learning process all the time - No attempt is made to encourage learners to work independently	
AID 1	Teacher adopts learning content to different individuals. Teacher assists those with learning difficulties. Teacher assists high achievers.	
AID 2	Teacher responds to learners who need additional assistance	
AID 3	Teacher does not pay attention to individual differences	

COMMENTS:

KEYS:

Acknowledging learners' prior learning: ALPL 1	5/6 (Adequate practice)
Acknowledging learners' prior learning: ALPL 2	3/4 (Barely adequate practice)
Acknowledging learners' prior learning: ALPL 3	1/2 (Inadequate practice)
Collaborative learning: CL 1	5/6 (Adequate practice)
Collaborative learning: CL 2	3/4 (Barely adequate practice)
Collaborative learning: CL 3	1/2 (Inadequate practice)
Integrated Approach: IA 1	5/6 (Adequate practice)
Integrated Approach: IA 2	3/4 (Barely adequate practice)
Integrated Approach: IA 3	1/2 (Inadequate practice)
Active learning: AL 1	5/6 (Adequate practice)
Active learning: AL 2	3/4 (Barely adequate practice)
Active learning: AL 3	1/2 (Inadequate practice)
Accommodating individual differences: AID 1	5/6 (Adequate practice)
Accommodating individual differences: AID 2	3/4 (Barely adequate practice)
Accommodating individual differences: AID 3	1/2 (Inadequate practice)

APPENDIX B: TEACHERS' UNDERSTANDING ASSESSMENT SCHEDULE

DATE: _____

TEACHER'S NAME: _____

SCHOOL: _____ **NO. OF LEARNERS:** _____

GRADE: _____ **LOCATION: RURAL:** _____ **URBAN:** _____

CRITERION CODE	INDICATORS	RATING
ALPL 1	Teacher shows understanding of the need to appreciate learners' prior knowledge and recognises the need to link learners' prior learning to new learning.	
ALPL 2	Teacher shows some understanding of appreciating knowledge and experience that learners bring to the learning situation, but shows little/ no recognition of the need to connect the learners' prior knowledge to new learning.	
ALPL 3	Teacher shows no/ very little understanding of what is meant by acknowledging learners' prior knowledge or the need to connect learners' previous knowledge, experience and understanding to new learning.	
CL 1	Teacher shows understanding of the need to promote collaborative learning among learners by recognising the need to encourage learners to communicate and assist one another.	
CL 2	Teacher shows some understanding of what is meant by collaborative learning, but shows little/no recognition of the need to encourage interaction among learners.	
CL 3	Teacher shows no/ very little understanding of what is meant by collaborative learning. Teacher shows no/very little recognition of the need to encourage joint activities and interaction among learners.	
IA 1	Teacher shows understanding of what is meant by using integrated approach by recognising the need of using cross-curricular activities to develop learners' understanding of the relationship between things.	
IA 2	Teacher shows some understanding of what is meant by using an integrated approach by recognising the need to encourage learners to engage in cross-curricular activities, but shows no/ little recognition of the need to develop learners' understanding of the relationship between things.	
IA 3	Teacher shows no/ very little understanding of what is meant by using an integrated approach by showing no recognition of relationship of concepts/ ideas in different learning areas.	

CRITERION CODE	INDICATORS	RATING
AL 1	Teacher shows understanding of what is meant by teaching learners to develop thinking skills and processes for independent and active learning by recognising the need to develop learners' abilities to: Observe, classify, and communicate.	
AL 2	Teacher shows some understanding of what is meant by motivating learners to learn with understanding, but shows no/ little understanding of what is meant by actively involving learners in a lesson, and by assisting learners to learn processes/ skills for independent learning.	
AL 3	Teacher shows no/ very little understanding of the need to teach learners to think or learn with understanding and or skills/ processes necessary for active learning.	
AID1	Teacher shows understanding of what is meant by varying learning according to individual differences and shows recognition of the need to create learning activities that accommodate learners with varied learning.	
AID 2	Teacher shows some understanding of what is meant by encouraging assisting learners with special needs, but shows little recognition of what is meant by accommodating learners with varied learning abilities.	
AID 3	Teacher shows no/ very little understanding of what is meant by accommodating learners with varied learning abilities.	

COMMENTS:

KEYS:

Acknowledging learners' prior learning: ALPL 1	5/6 (Adequate understanding)
Acknowledging learners' prior learning: ALPL 2	3/4(Barely adequate understanding)
Acknowledging learners' prior learning: ALPL 3	1/2 (Inadequate understanding)
Collaborative learning: CL 1	5/6 (Adequate understanding)
Collaborative learning: CL 2	3/4 (Barely adequate understanding)
Collaborative learning: CL 3	1/2 (Inadequate understanding)
Integrated approach: IA 1	5/6 (Adequate understanding)
Integrated approach: IA 2	3/4 (Barely adequate understanding)
Integrated approach: IA 3	1/2 (Inadequate understanding)
Active learning: AL 1	5/6 (Adequate understanding
Active learning: AL 2	3/4 (Barely adequate understanding)
Active learning: AL 3	1/2 (Inadequate understanding)
Accommodating individual differences: AID 1	5/6 (Adequate understanding)
Accommodating individual differences: AID 2	3/4 (Barely adequate understanding)
Accommodating individual differences: AID 3	1/2 (Inadequate understadning)

APPENDIX C: TEACHER REFLECTIVE ASSESSMENT SCHEDULE

DATE: _____

TEACHER'S NAME: _____

SCHOOL: _____ **NO. OF LEARNERS:** _____

GRADE: _____ **LOCATION: RURAL:** _____ **URBAN:** _____

CRITERION CODE	INDICATORS	RATING
OS 1	Teacher presents a holistic description of the inquiry activities. Teacher's description shows evidence of systematic inquiry. The description is based on the focus of the inquiry activities. Teacher shows clearly the findings and evidence of the inquiry activities.	
OS 2	Teacher presents a list of activities being carried out. The description has connection with the focus of the inquiry activities. Teacher does not make connection between activities. Teacher presents findings of the activities, but there is little/ no evidence of what has been found out.	
OS 3	Teacher's description shows little/no connection with the focus of the inquiry activities.	
AS 1	Teacher presents a critical analysis of issues emerge from inquiry activities, and state new understandings and discoveries from the inquiry activities.	
AS 2	Teacher presents a descriptive account of the activities, but there is little/no discussion on new understandings and discoveries.	
AS 3	Teacher's description is a surface description of activities being carried out.	
EVS 1	Teacher draws on theory and evidence from the inquiry activities to support his/her own reflections and use it to develop his or her own thinking.	
EVS 2	Teacher makes some reference to theory and inquiry activities , but does not develop his or her own thinking	
EVS 3	There is little/no evidence of use being made of theory and inquiry activities or of critical reflection.	
S S 1	Teacher critically presents different action strategies and develops a plan suitable for bringing improvements to the situation.	
SS 2	Teacher produces an action plan and justifies it with reasons but there are little or no discussions of action strategies.	
S S 3	There is little/no evidence of any action strategies to effect improvements.	

COMMENTS:

KEYS:

Observation skills:OS 1	5/6 (Adequate reflection)
Observation skills:OS 2	3/4 (Barely adequate reflection)
Observation skills:OS 3	1/2 (Inadequate reflection)
Evaluation skills: ES 1	5/6 (Adequate reflection)
Evaluation skills: ES 2	3/4 (Barely adequate reflection)
Evaluation skills: ES 3	1/2 (Inadequate reflection)
Analytical skills: AS 1	5/6 (Adequate reflection)
Analytical skills: AS 2	3/4 (Barely adequate reflection)
Analytical skills: AS 3	1/2 (Inadequate reflection)
Strategic skills: SS 1	5/6 (Adequate reflection)
Strategic skills: SS 2	3/4 (Barely adequate reflection)
Strategic skills: SS 3	1/2 (Inadequate reflection)

APPENDIX D: VIGNETTES (TEACHING SCENARIOS) FOR ASSESSING TEACHERS' UNDERSTANDING OF THE PBI INSET MODEL.

Preamble: The researcher reads the following teaching scenarios together with teachers and then ask questions on each of the descriptions.

A

Mrs Shoombe is a grade 3 teacher. She asked her learners to collect different soils from home and school grounds for the science lesson on the following day. She plans her lesson to help learners to classify different types of soils. She divides the class into groups. She gives each group containers with different types of soils and empty jugs. She moves from one group to another, tell them how to classify different types of soils and ask one child in each group to do the task, while others are watching. At the end of the lesson, she summarises the main points of the lesson.

B

Mr Witbooi is a grade 2 teacher. He teaches learners to count and compare using the family tree. He begins his lesson by drawing his family tree. He draws his father on the left and his mother on the right hand side. He labels the picture, ordering the members of the family so that the first born is on the left-hand side. He also draws himself as a member of the family. He asks the children the following questions:
How many children in the family? How many boys? How many girls? Are there more boys than girls? He asks, each child in the class to draw a picture of his own family tree. He also asks them to write short sentences about their own families, indicating how many brothers and sisters, as well as indicating whether there are more males than females. He assists those who have difficulties and gives additional tasks to those who are fast in completing the task. After the learners have completed their tasks, the teacher highlights the main points of the lesson.

C

It is a grade 4 Math class. The teacher reminds the learners what they have done the previous day. She then rapidly writes 4 sums on the chalkboard. She asks 4 learners to solve the sums. While they are working out the answers, she writes another set of sums on another chalkboard. When the first group have finished, she asks the rest of the class to check if the answers are correct. While this is taking place, the second group of learners are working on the next set of sums. This sequence continues until every learner has a turn at the chalkboard. Towards the end of the lesson, the teacher gives a chance for learners to ask questions.

D

Mrs Swarts is teaching grade 3. In her introduction of the Environmental Studies lesson on the topic 'Our community', she asks learners to tell her about their villages, that is, what adults and children do in their villages. She gives out a work sheet in which each learner has to list ways of keeping their villages clean. She watches them and responds to individual

seeking help. After the learners have finished, she asks them draw their villages and put their drawings on the wall, after the work is completed.

E

Mr Theo is a grade 4 teacher. He plans his lesson to help children understand the concept of electricity. He has arranged all the materials necessary for the lesson, during the morning break. He puts at each desk, a collection of bulbs, wire, batteries and switches. When the children enter the class from the break, they jump to their desks. He calms them down. He first explains some difficult concepts regarding electricity. He also asks the class to mention any objects that are related to electricity. He divides learners in pairs, gives out a work sheet in which the children have to complete some sentences regarding things about electricity. He assists different each pair to come up with ideas through asking them questions and explaining certain words. He asks each pair to exchange with other pair so that others can see what others have done, he then summarises the main points of the lesson.

F

Mrs Tjiteo is a grade 1 teacher. It is a Maths lesson:

Mrs Tjiteo:	Children, today we are going to learn to count up to ten.
Jerry:	I know how to count. Can I start?
Mrs Tjiteo:	No, no Jerry I must teach how to count first. Ok, children, say the numbers after me. One, two, three.
Class:	One, two, three.
Mrs Tjiteo:	Four, five, six.
Class:	Four, five, six.
Mrs Tjiteo:	Seven, eight, nine.
Class:	Seven, eight, nine.
Mrs Tjiteo:	Ten.
Class:	Ten.
Mrs Tjiteo:	Very good children, but I did not hear everybody's voice. Let's count again.
Class:	(The entire exercise is repeated)
Mrs Tjiteo:	She sings a song with numbers.

APPENDIX E: CLASSROOM PRACTICE

CASES	ALPL 1	ALPL 2	ALPL 3		CL 1	CL 2	CL 3		IA	IA2	IA 3		AL 1	AL 2	AL3		AID 1	AID 2	AID 3
T 01		3					2			3				4				3	
T 02	5						1				1			3					1
T 03		3				4				3				4				3	
T 04		4				3				4				4					1
T 05	5					3				3				4				3	
T 06		4					1			3				4				3	
T 07		3				3					1				2				1
T 08	5				5						1		5					3	
T 09		4				3				3				4				3	
T 010		3				3					1			3				3	
T 011		3				3					1			3					2
T 012		3				3					1			3				3	
T 013		4				3					1			4					1
T 014		4				3				4				3				3	
T 015		3				3					1			3				3	
T 016		4				3					1				1				2
T 017		3					1				1				1				1
T 018		3					1				1			3					1
T 019		3				3					1			3					1
T 020		3					2			3					1			3	
T021	5					4				3				4				3	
T022		3				3					1				1				1
T023			1			3					2				2				1
T024		3					1				2				1				2
TO25			1			4					1				1				1
T026		3					1				1				2				1
T027		3				3				3					1				1
T028			1			3					1				1				2
T029		3				3					1			3					1
T030	5						2			3				4					1

APPENDIX F: TEACHERS' UNDERSTANDING

CASES	ALPL 1	ALPL 2	ALPL 3		CL 1	CL 2	CL 3		IA	IA2	IA 3		AL 1	AL 2	AL3		AID 1	AID 2	AID 3
T O1		4					1		5					3			5		
T 02	5						1			4					1			4	
T 03		4				4				4				4			5		
T 04		4				3					1		5				5		
T 05	5						1			4					1			3	
T 06	5				5					4				3			5		
T 07	5				5						1			3				3	
T 08	5				5					3				3				3	
T 09	5				5					4			5				5		
T 010	5					4					1		5					3	
T 011	5					4					1			3				3	
T 012			1			4				3				3				3	1
T 013		4				3					1			3					
T 014			1			3					2				1			3	
T 015	5						2				1			3					1
T 016	5				5						2				1		5		
T 017	5						2				1				2			3	
T 018		3					2				1				1			3	
T 019		3					2				1				1				2
T 020			1				1				2				2			3	
T021	5					4					1			4				4	
T022		3					1				1				2				1
T023		4				3					1			3					2
T024			2				1				2			3				3	
T025		4					2				1				1				1
T026		3					2				1			4				4	
T027			1				2				1				1				2
T028			1				2				1				1				2
T029		3				3					1			4					1
T030		3					1				1			3				3	

APPENDIX G: TEACHER REFLECTION

CASES	OS 1	OS 2	OS 3		AS 1	AS 2	AS 3		ES 1	ES 2	ES 3		SS 1	SS 2	SS 3
T O1			1				1				1				1
T 02		3				3					1				1
T 03		3				3					1				1
T 04		3				4				4					1
T 05			2			3					1			3	
T 06			1				1				1			4	
T 07		3					2				1			3	
T 08			1				1				1				1
T 09			1			3				3					1
T 010		3					1				1				1
T 011		4					2				1			3	
T 012		3					1			3					1
T 013			1				2				1				1
T 014		3					1				1				1
T 015			1				1				1				2
T 016		4				4					2				2
T 017			1				1				1				1
T 018			1				1				1				1
T 019			1				1				1				2
T 020			1				1				2				1
T 021		3					1				1				2
T 022			1				2				2				1
T 023			1				1				1				2
T 024			1				1				1				1
T 025		3					2				1				1
T 026			1				1			3					1
T 027			1				1				1				2
T 028		3					2			3					1
T 029			1				1				1				1
T 030		3				4				3				3	

APPENDIX H: CORRELATION BETWEEN TEACHERS' UNDERSTANDING AND CLASSROOM PRACTICE SCORES USING THE SPEARMAN RANK-ORDER CORRELATION COEFFICIENT (rho)

Cases	X Score	Rank	Y Score	Rank	d	d^2
T01	18	24.5	15	22	2.5	6.25
T 02	15	18.5	11	12	7.5	56.25
T 03	21	28	17	26	2	4
T 04	18	24.5	16	24	0.5	0.25
T 05	14	16.5	18	28	-11.5	132.25
T 06	22	29	15	22	7	49
T 07	17	22	10	9	13	169
T 08	16	20.5	19	29.5	-9	81
T 09	24	30	17	26	4	16
T 010	18	24.5	13	18.5	6	36
T 011	16	20.5	12	15.5	5	25
T 012	15	18.5	13	18.5	0	0
T 013	12	12	13	18.5	-6.5	42.25
T 014	10	7	17	26	-19	361
T 015	12	12	13	18.5	-6.5	42.25
T 016	19	27	11	12	15	225
T 017	13	14.5	7	1	13.5	182.25
T 018	10	7	9	6.5	0.5	0.25
T 019	10	7	11	12	-5	25
T 020	9	4.5	12	15.5	-11	121
T 021	18	24.5	19	29.5	-5	25
T 022	8	3	9	6.5	-3.5	12.25
T 023	13	14.5	9	6.5	8	64
T 024	11	9.5	9	6.5	3	9
T 025	9	4.5	8	3	1.5	2.25
T 026	14	16.5	8	3	13.5	182.25
T 027	7	1.5	11	12	-10.5	110.25
T 028	7	1.5	8	3	-1.5	2.25
T 029	12	12	11	12	0	0
T 030	11	9.5	15	22	-12.5	156.25
Total						**2137.50**

X = Understanding scores

Y= Classroom practice scores

$$rho = \frac{1 - 6(\Sigma d^2)}{N(N^2-1)}$$

$$= 1 - \frac{6(2137.50)}{30(900-1)}$$

$$= 1 - \frac{12.825}{26.970}$$

$$= 1 - 0.47552$$

$$= 0.52$$

rho = 0.52

APPENDIX I: CORRELATION BETWEEN REFLECTION AND TEACHERS' UNDERSTANDING USING THE SPEARMAN RANK-ORDER CORRELATION COEFFICIENT (rho)

CASES	X Score	Rank	Y Score	Rank	d	d^2
T 01	4	3.5	18	24.5	-21	441
T 02	8	22	15	18.5	3.5	12.25
T 03	8	22	21	28	-6	36
T 04	12	28.5	18	24.5	4	16
T 05	9	25.5	14	16.5	9	81
T 06	7	18	22	29	-11	121
T 07	8	22	17	22	0	0
T 08	4	3.5	16	20.5	-17	289
T 09	8	22	24	30	-8	64
T 010	6	14.5	18	24.5	-10	100
T 011	10	27	16	20.5	6.5	42.25
T 012	8	22	15	18.5	3.5	12.25
T 013	5	9.5	12	12	-2.5	6.25
T 014	6	14.5	10	7	7.5	56.25
T 015	5	9.5	12	12	-2.5	6.25
T 016	12	28.5	19	27	1.5	2.25
T 017	4	3.5	13	14.5	-11	121
T 018	4	3.5	10	7	-3.5	12.25
T 019	5	9.5	10	7	2.5	6.25
T 020	5	9.5	9	4.5	5	25
T 021	7	18	18	24.5	-6.5	42.25
T 022	6	14.5	8	3	11.5	132.25
T 023	5	9.5	13	14.5	-5	25
T 024	4	3.5	11	9.5	-6	36
T 025	7	18	9	4.5	13.5	182.26
T 026	6	14.5	14	16.5	-2	4
T 027	5	9.5	7	1.5	8	64
T 028	9	25.5	7	1.5	24	576
T 029	4	3.5	12	12	-8.5	72.25
T 030	13	30	11	11	20.5	420.25
Total						**3004.51**

X = Reflection scores

Y= Understanding scores

$$\text{rho} = 1 - \frac{6(\Sigma d^2)}{N(N^2 - 1)}$$

$$= 1 - \frac{6(3004.51}{30(900-1)}$$

$$= 1 - \frac{18.027.06}{26.970}$$

$$= 0.33$$

$$\text{rho} = 0.33$$

APPENDIX J: CORRELATION BETWEEN REFLECTION AND CLASSROOM PRACTICE SCORES USING THE SPEARMAN RANK-ORDER CORRELATION COEFFICIENT (rho)

CASES	X Score	Rank	Y Score	Rank	d	d^2
T 01	4	3.5	15	22	-18.5	342.25
T 02	8	22	11	12	12	144
T 03	8	22	17	26	-4	16
T 04	12	28.5	16	24	4.5	20.25
T 05	9	25.5	18	28	-2.5	6.25
T 06	7	18	15	22	-4	16
T 07	8	22	10	9	13	169
T 08	4	3.5	19	29.5	-24	576
T 09	8	22	17	26	4	16
T 010	6	14.5	13	18.5	-4	16
T 011	10	27	12	15.5	15.5	240.25
T 012	8	22	13	18.5	3.5	12.25
T 013	5	9.5	13	18.5	-9	81
T 014	6	14.5	17	26	-11.5	132.25
T 015	5	9.5	13	18.5	9	81
T 016	12	28.5	11	12	16.5	272.25
T 017	4	3.5	7	1	2.5	6.25
T 018	4	3.5	9	6.5	-3	9
T 019	5	9.5	11	12	-2.5	6.25
T 020	5	9.5	12	15.5	-6	36
T 021	7	18	19	29.5	-11.5	132.25
T 022	6	14.5	9	6.5	8	64
T 023	5	9.5	9	6.5	3	9
T 024	4	3.5	9	6.5	-3	9
T 025	7	18	8	3	15	225
T 026	6	14.5	8	3	11.5	132.25
T 027	5	9.5	11	12	-2.5	6.25
T 028	9	25.5	8	3	22.5	506.25
T 029	4	3.5	11	12	8.5	72.25
T 030	13	30	15	22	8	64
Total						**3354.50**

X= Reflection scores

Y= Classroom practice scores

$$\text{rho} = \frac{1-6(\Sigma d^2)}{N(N^2-1)}$$

$$= 1 - \frac{6(3354.50)}{30(900-1}$$

$$= 1 - \frac{20127}{26970}$$

$$= 1 - 0.7462$$

$$= 0.25$$

rho= 0.25