A REVIEW OF COLLABORATIVE TEACHER NETWORKS USING ACTION RESEARCH TO ENHANCE PROFESSIONAL DEVELOPMENT

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A REVIEW OF COLLABORATIVE TEACHER NETWORKS USING ACTION RESEARCH TO ENHANCE PROFESSIONAL DEVELOPMENT

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Abstract

This study focuses on the professional development approach utilised by the Capricornia Educators' Professional Development Consortium (CEPDC). From July 1994 until December 1996, three CEPDC Numeracy projects (among others) were implemented in Central Queensland to provide educators with professional development opportunities to enhance the quality of their educational practice and improve student learning outcomes. An action research methodology was employed to examine these projects, funded by the Federal Government's National Professional Development Program (NPDP). Specifically, the intention of this study was to (i) review the use of CEPDC networks of teachers as a mechanism for delivering teacher professional development; (ii) determine the benefits and difficulties of using action research as a teacher professional development process, and (iii) draw conclusions to identify significant implications for future professional development programs.

The study examines the complex and difficult nature of utilising a professional development approach which challenged participants to accept greater responsibility for their own professional development. It provides a first-hand account of how action research enabled the project to build on and consolidate work begun in the first and subsequent years of operation. Insights from, and learnings of those involved have contributed to a developing understanding of the processes used, particularly in relation to the use of collegial networks as a mechanism for delivering professional development, and the potential and

limitations of utilising action research as a process for engaging educators in self-directed professional development. The significance of this study lies in its contribution to the continuing debate about effective professional development models for educators. In particular, findings have the potential to guide other individuals and schools or school clusters as well as professional associations or educational systems wishing to implement a similar professional development approach to that employed by the CEPDC. Such findings about collegial network groups include motives for joining a network; the development of collaborative learning environments; participant perceptions of the network as a mechanism for delivering teacher professional development, and the structure of network meetings. With regard to action research, findings include coming to terms with a new way of engaging in professional development; engaging in the action research process; identifying the rewards and difficulties of using action research as a process for teacher professional development, and developing the skills of critical reflective enquiry through journal writing. These findings inform eighteen recommendations about (i) using collegial networks as a mechanism for delivering professional development and (ii) utilising action research as a process for teacher professional development.

Table of Contents

List of Tables

List of Diagrams

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Declaration

I certify that the substance of this thesis has not already been submitted for any degree and is not currently being submitted for any other degree or qualification.

I certify that any assistance received in preparing this thesis, and all sources used, have been acknowledged in this document.

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Debra Kay Martin

March 2000

CHAPTER 1: INTRODUCTION TO THE STUDY

1.1 Overview

This study focuses on a regional professional development project that was initiated in Central Queensland in 1993 by the Capricornia Educators' Professional Development Consortium (from here on referred to as the CEPDC). Its purpose was to assist teachers throughout Central Queensland to identify their own professional development needs in relation to the National Statements and Profiles in English and Mathematics, and the Key Competencies. In order to provide opportunities for professional development activities, the CEPDC established collegial networks from educational communities throughout Central Queensland. Given the size and complexity of the project, this study has focussed only on selected Numeracy Networks. The current research project examines the professional development approach adopted by the CEPDC from 1994 until 1996. Specifically, this study reports on the mechanism used to deliver professional development activities and the use of action research as a process for teacher professional development.

Chapter 1 serves four main purposes. First, it provides a description of the context in which the study occurred. Second, this chapter provides background information about the projects. Third, it provides details of the professional development approach adopted by the CEPDC and elaborates upon the model

adopted. It then provides a brief statement of the research problem, before discussing the significance of the study.

1.2 Contextualising the Study

Identifying a worthwhile form of professional development for teachers has long been an issue of concern for researchers (Calderhead, 1993), and it is evident that interest in professional development is growing in prominence. Educators (Ahmed, 1987; Hargreaves & Fullan, 1992; Logan, 1994; O'Connor & Northfield, 1995) advocate that professional development is crucial for teachers to make informed decisions about curriculum changes. Professional development is not an option; it is a necessity. Without it, teachers cannot be expected to meet the challenge of connecting theory and practice to incorporate change into their existing practice.

During the last decade, massive changes have taken place in mathematics education. These changes have been brought about, and influenced by curriculum reform at both National and State levels. Nationally, curriculum reform was introduced through the implementation of *The National Statement on Mathematics for Australian Schools* (1990) and the interpretation by each State of *Mathematics – a curriculum profile for Australian schools* (1994). Within the time span of the current investigation, the publication of the Queensland curriculum review, *Shaping the Future* (1994), and the then

impending implementation of an outcomes based reporting framework statewide caused major curriculum changes to occur in both the content of mathematics education and how it was taught. These changes produced a need for professional growth in discipline and pedagogical knowledge so teachers could keep abreast of current research findings and remain effective practitioners. One possible direction was to offer professional development activities that assisted teachers to take proactive action. However, in order for a proactive approach to be adopted there needed to be a shift from isolated professional development which tells teachers what they ought to be doing, to continuing professional development which assists teachers to take control and effect change.

It is well documented (DEET, 1988; Dunlop, 1989; Gray, 1990) that teachers express dissatisfaction with the professional development on offer. Brennan (1995) expressed the view that much professional development occurring in a climate of curriculum reform is hurried information passing. Literature (Corcoran, 1995; Fullan, 1982) indicates that such knowledge transmission usually occurs in a one off situation, with either no, or limited follow-up support being offered. The assumption is that knowledge gained will be sufficient to ensure the transfer of knowledge into practice. The solution is certainly not as simple as the provision of a 'quick fix' professional development program. Despite major restructuring within the Queensland Department of Education, there appeared at the time of the present study to be minimal change to the style of systemic professional development being provided. Thus, in a context where

contemporary professional development for teachers was widely regarded as being ineffective, it was both appropriate and timely to explore one professional development approach employed throughout rural Central Queensland.

1.3 Background to the CEPDC's Project

In a climate of accelerated change and economic restriction, the CEPDC was formed in 1993 in response to the National Professional Development Project (NPDP), funded by the Federal Government through the (then) Department of Employment, Education and Training (DEET).

Funding made available by the Federal Government provided an opportunity for the CEPDC to overcome some of the constraints of distance and geographic isolation that have restricted teachers' access to inservice and professional development activities in the past within Central Queensland. These funds enabled the CEPDC to provide innovative professional development opportunities over and above that provided by employing authorities to assist teachers to respond to some of the issues relating to national and state curriculum agendas.

Inter-systemic Partnerships

The CEPDC was an inter-systemic partnership between a number of groups in Central Queensland concerned with education. In all, there were twenty-one partners consisting of a tertiary institution, three educational employing bodies,

the Queensland Teachers' Union, the Queensland Council of Parents and Citizens Association, and numerous voluntary professional associations. These partners worked collaboratively to promote the CEPDC activities and were involved in the management of the project.

Project Management

The overall management of the project resided with a Steering Committee comprising members representing the major partners, plus the project consultant and the external evaluator. Responsibility for the day-to-day planning, organisation and implementation of the project was vested in a team of project officers, one of whom was team co-ordinator. For each focus area, that is Literacy, Numeracy, and the Key Competencies, a project officer was employed in either a part-time or a full-time capacity.

Project Stages

The CEPDC project comprised three stages to cater for its developmental nature (CEPDC, 1995). As a consequence of the funding being allocated on an annual basis, it was necessary to treat each stage as a separate "project" that consolidated and extended the work undertaken in the various networks/focus areas in the previous year. Table 1.1 (p. 6 following) identifies the three different "projects", as well as the networks and nature of focus areas.

Table 1.1 Stages of the CEPDC Project

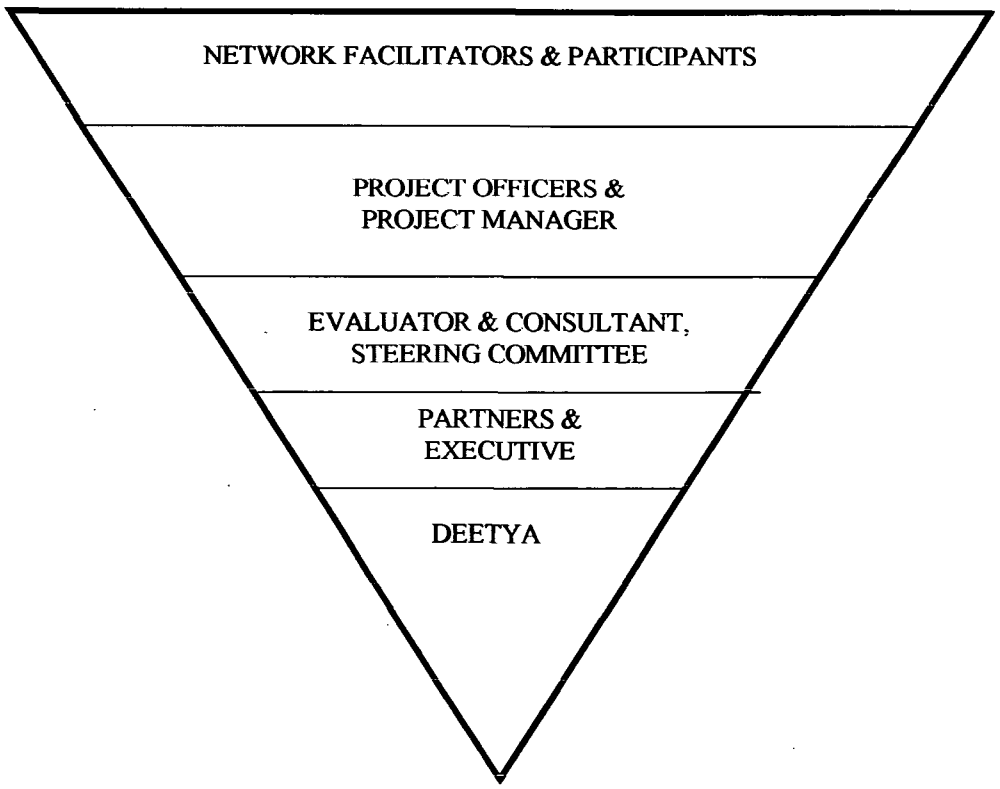
Stages	Overview
Stage 1 Project 1 – July to Dec. 1994	• 15 networks established. • Focus Areas Projects: Literacy, Numeracy and the Key Competencies.
Stage 2 Project 2 - Jan. to Dec. 1995	• 35 networks established (blend of new and continuing). • Focus Areas Projects: Literacy, Numeracy and the Key Competencies.
Stage 3 Project 3 - Jan. to Dec. 1996	• 38 networks established (blend of new and continuing). • Focus Areas Projects: Literacy, Numeracy, Vocational Education Training and Middle Schooling.

In other words, there was a "Coordinating" Project (CEPDC) which had three stages and within each stage there were sub-projects distinguished by Focus area. Thus, by 1996, there were Literacy, Numeracy, Vocational Education Training and Middle Schooling sub-projects.

Project Organisation

Given the complexity of the coordinating CEPDC project, a diagram was designed to explain the organisational framework. Diagram 1.1 (p. 7 following) represents the relationship between networks and the management structure of the coordinating CEPDC project (CEPDC, 1996a).

Diagram 1.1 Project Organisation



At all times the project remained focused on the importance of facilitators and participants continuing their own professional development and in enhancing learning outcomes for a wide variety of students. Hence, the use of the inverted triangle.

Project Aims

Overall, the principal aim of the CEPDC coordinating project was to assist teachers throughout Central Queensland to identify their own professional development needs in relation to the National Statements and Profiles in English

and Mathematics, and the Key Competencies (Wood & Martin, 1995a). In order to do this, teachers had to reconceptualise their current teaching practices in relation to the National Statements, Profiles or Key Competencies so that they could confidently identify their own professional needs and pathways to enhance and extend their curriculum and pedagogical knowledge and the use of the national documents as planning and reporting frameworks (CEPDC, 1994).

Another aim of the CEPDC was to provide opportunities for teachers to take greater control over the direction of their own professional development (Wood & Martin, 1995a). It sought to do this by involving teachers in professional development activities "which emphasise empowerment, critical reflection, action research and change management" (CEPDC, 1996b). To achieve these aims the CEPDC employed a professional development approach which at that time was innovative for Central Queensland teachers.

1.4 The CEPDC's View of Professional Development

The CEPDC emphasised a view of professional development that not only incorporated inservice education and training but also focussed on "long term change from within" rather than induced change through the provision of "short-term external courses/sessions or seminars" (CEPDC, 1994, p. 5). In this sense, professional development was seen to be "personally generative and expansionary" (CEPDC, 1994, p. 5). Thus the CEPDC approach sought to foster self-growth from within to enhance the quality of teaching, and thus

improve learning outcomes for students. Consequently, the CEPDC approach was a unique experience for many participants.

Traditional inservice activities are usually determined by the individual's employer and as such, are designed to achieve the goals of the system, rather than those of the individual. In contrast, the CEPDC sought to promote professional development as being concerned with self-directed learning, and hence, participants were encouraged to take charge of their own learning agendas through reflective enquiry by engaging in action research. Table 1.2 (p. 10 following) illustrates the CEPDC's view of the differences between traditional inservice and the kind of professional development that was offered within its approach.

Table 1.2 Traditional Inservice and Professional Development

Traditional Inservice	Professional Development
Tends to focus on curricula	Provides for both a curriculum development focus as well as challenging participants to reconceptualise their own teaching practices in light of curriculum reform.
Tends to be an isolated event.	Becomes part of a lifelong learning process.
Tends to be solution giving.	Contributes to problem solving.
Tends to lack support structures.	Develops support structures.
Participants usually adopt a passive communication receiver role and have minimal responsibility for their own learning.	Participants adopt an active role and have the major responsibility for their own learning.
Tends to be driven by systemic priorities.	Is given direction from participants' needs.
Tends to make teachers dependent on experts/administrators.	Make educators inter-dependent.
Ignores the dynamics of change.	Supports the dynamics of change.

Original source unknown. Modified by Wood and Martin (1995b, p. 2) *

While both inservice education and professional development, as described in Table 1.2, aim to bring about change, inservice focuses on change which is

* Every effort has been made to locate the source of Table 1.2 which was collected during the development of the CEPDC project, but inadvertently was not identified appropriately in the process. The modification by two Project Officers was made to better suit the CEPDC orientation.

imposed externally. Although there is a place for traditional inservice to keep teachers informed of system initiatives and to learn specific skills, for change in teaching practice to occur as part of a continuing process, professional development of the kind described in Table 1.2 is essential to give teachers the opportunity "to develop the ability to be able to identify whether changes in their own practice are needed and how these changes can best be made" (Wood & Martin, 1995b, p. 2). Inherent in the CEPDC professional development approach was preparing teachers to respond to changes impacting on their profession, as well as to develop skills to assist them to actively seek solutions to problems which impact not only on individual classroom settings, but also on the wider school community.

Hence, the perceptions of professional development held by the project stakeholders, the Steering Committee, facilitators and participants resulted in the development of a number of principles upon which the CEPDC's approach was based. They are as follows:

- professional development should be gradual and long term, involving time and commitment;
- professional development should encourage teachers to make explicit their beliefs about their own learning, about their teaching practice and about education in general;
- professional development should allow for slow and gradual shifts in perspectives;
- professional development should provide opportunities for teachers to take greater responsibility for their own learning and to construct their own knowledge;
- professional development should be collaborative and collegial;

- professional development occurs when teachers' concerns are addressed, and
- professional development should involve action and critical reflection (after CEPDC, 1996a. p. 11).

The implementation of principles such as these resulted in the CEPDC being able to offer teachers an approach to professional development that was different from previous offerings in that:

- participants choose where emphasis is placed in terms of the focus for their group and where and how they want to undertake their professional development;
- participants have responsibility for the direction their group takes, as well as their own professional growth, and
- the project acknowledges the professionalism of teachers (Wood, Martin & Webb, 1995, p. 6).

The CEPDC's approach to professional development viewed classroom teachers as agents of long term change. Since it firmly believed that professional development should be based primarily on the needs and concerns which teachers themselves identify, it favoured voluntary, self generative and developmental professional development activities.

1.5 CEPDC's Model for Action and Change

The CEPDC model for action and change recognised the teacher to be the most significant factor in the change process. Thus, it sought to foster personal growth and change.

The key elements of the CEPDC model for change in teachers' discipline and pedagogical knowledge were those of

- working in a collaborative and collegial network environment;
- participating in regular and continuing professional development activities;
- conducting a classroom based action research project, and
- using reflective journal writing as a tool for reflective enquiry.

The CEPDC model featured the formation of collegial networks from diverse educational communities throughout Central Queensland. During the life span of the CEPDC coordinating project, networks of educators who were interested initially in Literacy, Numeracy and Key Competencies, and during 1996, in Middle Schooling and Vocational Education, were established.

Each network comprised a facilitator and a maximum of twenty participants. Creating a trusting network environment; developing a shared group agenda; facilitating professional dialogue; guiding the participants, and being responsible for all the organisational details such as the venue and refreshments were the responsibility of each network facilitator. Participants volunteered to undertake project activities for their own professional development purposes, in their own time. Classroom teachers from state, Catholic and independent education systems, as well as third year education students and academic staff from Central Queensland University joined networks.

Facilitators, usually classroom teachers, structured the network activities so that participants had opportunities to initiate their own professional learning. Although the facilitator led each network meeting, participants were encouraged and expected to take an active role in shaping the direction of the learning experiences by determining the issue/s to be investigated; setting the agenda, and identifying how best to address their identified issue/s.

Given the unfamiliar, complex and demanding role of the facilitators, continuing training and support was vital to the effectiveness of network groups as a mechanism for delivering professional development. Hence, facilitators were required to participate in a two-day training program prior to commencing network meetings. Due to the distances facilitators had to travel, the initial training was offered over a weekend. Prior to 1996, one training program was offered to all network facilitators. However, in 1996, two programs informed by observations made by project officers, evaluation findings and recommendations were organised. The decision to conduct two separate trainings was influenced by instances whereby (i) some people had been a facilitator for as long as eighteen months; (ii) others had experience as network participants, and (iii) some were involved with the project for the first time (CEPDC, 1996a).

Feedback from facilitators, the external evaluators and the project officers was used as the basis for determining the focus of the training programs. Facilitators from the different focus areas (i.e. Literacy, Numeracy, and Key Competencies)

were trained simultaneously to minimise costs and to address time constraint issues. In Table 1.3, the key areas focused on during both training programs are presented.

Table 1.3 Training for Teacher Facilitators

Training for Continuing Facilitators	**Training for New Facilitators**
confirming a common philosophical understanding of the project	developing a common philosophical understanding of the project
sharing strategies that facilitate adult learning	exploring and modeling effective strategies for working with adult learners
techniques for introducing action research to participants	enhancing knowledge and understanding of the action research process
rehearsing the action research process	rehearsing the action research process
using a reflective journal	using a reflective journal
implementing and sustaining network/classroom based action research learning	exploring different modes of operation for network groups and conceptualising what might happen during a meeting
exploring individual focus areas (e.g. Numeracy)	exploring individual focus areas (e.g. Numeracy)

(CEPDC, 1996a)

Essentially, the training focussed on preparing facilitators to cope with introducing an unfamiliar professional development approach to participants. One advantage of conducting two training programs was that continuing facilitators were invited to facilitate sessions for new facilitators. Thus, the experience and knowledge of these facilitators was acknowledged. Another advantage was that the programs could be tailored to accommodate the varying needs of the facilitators.

In addition to the training programs, continuing support for facilitators was offered in the form of facilitators' network, which comprised other facilitators in the same focus area and the project officer responsible for that area. Regular teleconference meetings were held on a monthly basis. These took the form of a debriefing session and included the provision of content knowledge; facilitators sharing successful strategies; discussions about issues related to the implementation of action research; resource sharing, and collaborative problem solving. In addition, the project officer attended network meetings and provided facilitators with whatever assistance they required ranging from planning network meetings cooperatively to providing resource material. The nature of support varied and was dependent on the individual needs of the facilitators.

The co-ordinating project sought to promote professional development as being concerned with self-directed learning; collaborative and collegial learning environments; classroom based research, and gradual shifts in perspective on

discipline and pedagogical knowledge. Through a process of action research, participants were encouraged to become aware of their own assumptions about learning and teaching; reconceptualise these assumptions against the National Statements and Profiles or other relevant documents at the national level; build on existing knowledge, and enhance their skills in relation to their current teaching practices. Initially, the Consortium's professional development approach was informed by the work of Kemmis and McTaggart (1988), although during 1996 Grundy's (1995) work on action research was also drawn upon extensively.

1.6 Statement of the Research Problem

The current study is predicated on the assumption that (i) much teacher inservice activity is ineffective, and (ii) longer term professional development that supports teachers' proactive participation in self-directed learning is a precursor to enduring pedagogical change.

The problem obtains: how is it possible to initiate and sustain professional development which brings about change, not only in pedagogical practice, but also in student learning outcomes? To address this problem, this study draws on the advent of the National Professional Development Project to answer these questions.

- What is the value of using collaborative networks networks as a mechanism for delivering teacher professional development?
- What are the benefits/limitations of using action research as a process for teacher professional development?
- What are the significant implications of this study for future professional development programs?

1.7 Significance of the Research Problem: A Professional Perspective

From a professional perspective, this research was important because of its potential to capture and create knowledge about a current and innovative professional development approach which had not been investigated previously in a similar context in Central Queensland. It was anticipated that the research would provide insights and understandings about the nature and processes of teacher professional development at a time when developing understanding in these areas was crucial. Obviously, the CEPDC experiences had the potential to inform other interested stakeholders about a range of issues which emerged while employing a professional development approach that represented a fundamental shift from a traditional management or 'top-down' approach, to one that involved teachers in the construction of knowledge about their own practice. Specifically, these issues related to the network mechanism employed to deliver professional development and the use of action research as a process for teacher professional development.

It was anticipated that the research would generate understandings which would enhance what was already known about the utilisation of networks as a mechanism for delivering teacher professional development, so that professional organisations and other professional development providers could explore the effectiveness of collegial networks as a means of delivering teacher professional development. They could also consider the value of teachers working in collegial network groups to research a common professional need or topic of interest as a possible means of professional development. Further, insights and understandings about the role of facilitators when working with their peers in a collegial network situation could also be drawn from this study.

The process used by the CEPDC was significant in the then current climate of change as it provided mechanisms for participants to respond to change in positive ways. Thus, the opportunity to explore how voluntary groups of teachers used an action research approach to improve an aspect of their practice was timely. The research had the potential to further develop an understanding of the type of support structures required by teachers whilst engaging in classroom based research. According to Wadsworth (1984, p. 5),

> There is value in knowing what people think of things, but even more value in knowing why, and thus what they would prefer.

This study provided an opportunity to synthesise insights, such as those nominated by Wadsworth, into how an action research approach to professional development evolved and developed over a two and a half-year period. Findings

in this area would be of particular interest to teachers as individuals; teachers as collective groups within and beyond schools (e.g. professional associations); individual schools, or school clusters interested in implementing an action research process as a means of professional development.

This study also provides an opportunity to test the theory espoused in the literature about effective elements of professional development in practice, with a view to building on existing research in this area. It is anticipated that this research will also provide insights into how some teachers in Central Queensland manage rapid, complex educational changes and the kind of support required to sustain those changes. The current research was conducted at a time when major curriculum reform in Mathematics Education had been initiated. Thus, the topic, which explores how voluntary groups of teachers used an action research approach to improve the learning and teaching of mathematics was timely. Also, the research had the potential to raise questions about the type of professional development that would best equip and support teachers to effect change in their everyday educational practice.

The findings of this investigation have therefore, the potential to influence the design of future professional development policies at professional association and multiple school, regional or state levels provided that prior experience continues to be valued. The current investigation has the potential to contribute to the existing debate on teacher professional development and open up

opportunities for future research. It is anticipated that educational systems, professional associations and universities could use the findings of this investigation to initiate and inform their own enquiry oriented professional development. Schools may even consider using a similar approach to undertake school or cluster based professional development.

1.8 Significance of the Research Problem: A Personal Perspective

From a personal perspective, this research was inspired by my view that there must be a better way of conducting professional development other than by participating in endless short courses or one-off events which make me extremely conscious of my own inadequacies. Having been responsible for designing and implementing professional development programs for mathematics educators over a number of years as an educational adviser for the Queensland Department of Education, I felt frustrated by having to guess what were the professional development needs of teachers. There were few opportunities either to determine their needs, or to develop a plan for addressing those needs collaboratively. These combined experiences of working as a provider of professional development, as well as being a participant in professional development programs, have continued to foster my interest in the field. Thus, this study offered an opportunity to extend and deepen my own personal understandings of the complex issues associated with implementing and

sustaining a professional development approach which was different from that previously experienced by most mathematics teachers in Central Queensland.

1.9 Conclusion

As evidenced, Chapter 1 provides a description of the context in which the study occurred; background information about the CEPDC projects, and details of the professional development approach adopted by the CEPDC and the model adopted. The significance of the study and the researcher's interest in the area have been declared. An overview of subsequent chapters follows.

Chapter 2 focuses on teacher professional development approaches by highlighting some of the key ideas presented in the literature and linking them to the theories underpinning the CEPDC projects. It also examines the nature and potential of action research as a process for teacher professional development. The role of critical reflection in contributing to the continual development of teachers' professional development and the use of a journal as a reflective tool are also considered. Chapter 3 describes the research methodology, the data collection techniques and the means used to analyse the data. Further, there is a consideration of revelant ethical issues as they applied to the study. Chapter 4 presents the findings arising from the data and discusses their significance in relation to the questions framing the research. In the final chapter, implications

arising from the research, as well as recommendations for others using a similar approach to the CEPDC, are presented.

CHAPTER 2: A REVIEW OF KNOWLEDGE ABOUT TEACHER PROFESSIONAL DEVELOPMENT

2.1 Overview

The literature reviewed in this section relates to teacher professional development. Specifically, the intent of the current literature review is to explore current issues in teacher professional development in general, including those dealing specifically with professional development for mathematics teachers, and to identify the nature of professional development and the effects of policy documents on its provision. In addition, processes and strategies aimed at promoting self-directed professional development that are consistent with the theoretical basis underpinning the professional development approach adopted by the CEPDC are discussed.

To narrow the focus of what is a vast field, the researcher sought to

- identify issues in teacher professional development;
- critique professional development policies;
- identify the nature of two major teacher professional development paradigms;
- critique past and current approaches to professional development for Queensland mathematics teachers;
- explore the role of facilitators of adult learning;

- consider implications associated with adopting action research as a process for teacher professional development;
- investigate the role teacher networks can play in delivering professional development, and
- identify characteristics of 'best practice' in professional development.

Ultimately, the review will synthesise the debates and common opinions emerging from contemporary research in those areas most relevant to the current study.

2.2 Issues in Teacher Professional Development

Throughout the literature the significance of continuous professional learning for teachers is emphasised (Ahmed, 1987; Bellanca, 1995; Cranton, 1996; O'Connor & Northfield, 1995; and Smyth, 1991). However, an increasing number of commentators have criticised the way professional development has been organised and delivered implying that the professional development needs of teachers are not being met adequately.

There is considerable discussion of the quality and effectiveness of different approaches to teacher professional development (Corcoran, 1995; Hargreaves & Fullan, 1992). The literature suggests that existing professional development sessions have limited impact on teachers as not only do they take place in isolation, but also they are often based on organisational, rather than participant

needs. For example, Corcoran (1995) questions the relevance of much existing practice to teachers' professional needs. He states:

> Professional development is thought of almost exclusively in terms of formal education activities, such as courses or workshops. These programs may or may not be relevant to teachers' professional development needs. Teachers typically spend a few hours listening and, at best, leave with some practical tips or some useful materials. There is seldom any follow-up to the experience and subsequent inservices may address entirely different sets of topics (p. 2).

A number of reports (DEET, 1991b; Dunlop, 1989; Gray, 1990; Research Services, 1991) also assert teacher dissatisfaction with existing professional development provisions. In particular, two reports, *Teacher Professional Development and Support* (DEET, 1990) and *Review of Inservice Education in Queensland* (Gray, 1990), state that the quality and format of professional development available to teachers is inadequate and irrelevant and fails to meet the needs of classroom practitioners. Another DEET report (1991a) draws attention to the disparity "between what teachers want from professional development activities and what is being provided by teacher educators, schools and education systems" (p. 9). Fullan (cited in Louden, 1994, p. 5), also speaks of topics for professional development activities as being "frequently selected by people other than those for whom the activity is intended". Further, Elliott, Macpherson and Aspland (1994) recognise that "professional development needs to be contextualised in the realities of teachers' work" (p. 7). Ahmed (1987) takes the argument further by claiming that if:

> changes in teachers' behaviour are to be brought about, the teachers themselves must be involved in challenging their beliefs and assumptions (p. 33).

Comments such as these imply that teachers have their own personal and professional purposes in undertaking professional development activities and are likely to be more motivated when the activity is relevant to those purposes and they play a role in shaping the nature of the professional activity. Most importantly, by involving teachers in shaping the direction of the learning process, professional development organisers would be according teachers the same integrity of purpose and ownership of the learning process that is currently being advocated for the effective teaching of students.

The role of teacher professional development in respect of stimulating change in pedagogy has also been subjected to examination and strong criticism. Writers such as Dunlop (1990) and Sparks (1995) point out that too often employers and organisations have expected that attendance by teachers at isolated in-service sessions would result in changes in classroom practice. Further, Loucks-Horsley and Stiegelbauer (1991) argue that "change is a process, not an event" (p. 17). They assert that the change process is developmental and as such requires time for inidividuals to "go through stages in their perceptions and feelings about an innovation, as well as in their skill and sophistication in using the innovation" (p. 18). Such comments in the literature clearly indicate that if time is allowed for participants to consider, experiment with, and reflect upon

their actions, it is more likely that professional growth will stimulate change in individual practice.

Another criticism raised in the literature is that professional development providers need to be much more aware of how adults learn and the implications of those processes for designing and implementing professional development activities (Queensland Board of Teacher Registration, 1991; Wood & Thompson, 1993). For example, Connor (1991) stresses the importance of paying attention to teachers as adult learners when planning professional development activities "if they are to have maximum impact" (p. 61). Further, Connor (1991) suggests that organisers of professional development activities need to take into account what the literature tells us about adult learning principles and the conditions that facilitate effective adult learning.

There is support among researchers for the contention that teachers "evaluate staff development efforts in much the same critical terms they did more than a decade ago" (McLaughlin, 1991, p. 61). For example, it is a common belief amongst teachers and administrators (DEET, 1991a; McLaughlin, 1991) that staff development efforts generally, are not designed in ways that enable an individual teacher either to develop or to grow professionally. Such criticisms have led researchers such as Harvard and Hodkinson (1994) to advocate the need to reconceptualise existing professional development approaches in order

to develop a new culture of teacher development that is more responsive to the developmental needs of teachers. For example, such a professional development approach might include opportunities for self-direction; collaborative learning, and support for teachers to implement and reflect on new practices.

2.3 Professional Development Policies

As in many countries, profound changes have occurred in education during the last ten years in Australia (Beare, 1991, p. 13). In response to these educational changes state/provincial governments have developed policies aimed at bringing about educational reform. Not surprisingly, one dilemma associated with educational change is the provision of teacher professional development. Lieberman and Miller (1991) confirm that "one of the most vexing problems of educational change is the continuous growth and development of teachers" (p. vii). Since professional development is at the heart of the quality of teaching and learning in schools, it is imperative that policies promote quality continuing educational opportunities for teachers.

In order to contextualise the policy framework within which teacher professional development programs are currently located in Queensland, a brief look at policies is appropriate. This is because, as Brennan (1990) states, "professional development opportunities for the majority of teachers are largely determined by policy frameworks set in place by governments" (p. 118). Whereas it is

acknowledged that the draft policy, *Professional Development and Training Agenda for Teachers* (Department of Education, Queensland, 1997), makes more aspects of professional development more explicit and has been adopted since the current study was undertaken, it is asserted that it doesn't address the issues with which the study is concerned.

This researcher's expectation that policy documents, which guide the provision of teacher professional development, would be located easily among the literature was unfounded. Much energy and time was spent locating the *Human Resources Policy on Employee Training and Development, Performance Management* (Department of Education, Queensland, 1995). Consultation with teachers and administrators revealed that many were unaware that such a document existed, perhaps because of its then recent publication.

An examination of the Department of Education's then current policy on teacher professional development raises many issues none the least of which is the need for the system to be explicit about both the nature of the professional development they offer teachers, and the intended outcomes of such activities. The policy document neither provides an explicit theoretical basis for constructing a policy (guidelines) on professional development, nor outlines the principles that underpin the development and implementation of the training and development programs. It states that organised professional development programs "are to have clearly defined objectives and outcomes" (p. 3). Whereas

the policy document includes a list of recommended learning options together with one of training and development providers, no information is offered about how to manage and improve the process of professional development itself. The only reference to the nature and design of training and development programs is that they need

> to take into account learning style, access to providers, financial, time and administrative implications, and be relevant to Department of Education policies and guidelines (Department of Education, Queensland, 1995, p. 3).

Such a shortcoming confirms Ingvarson's (1987) observation that "you will search in vain in many policy documents for a conception of how the professional knowledge required is to be developed and implemented" (p. 43).

Another shortcoming relating to government policies is pointed out by Graham (1994) who says that an "outcome of top down curriculum innovation is that the bottom (teachers) not the top (policy writers) get to implement the policy" (p.1). Further evidence in the literature supports the claim that professional development has a greater chance of success when:

- there is a shared understanding of its purposes (Showers, Joyce & Bennett, 1987), and
- it is bottom up and reflects the identified needs of teachers and schools (Graham, 1994).

This latter point is significant, for as Graham (1994) asserts about 'top' down policies, "five years down the track all that may remain are new ways of talking about pre-existing practice" (p. 1).

The influence of political agendas in the framing of professional development policies is another factor that needs to be considered. The political milieu in which the policy is developed has significant implications for the kind, and degree, of support for professional development provided. For example, as a result of a change of government in Queensland, the implementation of Student Performance Standards in English and Mathematics was discontinued, despite the fact that eighteen months had been spent training teachers for their implementation. Another observation is that whenever a state or federal government policy initiative is implemented prior learning about how a new initiative may be implemented and supported doesn't seem to enter into the equation. Indeed, Brennan (1995) states:

> Much activity associated with state and federal government policy initiatives seems to have forgotten that this learning has been well documented and could be built into current efforts to provide professional development, even within cost constraints (p. 4).

Based on comments such as this, one could argue that economic and political, rather than educational reasons drive the majority of decisions the government makes about the type of professional development on offer to teachers, as well as the degree of support provided.

A key opportunity to address some of the current concerns expressed about government policies for the professional development of teachers arose when, as a result of devolving educational responsibility since the 1980s, the provision of teacher professional development in Queensland was decentralised. The locus of implementation moved from a completely central office focus to a regional, school support centre and school-based responsibility (DEET, 1991b). Initially, Central Office still played a major role in the initiation of professional development and allocation of funding to support system priorities, such as the implementation of Student Performance Standards (SPS) throughout Queensland in 1994-1995. Based on her own experiences, Brennan (1995), however, draws attention to the fact that recent departmental policies have tended to imply that professional development is an individual school level responsibility (p. 4), rather than a regional responsibility. With this shift, from a centralised to a decentralised policy, several problems have emerged. It is not the intention of this review to identify all such problems, but those that are relevant to the current research project will be discussed. They are: introduction of new policies; the availability of human and physical resources; the expectation that teachers will deliver inservice, and the provision of follow-up support.

The first problem relates to the way in which new policies are introduced. Brennan (1995) notes that the general trend when introducing new policies is for an information session to be held for administrators and/or key teachers who are

then asked to "ensure the in-servicing of teachers at the school in order to implement the initiative" (p. 4). However, Mitchell (1994) argues that there are "limited structures in place in most schools to enable individuals or groups" (p. 6) who attend information sessions to share their experiences with their colleagues. The CEPDC's network mechanism sought to overcome this problem by providing a means for teachers to share their knowledge and experiences.

The second problem relates to the availability of "human and physical resources" (DEET, 1991b, p. 52) to provide professional development activities to "large and small schools, rural and city schools" (DEET, 1991a, p. 5). In a centralised system, teachers have "limited choice in terms of the state provided professional development" (DEET, 1991b, p. 2). For example, each teacher is usually introduced in a similar fashion to mandated curriculum change (DEET, 1991b). However, in a system which is more devolved, individuals can seek professional development in accord with a self-generated agenda. Not withstanding that possibility, providing a wide range of professional development activities to cater for the diverse needs and interests of individual teachers and schools, as well as overcome some of the constraints of distance and geographic isolation, has been difficult, especially in rural areas such as Central Queensland. Establishing a consortium, such as the CEPDC, is one means of facilitating professional development, which has a high degree of flexibility and built-in responsiveness in order to realise an individual's personal agenda.

The third problem has to do with the expectation that teachers provide inservice for their colleagues about system initiatives, which they may or may not understand. Brennan (1995) argues that such a problem becomes more complex when time is not allowed for the session leader to accommodate the paradigm shifts that may be necessary to implement the initiative. Training teachers as facilitators and providing continuing support to them in that role is the CEPDC's response to this problem.

The fourth problem deals with supporting and sustaining teacher professional development. A report prepared by the Queensland Board of Teacher Registration (1991) acknowledges the importance of adequate support and opportunity for teachers "to apply and evaluate new ideas" (p. 32). Further, Dale (1995) argues that all too often the potential effectiveness of changes is severely affected by the "lack of adequate professional development support" (p. 17). Past experiences serve as a reminder that support for system initiatives is often removed when they are not widely understood and before there is evidence of successful implementation at the classroom or school level. One example of this practice was the withdrawal of advisory support to schools for the implementation of the Behaviour Management in a Supportive School Environment Policy (1993) at the end of the same year in which it was introduced. Action such as this demonstrates a lack of insight and understanding about the kind of professional development and continuing support that is

required to accommodate the changes recommended in some of the current policies.

In addition, during the past ten years, a lack of cohesion within policies emanating from Studies Directorate and numerous disparities among the methods used by the Queensland Department of Education to sponsor professional development have affected how teachers perceive and value it. Such disparities are predominantly concerned with economic and professional development policies. Factors relating to funding on the one hand include: the varying availability of relevant professional development from one year to the next as a result of economic rationalism; little money being available specifically for classroom-driven, teacher-focused professional development; the availability of funds predominantly for the initial implementation of system initiatives; and the 'user pays' system for some, but not all, professional development activities. On the other hand, factors relating to government policy include: limited access to professional development activities during school time as a result of a change in government; little or no subsequent support for new initiatives; the quality of professional development on offer by employers; the lack of coordination of professional development for teachers, and the varying nature and amount of professional development offered by individual regions to teachers. Collectively, these factors contribute to a very fragmented picture of the nature, availability, and delivery of teacher professional development in Queensland.

Such fragmentation is not surprising in light of McMorrow's (1995) suggestion that in most instances in Australia, past policies for the professional development of teachers "lacked systematic planning" (p. 4). In response, others (e.g. Corcoran, 1995; Graham, 1994) recommend a complete restructuring of professional development policies to better meet both individual and whole school needs. Indeed, Corcoran (1995) argues that if today's teachers are to be prepared adequately to meet future challenges, the current haphazard approach to professional development must come to an end. McMorrow (1995) also supports the view that there is a need for policy outcomes whereby professional practice in teacher education is substantial and meaningful and leads to professional growth. Another valid point, to which Corcoran (1995) draws attention, is that policy makers must establish a coherent and more effective approach to professional development. He contends that in order to do so, they must understand how professional development is an "essential and integral part of teachers' work" (p. 2). It is evident from McMorrow's and Corcoran's comments and other examples in the literature which highlight inadequacies in the current policy, that there is a need for the development of a strategic policy framework.

Finally, it seems that policies on teacher professional development are essential to inform providers of professional development programs about their nature and to guide their conduct. Such policies should be sufficiently flexible to take

into account the priorities of individual teachers, and schools and broad system requirements. Furthermore, professional development policies need to place more emphasis on the provision of programs that will empower teachers to manage educational change.

2.4 The Nature of Teacher Professional Development Paradigms

It is possible to classify the approaches to professional development found in the literature into two groups. Some authors refer to these as the 'old' and 'new' approaches, although the use of these terms implies that the former approach is no longer acceptable. 'Traditional' or 'non-traditional' are two other popular terms used to describe approaches to professional development in the literature. Whereas Ingarvson (1987) simply distinguishes between the two paradigms by referring to "learning from others" and "learning for oneself" (p. 29), the terms "management approach" and "empowerment model" seem to characterise the features exhibited respectively by each. No matter what their labels are, the two paradigms are framed by different theories of learning and embody distinctly different systems of belief, and hence action: one is 'reactive', the other 'proactive'. Evidence of this can be seen in Table 2.1 (p. 39 following), which identifies the contrasting characteristics of each.

Table 2.1 Two Teacher Professional Development Paradigms

	Management Paradigm	**Empowerment Paradigm**
focus	change	Choice
source of ideas	experts/theorists	teachers/practitioners
starting point	new idea imported from outside	individual teacher's own strengths and abilities
locus of power/ control	outside agents	teachers
indicator of success	change in teachers	responsible decision making by teachers
role of teacher	obstacle to be overcome	decision-maker
view of teacher	deficient and devious	competent and responsible
expectation of teacher	revolution	evolution
role of outside agent	change agent	choice agent
mode of operation of outside agent	propaganda pressure	presentation of choices support
'image' of outside agent	salesperson	facilitator

Original source unknown. *

- Every effort has been made to locate the source of Table 2.1 which was collected during the development of the CEPDC project, but inadvertently was not identified appropriately in the process.

The management paradigm is oriented organisationally, with the professional development needs being determined by the individual's employer. Such a model is often used to highlight new policies, programs or curricula to schools. Activities are often based on a 'deficit' belief with the intention being to provide teachers with information updates on new developments (Dunlop,_1990). Usually requiring teacher-release time, this model is short term with either limited or no follow-up support being offered. Participants usually adopt a passive receiver communication role with leaders being predominantly outsiders to the school and functioning primarily as experts. Expectations are that the skills and knowledge gained by teachers will be incorporated into classroom practice in the immediate future. Change is viewed as something that "is done to teachers", so that, by participating in a training program, teachers change, and by implication, their classroom practice improves (Clarke & Hollingsworth, 1994, p. 2).

An example of such an approach to professional development in action is the one-day inservice on Student Performance Standards provided by the Queensland Department of Education for mathematics teachers. After this activity, it was assumed teachers were prepared to meet the challenge of implementing Student Performance Standards.

In contrast, the empowerment approach has a strong commitment to the individual participant. Participants are encouraged to pursue activities that will meet their self-identified professional needs. Not only are participants actively engaged in the learning process, but also they are acknowledged as professionals with greater control over their own professional development (Wilkinson, 1995, p. 9). The empowerment approach aims to bring about long-term change, especially in philosophies underpinning current practice. It is based on the belief that professional development for teachers occurs through personal growth and change from within as teachers reflect on their classroom practice, based upon their own classroom experiences. As early as the 1980s, aspects of the empowerment approach were described (Ahmed, 1987). However, there are few examples in the literature of programs based on the philosophy underpinning the empowerment approach, although the Low Attainers in Mathematics Project (LAMP) is one successful example cited. Reasons attributed to the success of the LAMP program include:

> involving teachers in a way of working together that enables them to develop their own strategies and hence become more confident and competent in their classrooms. Teachers do not view their development as a 'fad' that will disappear along with all the others because their beliefs about learning and mathematics have changed (Ahmed, 1987, p. 45).

Ahmed's comment suggests that the implementation of the empowerment paradigm encourages teachers to refine current practices leading to changes in practice and continuing professional growth.

It is not suggested that there should be a singular approach to professional development, however, for it is clear that the purpose of the professional development program determines which approach is adopted. The approaches are probably seen most usefully as being two ends of a spectrum. Thus, whereas it is appropriate to use the management paradigm to inform teachers expeditiously about systemic needs, the empowerment paradigm is appropriate when long-term change in teaching practice, as described by Ahmed (1987) and Clarke and Peter (1993a), is desired. Not withstanding that, a number of professional development activities which are reported as being highly effective feature elements of both the management and empowerment paradigms. One example is the course, *Basic Learning in Primary Schools* (Department of Education, Queensland, 1987). Nevertheless, it is disconcerting to find that existing knowledge about both approaches to teacher professional development has not been used to inform the philosophies underpinning professional development programs currently on offer to Queensland teachers, for in reality, the management paradigm dominates to the exclusion of the empowerment paradigm.

2.5 Past and Contemporary Approaches to Professional Development for Queensland Mathematics Teachers

Historically, formal professional development attempts aimed at fostering change in classroom practice have been unsuccessful for mathematics teachers. Dunlop (1990) claims that although school curricula in mathematics continue to

undergo changes in content and recommended pedagogy, it remains the case that classroom practice in many places is little different from what it was twenty years ago. Kanes and Nisbet (1995) also emphasise that teacher development as it currently exists is not usually regarded by teachers themselves as being effective in improving the quality of professional practice in mathematics education.

As a consequence of being unable to locate literature about approaches to professional development used by the Queensland Department of Education during the1970s, I conducted interviews in March and April 1995 with Mr Colin Dore, who from the early 1970s until 1986 was Primary Inservice Coordinator for the Queensland Department of Education. As he explained, there was no coherent organisational plan for professional development in the early 1970s, and the majority of inservice was directed towards school administrators who were responsible for passing on what they saw as being relevant to their own staff. Until 1973 when Commonwealth and State funding enabled the provision of a range of one-day inservice courses there was minimal inservice offered directly to teachers. A particular focus at that time was placed on extending mathematical knowledge and skill, rather than on exploring educational issues associated with the teaching of mathematics (Dore, personal communication, 30 March 1995). It was only during the 1980s that there was a gradual shift from centrally devised top-down professional development programs to those offered

at school level and focusing on change. A consequence was that mathematics teachers were given greater access to professional development through inservice activities organised by their own school and/or Regional Education/School Support Centres.

In late 1988, the 1-10 Mathematics Inservice Project (MIP) for primary and secondary teachers of mathematics was introduced as an initiative of the Queensland Department of Education (Cranston, Dungan & Grieve, 1989). This innovation signaled a milestone in the professional development arena for teachers of mathematics. The MIP model was significantly different from previous professional development models in that the focus was on enhancing the classroom practices of primary and secondary mathematics teachers, as well as extending their mathematical knowledge and understanding (Cranston *et al.*, 1989). Whilst involved in the project, participants were withdrawn to a central location for a series of nine to sixteen full-day workshops. Previously, mathematics educators (Ahmed, 1987; Cockcroft, 1983; Lovitt, Owen, Johnson, Clarke & Morony, 1988) had recognised the need for, and written about the increased importance of ongoing professional development for mathematics teachers. However, this was the first time that teachers of mathematics in Queensland were released from their classrooms to participate in a continuing professional development activity.

In the 1990s, the focus was on either providing a full day of management-type professional development for administrators or training of key teachers to prepare their peers for the new responsibilities educational changes bring. The emphasis on using teachers as change agents seems to be a growing trend. According to Morrison (1993), the rationale behind this approach is that "the inservice training of teachers is better effected by practitioners who are rooted in classroom practice" (p. 71). Such is predicated on the assumption that effective classroom practitioners make effective teacher educators in a facilitator role. The work of Knowles (1980), Jarvis (1988) and Candy (1991) has been significant in raising issues relating to the skills required by teacher facilitators working with their peers. These issues are explored further in the next section sub-titled, 'The Role of the Teacher Facilitator'.

It is clear that during the past two decades some efforts have been made through inservice education and the training of key teachers to prepare mathematics teachers for the new responsibilities educational changes herald. Thus, the challenge now, is for educators to determine how to apply the findings of contemporary research on learning and teaching in mathematics education generally, to teacher professional development programs specifically so that benefits accrue to both students and teachers (Hawthorne, 1995). Such knowledge, especially that learned from other successful professional development processes, should be utilised to provide possible answers to the question of what factors contribute to the successful provision of professional

development in mathematics education for teachers. Information of this nature, which would guide teacher facilitators of adult learning in mathematics as well as other curriculum areas, seems to be wanting in the literature.

2.6 The Role of the Teacher Facilitator

The move towards a reconceptualisation of teacher professional development together with a need to empower teachers requires fresh thinking about the role of facilitators of adult learning, with Harvard and Hodkinson (1994) drawing attention to the need to change their traditional role. In the literature, a range of terms such as teacher educators; adult educators; educators of adults, and facilitators of adult learning are used to describe the person/s responsible for facilitating learning. In the context of this study, these terms have been interpreted to refer to that/those person/s (e.g. educational advisers, consultants, university academics or teacher peers) involved in providing continuing professional development for practising teachers. Because the CEPDC adopted the title Facilitator to identify those teachers who led network professional development activities, the term Teacher Facilitator is used to denote such persons henceforth.

Knowles (1980) claims that the role of the teacher facilitator has moved from that of "transmitter, judge and instructor" to that of "helper, guide, and resource person", with the ultimate goal of assisting people to grow in their ability to learn (pp.48-49). He acknowledges that the shift in role from "transmitter" to

"resource person" places a heavy burden on teacher facilitators (1980, p. 49). According to Knowles (1980), the challenge for the teacher facilitator can be viewed as helping individuals "develop the attitude that learning within one's profession is a lifelong process", thus assisting them to acquire the skills necessary for self-directing their own professional learning more effectively (p. 28). This notion is also supported by Candy (1991) who claims that current literature relating to the role of "adult educators" promotes an "ideology in which many more initiatives have passed over to the learners who are now expected to be much more independent, self-directed and autonomous" (p. 32).

Cooper & Boyd (1994) argue that for teachers to be successful in this challenging endeavour of working with other adults who are expected to be more self-directed, they need to be coached in ways of working collaboratively with their peers, and ways of helping adults both to understand change, and to see themselves as continual learners. Jarvis (1988) notes, however, that the preparation of educators of adults has "occupied an insignificant place in teacher education" (p. 118). He argues further, that whereas teachers of adults have relevant experience and knowledge, they require certain other skills in order to help adults learn. Such skills include "knowledge of the educational process; appropriate philosophy and attitude; teaching and personal skills" and an understanding of adult learners (Jarvis, 1988, p. 118). Part of the challenge,

then, is to find skilled teacher facilitators who can respond to the diverse needs of their peers with whom they are working as adult learners.

2.7 Action Research as a Process for Teacher Professional Development

In response to perceived "tensions between theory and practice", some teacher facilitators are turning to "ideas of reflective practice to attempt an integration of theory with practice" (Harvard & Hodkinson, 1994, p. vii). Much has been written about the use of action research as a process that teachers can use to reflect upon and implement both personal and organisational change (Grundy, 1995; Grundy & Kemmis, 1988; Wilkinson, 1995). According to Grundy (1995), action research in the context of education is "a process of change, but not just change for change's sake; it is change specifically directed towards improvement" (p. 9) and as such, is not just a process of change: "it is also a process of professional learning" (p. 5). Comments such as these imply that action research has the potential to be a powerful form of teacher professional development.

It is accepted generally that learners should be active constructors of their own knowledge structures rather than being passive recipients of others' knowledge. Action research is a way of providing an opportunity for teachers to construct their own knowledge; test it out in practice, and challenge preconceived assumptions about teaching and learning. Whereas Jennings (1994) argues that

the action research process is a means of informing and challenging the "taken-for-granted beliefs that teachers hold" (p. 4), Grundy (1995) perceives it to be a form of practical action which "teachers undertake as part of, not separate from, their professional work" (p.7). In effect, action research provides a process for teachers to investigate their own practice thereby engaging professional learning to make sense of the teaching/learning process in their own contexts.

The strength of this approach from a professional development perspective is its capacity to inform and empower the participant practitioners. Teachers work from a position of "a perceived need for change" as opposed to that of being "recipients of the decisions of others" (de Gauna, Diaz, Gonzalez & Garaizar, 1995, p. 186). A view such as this places teachers at the centre of the change process. Halliwell (1987) also supports the view that significant change only takes place when the teacher is actively involved in the change process (p. 1). From this perspective, Grundy (1995) maintains that action research "is a powerful form of professional development" with its power coming "from the fact that the focus of inquiry and interest in action research is the participants' own practice" (p. 5).

Contemporary literature and recent studies tend to support an approach to professional development that addresses the concerns of teachers in an action research mode. Reference has been made previously to the LAMP professional development model, which also advocates that teachers be researchers in their

own classrooms (Ahmed, 1987). Clarke, Carlin and Peter (1992) agree that effective professional development is based on the belief that change will arise from the classroom experiences of teachers who have undertaken to experiment with old and new techniques in their classroom. Such an approach to professional development assumes that its value will emerge more clearly and with greater personal impact when applied in a teacher's own classroom, and that this will fuel a change in that teacher's beliefs, generating further commitment to continuing professional development.

According to Grundy (1995) and Wilkinson (1995), classroom teachers can change current practices by engaging in action research. However, it is clear that two conditions are essential. First, teachers must be put in touch with education research and theory, gaining a sound and workable understanding of relationships between theory and practice from the start. As Goninan (1995) states, without linkage to a theoretical framework and the opportunity to debate the application, there may be a tendency to adopt inappropriate practices. Further, Richardson (1990), writing of teacher change, commented that "empowerment is threatened when teachers are asked to make changes in activities without being asked to examine their theoretical frameworks" (p. 16). Second, teachers must be committed to wanting to begin to bring about change. Nevertheless, those who are willing and want to change their practice require support structures (such as opportunities to work cooperatively with other teachers).

Some written accounts of action research projects (Ahmed, 1987; Ministry of Education Victoria, 1989; Wilkinson, 1995) illuminate some of the benefits of using an action research approach as a process for teacher professional development. Whereas Ahmed (1987) reminds us that the professional growth that occurs by engaging in action research "is not easy or quick", he claims it to be "evocative and long lasting because it is firmly rooted in the personal experiences of teachers in their classrooms" (p. 45). Further, the Ministry of Education in Victoria (1989) states:

> when learners become more analytic and reflective about their learning and value their own personal role in controlling it, they are in a better position to improve their learning (p. 14).

Comments such as this support the notion that action research can be used as a process for encouraging more reflective teaching. They also imply that reflection is a crucial element in the professional growth of teachers.

Improving Professional Practice Through Reflective Enquiry

Numerous references to the 'reflective practitioner', 'reflection on teaching', 'critical reflection', 'reflection in action' and 'reflectivity' confirm that there is considerable interest in the notion of 'reflective practice' in the field of education (Calderhead, 1991; Dewey, 1933; Noffke & Stevenson, 1995; Schon, 1994; Zeichner & Liston, 1987). However, in the literature, reflective terminology is used in various ways and is informed by diverse theoretical frameworks. As

Houston and Clift (1990) observed, these terms refer to "different assumptions concerning the processes and outcomes of reflective practice" (p. 209).

Close examination of the literature reveals that much of the work in this area derives from a concern with the preparation of reflective teachers, particularly during the preservice phase. However, some literature refers also to developing reflective practice through inservice and professional development activities. In respect of those, the four areas that seem most relevant to this study are discussions of: (1) definitions of a reflective practitioner; (2) strategies for developing reflective practice; (3) the role of reflection in teacher professional development, and (4) conditions that constrain reflective practice.

Definitions of a Reflective Practitioner

The work of Dewey (1933) and Schon (1994) has been particularly influential in shaping the ways that many researchers of adult learners and facilitators of their learning have interpreted the role of the "reflective practitioner" (Schon, 1987). Hence, many definitions of the "reflective practitioner" exist, and the literature being cited here defines such educators in three ways, namely by (i) synonym; (ii) characteristic action, and (iii) purpose.

Firstly, Schon (1983, cited in Bissex, 1994, p. 93) uses the descriptor "reflective practitioners" for teacher-researchers "whose understandings and awareness

reshape, reform, their practice" (Bissex, 1994, p. 93). Secondly, for Houston and Clift (1990), the reflective practitioner is one who "stands back from the situation, analyses it, recognises nuances within it, and proposes solutions that are then tested" (p. 211). Thirdly, Cooper and Boyd (1994, p. 83) state that

> reflective practice is for the purpose of individual professional development that enhances the educator's own knowledge, skills and attitudes for their own benefit, for the benefit of the student, for the benefit of the school community and for the benefit of the profession.

Such a range of definitions illustrates the multiple dimensions of the notion of a reflective practitioner and what s/he pursues.

Strategies for Developing Reflective Practice

One feature about which there is a great deal of agreement in the literature is the enormous difficulty of putting ideas about reflection into practice (Calderhead, 1991; Zeichner & Liston, 1987). Thus, materials have begun to appear which offer specific guidance to teacher facilitators regarding the use of strategies to foster reflective practice.

One such strategy is to deliberately make time to engage in the reflection process. Holly and Mcloughlin (1989) argue, "[T]eachers need time and conditions conducive to reflection in order to consider practice and the meanings of teaching" (p. 261). According to Holly (1984), setting aside a period of time for journal writing on a regular basis is one step toward forming the writing

habit. Furthermore, she claims that if journal writing is done in haste, then reflection is less likely. Another important consideration raised by Calderhead and Gates (1993) is that changes in teachers' "levels of reflection appear to occur only over fairly lengthy periods of time" (p. 9). Comments such as these imply the need to highlight opportunities for making time for reflective practice in the teachers' daily routines, as well as embedding opportunities for reflection and professional discourse into teacher professional development activities on a continuing basis. It also seems that teacher facilitators supporting teachers in the use of journal writing need to recognise that it is a gradual and developing process.

A second strategy emerging from the literature is that of assisting teachers to develop and practise the skills required to become a reflective practitioner. For example, the process of reflection requires considerable skill in developing vocabulary; making explicit beliefs and assumptions, and posing evaluative questions about these (Cranton, 1996). Researchers (Calderhead & Gates, 1993; Cranton, 1996) suggest that there is a developmental process in becoming reflective which Calderhead and Gates (1993) explain thus:

> In the early stages ... develop a vocabulary for talking, writing and thinking about practice. Thereafter, ... [make] explicit underlying beliefs and assumptions ... by which to appraise classroom practice (p. 9).

A third strategy that is commonly used to facilitate reflection is the use of a journal (Calderhead & Gates, 1993; Holly, 1984; Zeichner, 1987). According to Holly and Mcloughlin (1989), a journal is defined as

> a comprehensive and systematic attempt at writing to clarify ideas and experiences; it is a document written with the intent to return to it, and to learn through interpretation of the writing (p. 263).

For Holly (1984) journal writing is a reflective process which

> involves a cyclical pattern of reflection: first reflecting on experiences before or as you write; and, later, reflecting on the journal entries, which may in turn provide material for further reflection and writing (p. 7).

As such, journal writing is "an approach to the notion of reflective practice" (Holly, 1997, p. v).

Since reflective writing is not a technique with which most teachers are familiar, Holly (1984) suggests the use of a list of focus questions as a catalyst for their journal writing. Wilson, Hine, Dobbins, Bransgrove and Elterman (1995) also support the notion of providing questions to stimulate thinking and to develop higher levels of reflection. Examples of typical questions include

- What did I think or feel about the issue or experience? Why?
- What did I learn?
- What was particularly significant for me? Why?
- What else do I need to know to better understand the issue or experiences?
- How will I apply what I have learnt to my teaching?
- How have my beliefs been affected? Why? (Wilson *et al.*, 1995, p. 169)

This researcher believes that initial focus questions such as these are extremely useful as a guide, although as teachers become more comfortable with the journal writing process and the notion of reflection, they should be encouraged to pose their own reflective questions.

While Heichel and Miller (1993) suggest reflective journals can be a vehicle for helping teachers think critically, Holly (1984) purports that reflective journal writing can promote change. However, for change to occur it is vital that entries in journals are not a mere record of the teacher's feelings and thoughts. As Wilson *et al.* (1995) point out, the analytical component is crucial, otherwise there might be little change in practice. However, even though journal writing may foster critical reflection, it might not lead to changed perspectives on practice.

Another important dimension of journal writing, says Holly (1984, p. 28), "is the sharing of ideas with a colleague (or colleagues)". Sharing with a colleague or colleagues can help teachers to become more informed about each other's practices and may lead to adopting a different perspective and engaging in further collegial discussions.

It seems that teachers become more comfortable and proficient with the reflective process when given opportunities to engage in reflective enquiry and

uncover the theory underlying their own practices. Applying strategies such as those discussed above takes time and commitment by both teacher facilitators and teachers. Further, because they are not common among current professional development activities, they have significant implications for teacher professional development.

The Role of Reflection in Teacher Professional Development

Cranton (1996) argues that one of the reasons that traditional inservice activities are not as effective as they could be is that teacher facilitators try to transmit knowledge about curriculum and pedagogy, rather than encourage reflection on practice. Literature (Calderhead & Gates 1993; Hargreaves, 1995; Wildman, Niles, Magliaro & McLaughlin., 1990) supports Cranton's argument by acknowledging that reflection should be an important tool in teacher's professional growth.

Similarly, Calderhead and Gates (1993) contend that professional development programs which promote reflective practice attempt "to ensure that teachers take responsibility for their own professional development" (p. 3). For this to happen, however, the objectives of the program need to be open-ended and teachers need to be involved in negotiating the objectives and how the objectives might best be achieved.

Furthermore, Clarke and Peter (1993b, p. 174) state that "reflection is the key mediating process by which change in knowledge or beliefs is translated into practice". The value of reflection for teachers lies in its potential to identify assumptions and beliefs that underlie action so that they can respond by making modifications to their practices. Consequently, Clarke and Peter (1993b) believe the "provision of opportunities for structured reflection should be given the highest priority in any professional development enterprise" (p. 172).

There are implications here for professional development activities as the inquiring mode which is inherent in the reflection process is not usually familiar to teachers. This is because traditionally, they are not avid inquirers into their own practice. Given that reflection is part of the action research spiral, using action research as a process for professional development is one way of engaging teachers in discourse about the nature and effects of practical aspects of curriculum implementation and pedagogy.

Conditions that Constrain Reflective Practice

Although reflection has come to be widely recognised as a vital element in the professional growth of teachers (Calderhead & Gates, 1993), two major constraints operate which may prevent teachers from engaging in reflective practice. They are lack of time and the need for risk taking. Wildman *et al.* (1990) recognise lack of time as a major constraint on reflection. Together with

Calderhead and Gates (1993), they identify one problem as that of little, if any, time being allocated for reflection. Furthermore, the "notion that teachers require time to analyse what they are doing and consider the educational worth of their practices", say Calderhead and Gates (1993, p. 4), is often in conflict with what actually happens in schools. Discussions with teachers confirm this fact. Despite Queensland teachers now being afforded non-contact time during which they might ideally engage in reflection, often it is taken up by preparation or administrative tasks.

Another problem associated with encouraging teachers to engage in reflection is that it involves a degree of personal risk because it "necessitates significant personal disclosure" (Wilson, *et al.*, 1995, p. 174). These writers also stress the fact that reflection can be painful. Indeed, many teachers find it challenging to analyse their own practice and sometimes an examination of their practice produces feelings of self-doubt. Both these constraints have the potential to be solved by teachers as they become more comfortable and adept at reflection and learn how to incorporate reflection into their daily routines. Creating opportunities for teachers to work collaboratively with their colleagues is one way in which the CEPDC networks attempted to address such problems.

2.8 Collaborative Teacher Networks

The idea of a teacher network being established to effect professional development is certainly not new, but contemporary literature supports it increasingly (Beale & Brydon, 1995; Cooper & Boyd, 1994; Corcoran, 1995; Hargreaves, 1995). Indeed, Hargreaves (1995) called for the "establishment of independent interactive networks" (p. 15) to challenge the perpetuation of traditional models of professional development.

Cooper and Boyd (1994) define a network as "a professional community organised around a common theme or purpose" (p. 129). They claim the "goal is learning from and with others, then incorporating these new ideas into one's own educational practice" (p. 132). For Beale and Brydon (1995), one of the attractions of the network concept is that it provides teachers with opportunities to work collaboratively and cooperatively. As teachers grapple to implement the curriculum reforms of the 1990s and beyond, it is imperative that they be given opportunities to engage in professional dialogue with their colleagues. The interactive nature of networking is powerful, according to Corcoran (1995), because it gives teachers access to a professional community in which their experiences and expertise are valued and where they can engage in professional discourse about improving practice.

Another attraction highlighted by Corcoran (1995) is that teacher networks have high credibility with teachers. He claims the networking process to have positive effects on teacher motivation and the "facility to enhance knowledge of pedagogy and subject-matter", despite the fact that it involves risk taking "and requires a commitment from teachers to improve their classroom practice" (p. 5). Other literature also confirms that teacher networks are a means of focusing on the specific needs of participants within the group, while McLaughlin (1991) argues that it is difficult for individual teachers to "sustain interest in their professional development if it is not valued and encouraged within the school community" (p. 61).

As a professional support structure, networks have the potential to promote professional discourse, collaborative enquiry, shared problem solving, and team work among and between participants. As well, Elliott (1993) recognises that the experience and expertise gained from practising one's craft can be valued and shared with others in supportive learning environments. Nevertheless, Grundy (1995) asserts that:

> while it is most appropriate, indeed crucial, to think of learning from others and sharing experiences, professional development isn't a game of 'pass the parcel' (you have it, so give it to me). It is a journey that we all need to take (p. 7).

Likewise, O'Connor and Northfield (1995) state that networks provide an continuing professional "support structure for sharing professional ideas" (p. 1),

while Gaffney (1995) asserts that the concept of collegial teacher networks "augurs well for professional development planning and delivery into the future" (p. 30). Not surprisingly, he argues that networks may well be initiating the "dawn of a new age" in professional development (p. 31). Therefore networks should be considered as a way of developing professional development infrastructures, which may continue once systemic support runs out.

Although much of the literature is rich in recommendations for using collaborative networks as a means of delivering professional development, it is impoverished in examples of how to start and sustain a teacher network facilitated by a teacher. Lacking in the literature are practical suggestions for organising, facilitating, and dealing with group dynamics within a network. Although such suggestions would be made about specific experiences within a particular context, much could be learnt from the experiences of others. If networks are to be a part of the professional development of the future, then there is a need for further research about principles for operating an effective network and the nature and degree of support to be provided to teacher facilitators. Such research is necessary in order to formulate arguments to convince teachers that networks are a viable way of delivering professional development.

2.9 Characteristics of 'Best Practice' in Teacher Professional Development

A diverse range of literature provides an overview of the knowledge of 'best practice' in teacher professional development in relation to curriculum and pedagogical change. Indeed, several lists of principles of 'best practice' have been published (Andrews 1988; Crowther & Gaffney, 1994; DEET, 1988; Dunlop, 1990; Louden, 1994; Lovitt *et al.*, 1988; National Board of Employment, Education and Training, 1990; Queensland Board of Teacher Registration, 1991). Irrespective of whether the source of the description of 'best practice' was Australian or international, there is a substantial amount of agreement amongst researchers about the principles of 'best practice' in teacher professional development in relation to pedagogical and curriculum change. For example, DEET (1988); Queensland Board of Teacher Registration (1991), and Crowther and Gaffney (1994) all list collaborative planning as an important principle of 'best practice' to be considered. Allowing sufficient time to allow internalisation, application and reflection is another common characteristic identified by Dunlop (1990); Queensland Board of Teacher Registration (1991), and Crowther and Gaffney (1994). Recognition of adult learning principles was a common characteristic listed by DEET (1988) and Dunlop (1990). Crowther and Gaffney (1994) expressed similar views about the principles of adult learning. Two other similarities among the majority of lists include the need for a

supportive facilitator/leader and a sense of ownership. All lists include commitment by participants as being an essential characteristic of 'best practice'.

Given that numerous items on the various lists were similar, the current study draws upon the set of characteristics Crowther and Gaffney (1994) identify as the basis for designing and implementing teacher professional development activities. Apart from being recent, this set of characteristics applies to professional development generally, which suited that being offered by the CEPDC. In particular, this set of characteristics of 'best practice' in teacher professional development has the potential to create and foster the notion of a professional development culture where teachers, who are seeking professional growth, become reflective practitioners.

Crowther and Gaffney (cited in Louden, 1994, p. 8), identify thirty characteristics of 'best practice' in professional development grouped around the four themes of planning, implementation, facilitation and application as shown in Table 2.2 (p. 65 following).

Table 2.2 Themes and Characteristic Features of 'Best Practice' in Teacher Professional Development

Themes	Characteristic Features
Planning	needs based; relevance; collaborative planning; choice and flexibility; linkages between needs; clarity; social justice and equity; participant commitment; preparation
Implementation	active engagement; balance of theory, research and practice; sequencing and spacing of program components; reflection time; modeling of exemplary practice application of learning theory; interactive action research; balance of curriculum and pedagogy; effective use of time
Facilitation	facilitator expertise; resourcing; facilitative networking; environmental quality; school executive support
Application	follow-up; demonstrated accountability; sense of ownership; practicality; institutionalised teamwork; rewards; transferability of learning

It is worthy to note that these characteristics reflect the learning theory underpinning the empowerment model of professional development identified earlier in this chapter. Not surprisingly, some of these characteristics of 'best practice' have been found to be lacking in contemporary teacher professional development on offer to teachers from professional organisations such as the

Queensland Association of Mathematics Teachers (QAMT) and employing authorities such as the Queensland Department of Education.

However, Dunlop (1990) argues that it is not the application of a few of the characteristics identified as 'best practice' which counts, "but rather an understanding of how they may interact to contribute to the success of professional development activities" (p. 14). Given the diversity of functions of professional development activities, and depending on the type of professional development (e.g. awareness raising), different characteristics may be more or less important. Planned follow-up, for example, might be more important for a continuing classroom-based action research project than a half-day inservice activity. For this reason, it is vital that the planners of professional development activities consider which characteristics of 'best practice' are most appropriate for the kind of professional development being offered.

2.10 Conclusion

An examination of the literature selected indicates that a great deal has been learned about teacher professional development and that subsequent research in this area should build upon previously acquired knowledge, skills and practices. In this chapter, issues in professional development were raised, with specific reference to those implications to be considered when planning such activities.

A review of professional development policies indicated that a more coordinated and effective approach to the provision of teacher professional development should be adopted. In addition, professional development policies should place greater emphasis on professional development activities that will provide teachers with a process for managing individual and organisational change. An examination of two different teacher professional development paradigms showed that each is framed by a different theory of learning and consequently embodies a different system of belief and action. An audit of both past and current approaches to professional development for Queensland mathematics teachers revealed that the majority of professional development on offer concentrates on systemic needs, rather than those of teachers. There is sufficient evidence in the literature to support the use of action research as a process for teacher professional development especially if positive changes in classroom practice; enhanced teacher competence and confidence, and reflective practitioners are desired outcomes. Another strong message communicated in the literature reviewed is the notion of using teacher networks as a mechanism for delivering professional development. Yet, it is clear that there is still much to learn about how to establish and sustain teacher networks. Not surprisingly, there is an abundance of lists that identify characteristics of 'best practice' as a reference for developing and delivering professional development activities for teachers. Only one set of characteristics was profiled, however, because that set was perceived to have the potential to create and foster the notion of a

professional development culture where teachers, who are seeking professional growth, become reflective practitioners.

There appears to be a general recognition within the literature of the importance of meeting teachers' need for continuing professional development so they can improve the quality of daily classroom practice. This contrasts with providing professional development activities to satisfy systems' needs to implement specific initiatives which are mostly offered when a new systemic initiative is being implemented. However, it is clear that further attention should be given to how the theories presented in the literature can be translated into practice. The current study, therefore, seeks to redress the situation that Clarke and Hollingsworth (1994) identify, namely that "the richness of learning theory and research has been tapped inadequately in the area of professional development ..." (p. 9).

Chapter 3: RESEARCH METHODOLOGY AND DESIGN

3.1 Overview

This chapter identifies the research method used in the current study; provides a rationale for the method chosen, and outlines the way the study has been developed. A description of the research design; the role of the researcher; the various techniques used to collect background information about the networks studied; qualitative data; the framework used to analyse data; the ethical issues involved, and the delimitations and limitations of this study are also presented.

3.2 Multi-level Action Research

The term 'method' in the context of this investigation refers to how the inquiry was conducted. Action research was undertaken throughout this study both to review and to enhance the CEPDC's professional development approach as it evolved over a three-year period. Kemmis and McTaggart's (1988, p. 54) description of action research as a repeated spiral of four 'moments', namely "planning, acting, observing and reflecting", was practised systematically. In order to provide CEPDC participants, facilitators and project officers with a framework to implement the four 'moments' of the action research cycle systematically, these 'moments' were interpreted to be to: (i) develop a plan of action to improve what is already happening; (ii) implement the plan; (iii) observe and document the consequences of the action (a fact finding task); and (iv) reflect on, and evaluate the outcomes as a basis for a new cycle of planning,

acting, observing and reflecting. It should be noted that the overarching CEPDC Project applied the action research process described on three levels:

Level 1. Network facilitators (that is, those teacher leaders who took responsibility for establishing a network, providing structures for meetings, and supporting learners) engaged in action research with the intention of improving their own performance as a professional development group facilitator;

Level 2. Participants (that is, the teachers and administrators who became members of a CEPDC network) were encouraged to conduct action research with the intention of improving an aspect of their classroom practice in relation to teaching mathematics, and

Level 3. The CEPDC project officer (that is the person responsible for managing the Numeracy Networks, who also facilitated (a) network/s engaged in the action research process) considered ways of improving the mechanism being used to deliver teacher professional development and evaluating action research as a process for professional development. This was done in each year of the Project (e.g., 1994-1996) to provide information for decision making regarding the CEPDC's operations.

The Thinking Behind the Choice of Action Research

Action research was a means to examine and improve systematically the CEPDC approach to professional development undertaken in Central Queensland. The selection of the method was influenced by the practical, problem-posing and problem-solving nature of action research, and the need to create conditions that promoted collaborative enquiry among the researchers. As described by Kemmis and McTaggart (1988, p.5),

> Action research is a form of collective self-reflective enquiry undertaken by participants in social situations in order to improve the rationality and justice of their own social or educational practices, as well as their understanding of these practices and the situation in which these practices are carried out.

One desirable characteristic of action research methodology was that it provided a process for participants, facilitators and the project officer to conduct research to review, plan, implement and manage change to enhance the quality of their own educational practice. Another major incentive for engaging in collaborative action research was to have the participants, the facilitators and the project officer benefit from working together on a regular basis in a supportive, professional community (Feldman & Atkin, 1995). Further, the decision to engage in action research acknowledged the professionalism of educators in respect of their ability to engage in critical reflection and to understand the complexity of the process in which they are engaged. According to Carr and

Kemmis (1986), strengthening the commitment to the research approach is the understanding that successful educational research depends invariably on the

> extent to which it encourages teachers to develop a more refined understanding of their own problems and practices (p. 126).

The two principal aims of action research identified by Grundy (1995, p. 11) are the (i) "involvement of practitioners" and (ii) "improvement in practices". These principles were central to achieving the CEPDC goals. In particular, the CEPDC aimed to improve three areas of concern, each of which was identified by Grundy (1995, p. 11). These were:

- the improvement of classroom practices;
- the improvement in the situation in which such classroom practice is occurring, and
- the improvement in understanding both of the practice and of the situation.

The self-reflective nature of the action research process led to another desirable characteristic described by Feldman *et al.* (1995), that of being "self-developmental" (p. 128). Feldman and his associate expect participants in action research to improve their educational practice and "come to a better understanding of their specific educational situations by doing so" (p. 128). This same expectation was held by organisers of this project by asking that:

- participants commit to improving an aspect of their classroom practice, documenting how this was done, and reflecting upon the subsequent outcomes;

- facilitators commit to improving their facilitation skills, documenting how this was done, and reflecting upon the subsequent outcomes; and
- project officers review the CEPDC's professional development approach and make recommendations to improve the next stage of the Project.

Therefore action research as explained here, offered the best methodolgy for the project to live up to its aim of empowering teachers, moving away from the expert-driven version of professional development. Thus, the research method paralled the project methodology, living up to the aims of action research in both theory and practice.

3.3 Overview of the Research

The focus of this investigation is to reflect critically upon the professional development approach utilized by the CEPDC with the explicit purposes of learning more about the benefits/limitations of utilising action research as a process for professional development, and the value of using collegial networks as a mechanism for delivering professional development. The intention of the current research project is to synthesise qualitative research data generated as a result of the study to make explicit learnings about the CEPDC professional development approach.

This investigation interrogates the findings from three interlinked action research projects with which I worked over a two and a half-year period. These projects

were implemented from mid 1994 until early December 1996. During that time, as both a project officer and a facilitator, I worked collaboratively with participants as they engaged in action research projects, as well as conducting a longitudinal action research study which followed the progress of the networks and the participants' efforts. My experiences as a facilitator in 1995 and 1996 also enabled me to gain knowledge of the networks from a facilitator's perspective.

The aims of the current study are to:

- make inferences about the utilisation of collegial networks to deliver teacher professional development;
- better understand the role of teachers adopting a facilitative role working with their peers in a collegial network situation;
- make explicit those learnings about action research as a process for professional development in consequence;
- develop further an understanding of the type of support required to assist teachers engaging in action research through locally initiated programs of professional development;
- develop further knowledge and understanding about professional development practices that promote independent and self-reflective learners;
- identify if there were evidence to support that changes in attitudes and classroom practices of the participants occurred, and

- contribute to the current debates concerning the nature and delivery of professional development.

Research Questions

The key questions prompting this investigation originate from the attempt to better understand the nature of professional development that teachers, faced with the challenge of change, might adopt. Specifically, the research questions focused on three main areas of concern. Thus, major questions framing the research are:

- What is the value of using collaboratvie networks as a mechanism for delivering teacher professional development?
- What are the benefits/limitations of using action research as a process for teacher professional development?
- What are the significant implications of this study for future professional development programs?

Framing the investigation also was the knowledge that, in many instances, the professional development on offer elsewhere at the time was not adequatedly meeting the needs of teachers throughout Central Queensland, and the need of teacher facilitators to learn more about professional development that empowers teachers to effect and manage change.

3.4 Role of the Researcher

From mid 1994 until early December 1996, I had binary roles in the three interlinked action research projects. During that time, I worked with twenty-nine numeracy networks either as a project officer, or as a facilitator. In these dual roles, I was responsible for initiating collaboratively with CEPDC facilitators, the establishment of their numeracy networks; acting as a resource person to facilitators; providing training for all numeracy facilitators; establishing collegial relationships with network participants; interacting with participants in formal and informal situations to collect data; conducting action research, and analysing the research findings generated by the numeracy networks over time to construct knowledge and inform the direction taken by both existing and subsequent projects. At the time of conducting the study, I was engaged in the action research cycle of planning, observing, taking action and reflecting to inform the direction of subsequent projects. The cyclical nature of the action research process allowed me the opportunity to identify concerns and objectives for various aspects of the Project; devise activities to accomplish these objectives; evaluate the success of the action taken, and move forward to new concerns and issues. This approach led to differences in operation among the 1994, 1995 and 1996 projects.

Although my study was conducted in an action research mode, it is retrospective in that the above mentioned projects ceased operation at the end of 1996

following the withdrawal of funding for NPDP projects nationwide. I examined, analysed and documented the findings of the research generated by the CEPDC numeracy network participants, facilitators and me as project officer, and engaged in critical reflective thinking to hypothesise what makes a good model for teacher professional development. In particular, my primary concern was to investigate the success or otherwise of the CEPDC networks as a mechanism for delivering professional development and the benefits/limitations of action research as a process for professional development.

Tables 3.1 (a, b & c, pp. 78-80 following) provides an overview of the key 'moments' embodied in the action research process in which I engaged over a two and a half year period to guide and monitor the establishment, maintenance and development of the CEPDC Numeracy Networks.

Table 3.1a 1994 'Moments' of the Action Research Process

Year	The Planning Moment	The Acting Moment	The Observing Moment	The Reflecting Moment
1994 **Jan to** **Dec**	Reviewed other professional development programs to identify characteristics of best practice and effective principles of adult learning. Identified 5 areas of concern: • developing an understanding of the CEPDC approach; • training facilitators; • establishing networks; • monitoring the progress of the numeracy networks, and • implementing multiple levels of action research.	Prepared training material for numeracy facilitators. Trained 6 facilitators. Promoted CEPDC activities to employing bodies, professional organisations and teachers. Provided support to facilitators. Investigated ways of creating collaborative collegial network environments. Observed network activities to identify how participants were being given opportunities to take more responsibility for their own learning.	Maintained a journal documenting significant events, changes & critical reflections. Conducted field observations at network meetings. Carried out document analysis (e.g. journals). Conducted a semi-structured interview with facilitators. Documented and analysed qualitative data.	What difficulties were experienced in establishing networks? How were these difficulties addressed? What happens in a network meeting? What is the nature of the support needed by facilitators? What changes need to be made to enhance the effectiveness of the networks? To what extent did participants and facilitators engage in the 'moments' of the action research process? What should be done differently?

Table 3.1b 1995 'Moments' of the Action Research Process

Year	The Planning Moment	The Acting Moment	The Observing Moment	The Reflecting Moment
1995 **Jan to** **Dec**	Reviewed data collected during 1994 project to identify what had worked well and areas for improvement. Identified 4 areas of concern: • roles and responsibilities of participants and facilitators; • ways of supporting facilitators; • developing reflective journal writing skills, and • conducting effective network meetings. Reviewed literature about reflective journal writing and strategies for developing reflective skills. Planned an alternative approach for introducing action research to the facilitators.	Reviewed and modified the training program for numeracy facilitators. Trained 14 numeracy facilitators. Facilitated a numeracy network. Prepared resource material to support facilitators. Collated a numeracy newsletter to promote effective network and classroom practices. Assisted facilitators to devise strategies that supported engagement in the action research process.	As for 1994 with the addition of further prompt questions for facilitators.	What kind of support is required by facilitators? What are participants gaining from their network experience? What evidence is there to suggest that participants are engaging in all 4 'moments' of the action research process? Are continuing participants more receptive to the notion of keeping a reflective journal? What are the benefits/limitations of action research as a professional development process?

Table 3.1c 1996 'Moments' of the Action Research Process

Year	The Planning Moment	The Acting Moment	The Observing Moment	The Reflecting Moment
1996 **Jan to** **Dec**	Reviewed data collected during 1995 project to identify what had worked well and determine areas for improvement. Identified 4 areas of concern: • developing colloborative networks; • catering for the differing needs of continuing and new facilitators; • improving the data collection skills of participants, and • ways of supporting participants with their action research projects.	Same as for 1995 with the addition of: Trained 17 numeracy facilitators. Documented effective network practices. Assisted some participants with the writing up of their action research projects.	Collected and analysed data as for 1994, with the addition of the reflection sheet for participants.	What are the advantages/disadvantages of the CEPDC network approach? What are the benefits/limitations of action research as a professional development process? What evidence is there to support that change/s are being implemented in the classroom? What are the implications of the CEPDC findings for other professional development programs?

3.5 Selecting the Numeracy Networks

Considering the wealth of data collected from twenty-nine networks over a three year period, the analytic process had the potential to be very time consuming and unmanageable. For the purpose of this study, a review has been made of the implementation of the CEPDC professional development approach within seven networks. These networks represented a cross-section of the different group structures involved in the Project during the 1994 – 1996 period. Selection was based on three factors: (i) year of operation, (ii) type of network (e.g. intersystemic, primary/secondary, mix of primary and secondary), and (iii) geographical location. For ease of reference in this and Chapter Four, the networks are labelled numerically, 1-7. Table 3.2 (which follows on pp. 82-83) identifies the nature and composition of these seven selected numeracy networks.

Table 3.2 Nature and Composition of Seven Selected Numeracy Networks

Network	Location	Participants	Year Level Taught	Range of Teaching Experiences	Facilitator/s	Network Experience	Network Meetings	Other Special Features
1	large industrial town in Central Queensland	6 participants were from the same school and the 5 remaining participants were from 3 different state schools.	Middle and upper primary year levels	3 to 15 years	Deputy Principal	No previous network experience.	Met 5 times over a three-month period.	
2	large rural town in Central Queensland	9 participants and the facilitator were from the same school, while 4 participants including a teaching principal were from small rural schools.	All primary year levels represented	1-33 years	Classroom Teacher	5 participants including the facilitator had been involved in a network the previous year.	7 meetings held over a 4-month period.	One of the participants was a Numeracy Educational Adviser.
3	large city in Central Queensland	9 teachers from state and non-state high schools.	Years 8-10	5-33 years	Secondary Science/ Maths teacher	No previous network experience.	Met once a month over a 6-month period.	Included a participant from the School of Distance Education.
4	large city in Central Queensland	10 from non-state schools and 3 from state schools.	Years 1-3	2-37 years	Educational Adviser from the Catholic Education System	Third network experience for 4 participants and the facilitator.	8 meetings held over a 7 month period	A new participant facilitated 3 meetings whilst the facilitator was on leave.

Table 3.2 Nature and Composition of Seven Selected Numeracy Networks

Network	Location	Participants	Year Level Taught	Range of Teaching Experiences	Facilitator/s	Network Experience	Network Meetings	Other Special Features
5	large industrial town in Central Queensland	7 pre-school teachers & 8 primary school teachers.	Pre-school Years 1-3	2-23 years	Educational Advisers	Facilitators were previous participants.	6 meetings over a 5 month period.	Co-facilitated
6	rural community	10 participants from the same secondary school, 2 from a state primary school and 1 from a non-state primary school.	Years 6-12	Unknown	Secondary Maths Teacher	Facilitator was a previous participant. Participants had no previous experience with a CEPDC network.	6 meetings held over a 5 month period.	
7	large city in Central Queensland	6 participants from state schools and 6 from non-state schools.	Years 4-7	4-25 years	CEPDC Project Officer	3 participants participated in the same network for 3 years. Facilitator adopted the role of teacher facilitator for two consecutive years.	7 meetings over a 5-month period.	Facilitator assumed multiple roles of CEPDC Numeracy Project Officer & researcher.

3.6 Data Collection Techniques

Data for this study were gathered over the period July 1994 to December 1996. Given the multiple techniques used in the data collection process, that is, participant observation; document collection; reflective journal writing; conversations with a purpose; semi-structured interviews; reflection sheet, and questionnaire, it is necessary to explain how each technique was employed and to consider some of the key issues associated with each one.

The term 'technique' is used here to embody both the procedures and instruments used to generate, gather, and interpret data relevant to the current study. The selection of techniques was guided by the principles underlying action research and the desire to elicit and build on the experiences of network participants and facilitators, while interacting with as many participants as possible within the context of their network situation. For these reasons, participant observation; document collection; reflective journal writing; conversations with a purpose; semi-structured interviews; reflection sheet, and questionnaire, were chosen as the most practicable, and therefore most effective techniques for achieving the research purposes. Although these techniques are indicative of those employed by researchers using a case study method, they reflect my personal preference and are appropriate for generating, collecting and analysing data in an action research context.

Qualitative Data

I consider that the research problem and the expectations of the research process and/or outcomes as outlined in the rationale (Chapter 1) are met through the collection of qualitative (verbal) rather than quantitative (numerical) data. Qualitative data are most appropriate to this study because they focus on process, understanding and interpretation, all essential elements to developing insights into the research questions over the duration of the CEPDC Projects. Glesne and Peshkin (1992) state that qualitative data are recognised as assisting the researcher to understand people's perceptions and feelings by capturing the human dimension of education, as well as to understand the 'hard facts'. According to Wadsworth (1990), qualitative data tell a story about the nature of the answers to who, what, when, where and why questions in contrast to quantitative answers to questions addressing how many. The emphasis on interpreting processes and outcomes, rather than measuring them, met the developmental nature of the project's implementation. As with any research, however, there exists the potential for 'bias' to occur within the data.

Since this was an action research project with other people, one way of testing and uncovering the biases and the ways in which they work was by testing out the emerging interpretations as they arose through the next cycle of action. The process of 'triangulation' suggested by Glesne and Peshkin (1992) was employed to validate the data. Essentially, data were collected from a variety of sources using multiple methods to reduce bias and eliminate preconceived ideas and

assumptions, as well as to check for reliability. This was accomplished by analysing and comparing the observations made by participants and other educators, such as the external evaluator and administrators; comments made by participants, facilitators and the external evaluator; and documentation provided by participants, facilitators and the external evaluator.

- ***Participant Observation***

Systematic field observations at facilitator training weekends, facilitator meetings and network meetings were undertaken. In my role as project officer, I visited at least one network meeting for each group. Network visits were negotiated directly with the facilitator. During these visits I adopted the role of participant observer, which, according to Stenhouse (1981), meant that I became "absorbed in the social setting being observed" (p. 21). By adopting an insider researcher role, I was in a position to observe what was happening, as well as to experience the role of a participant.

The data gathered through participant observation enabled me to identify and explore the commonalities and diversities within and across networks; better understand the roles adopted by participants and facilitators, and compare participants' and facilitators' responses to the CEPDC professional development approach. Significant observations made in the field were recorded as objectively as possible in my journal.

One drawback associated with adopting the role of participant observer is the probable effect my presence had on what happened in each setting. A distortion of findings is a possible outcome. Therefore, I endeavoured, as Dadds (1991) suggests, to fulfil the role of "insider researcher" (p. 223) as discreetly as possible. As I was known to most participants, having worked with many of them in a range of professional situations over a number of years, my visits to network meetings were not as intrusive as they might have been under different circumstances.

- ***Document Collection***

To identify issues common to the CEPDC's networks and the utilisation of action research as a process for professional development, I collected a range of documents generated by the Project. As shown in table 3.3 (p. 88 following) various documents were sorted and classified into three categories to ensure all main sources of data were analysed.

Table 3.3 Source and Type of Document Collected

	External NDPD Document	Internal CPDC Documents	Internal Network Documents
Network Participants		• Questionnaire prepared by external evaluator. • Reflection sheet.	• Journals. • Artifacts written during network meetings. • Action research report.
Network Facilitators		• Questionnaire prepared by external evaluator. • Transcrips of semi-structured interview conducter by external evaluator.	• Journals.
Project Offiecr	• Project submissions to DEET (1994 & 1995). • Project submissions to DEETYA (1996). • External evaluation report (Brennan, 1994). • External evaluation reports. (Danaher, 1995 and 1996). • CEPDC interim and final reports to DEET (1996).	• Journals. • Papers written for conferences.	• Field notes. • Trancripts of interviews conducted by Project Officer with facilitators.

A series of questions was devised to assist with the analysis of all the documents. These questions are presented in the Data Analysis section.

- ***Reflective Journal Writing***

Written recollections in the form of journals kept by participants, facilitators and me as Project Officer were an important source of evidence in relation to two of the three key research questions and the subsidiary questions generated by the study. Firstly, the participant journal entries focused on network and classroom

activities; the change/s in pedagogy that occurred and the feelings associated with that/those change/s. Secondly, the facilitator journal entries concentrated on network implementation issues and their role as a facilitator. Thirdly, my journal entries focused on positive/negative aspects of the network mechanism and the action research process being used.

Major concerns associated with the journal writing centre around the validity and reliability of the data it generates due to its subjective nature. The very fact that participants were evaluating their own practice relies upon their ability not only to provide an accurate interpretation of what occurred, but also to reflect critically on the outcomes. In spite of this, I chose to access such data because it provides rich descriptions and expresses understanding in authentic teacher voices.

- ***Conversations with a Purpose***

Discussions with participants and facilitators were of the conversational type described by Wadsworth (1984). The purpose of the conversations was two fold: first, conversation was used to gain insight into what people meant. Second, conversation enabled me to validate data gathered through other sources. The conversation also provides an essential situation in which participants can clarify goals and other aspects of the research, and raise issues of a professional nature that may be impacting on the progress of their action research project. Such is in line with Wadsworth's notion (1984, p. 21) that

"social research needs to use conversation to develop .... understandings about what people mean".

Conversations with a purpose took two forms:

(i) informal telephone or face-to-face conversations between me as the project officer and network facilitators, and

(ii) informal face-to-face conversations.

Conversations of this kind allowed participants to identify and explain with greater clarity and understanding their interpretation of what had happened. My journal entries describing the content and outcome of conversations that I engaged in were reviewed and analysed.

- ***Semi-structured Interviews***

Semi-structured interviews conducted by the Project Officer

The semi-structured interviews that I conducted individually only with the facilitators took place after the final network meeting as a debriefing exercise. The purposes of the interview were to gauge general reactions, as well as to seek clarification about the professional development process; participant reactions to the networking idea; the facilitative role; the use of reflective journals, and the nature of any changing teaching practices. The questions were kept broad deliberately to enable the facilitators to tell their story.

As suggested by Wadsworth (1984) an "interview schedule" (p. 84) was used to obtain more targeted information to assist me to understand what facilitators believed actually happened in network meetings. An open-ended interview schedule (Appendix 1) was employed to facilitate dialogue during interviews. It was a critical tool for generating data about key areas such as aspects of working that demonstrate collaboration and collegiality and participant characteristics that contribute to the success of the networks. The interview guide listed, in the desired sequence, the questions that would be asked during the interview. A list of probe questions for each major question was also created (Appendix 2).

Semi-structured interviews conducted by the External Evaluator

Semi-structured group interviews conducted by the External Evaluator or his nominee usually took place during the final network meeting. All the interviews were audiotaped by the External Evaluator or his nominee and transcribed verbatim by secretaries. Interview transcripts formed an important element in the data pool. Such interviews gave participants the chance to articulate and explore shared and divergent understandings of their network experience.

My journal entries describing the content and outcome of the semi-structured interviews together with the transcripts of semi-structured interviews that the external evaluator conducted were reviewed and analysed.

- ***Reflection Sheet***

The 1995 and 1996 network participants completed a reflection sheet (Appendix 3) which I designed as the researcher. The reflection sheet was given to participants before their last meeting so they would have ample time to reflect upon the open-ended questions before responding. Each network facilitator returned these proformas to me. The reflection sheet had dual purposes. Firstly, it was one way of providing feedback to network facilitators. Secondly, the resulting data was used to validate data obtained from other sources.

- ***Questionnaire***

In 1995 and 1996 an initial and a supplementary questionnaire were administered to all network facilitators and participants by the project's External Evaluator. Some of these questions were posed to elicit responses related to research issues of concern to the overall project, while others focused on research issues of interest to the focus of this study. Responses to the questionnaire were analysed by the External Evaluator. Thus, a summary of the External Evaluator's findings provided another source of data. The questionnaire had dual purposes. Firstly, it was one means of providing feedback to the CEPDC management team from an independent source. Secondly, the resulting data were used to validate data obtained from other sources.

3.7 Framework for Analysing the Data

This section describes the framework used to analyse the data to determine the study's findings. In the process of managing the CEPDC Networks as Project Officer (Numeracy), I recorded and filed all data and their sources systematically. This was achieved by identifying the network origins of the data and the year(s) in which they were generated/collected. All information collected from a particular network was organised chronologically in a folder.

Data Analysis Procedures

Data analysis was done simultaneously with the data collected in each action research project, so that I could gain specific insights relating to the research questions to inform the next cycle of my action research. I systematically examined and analysed documentation referring to the 1994, 1995 and 1996 projects. The analysis of data from the 1994 Project was used to review it and determine the most effective means of administering the 1995 Project. Data from the 1995 Project were analysed to enhance current operations, as well as to inform the subsequent project. The various sources of data were analysed to identify key issues or themes that were evident in the data. A description of how the different kinds of data collected were analysed follows.

Participant Observation

Entries in my project officer's journal were read multiple times. Thematic words associated with the key research questions were highlighted. Specific questions based on themes related to the key research questions were used to analyse these entries. Significant responses were then transferred to the matrix system explained in the section sub-titled 'Compare and contrast recurring themes and issues among and across data sources' (p. 100 following).

Document Collection

Specific questions based on themes (see Table 3.4 on p. 95 following) related to the key research questions guided the analysis of relevant documents. Consistencies or anomalies between and among different documents were highlighted, sorted into categories and then transferred to the recording matrix (Appendix 4).

Journal Writing

Eighty-five journals written by network participants and seven journals written by network facilitators were examined. All the journals for a particular network group, including that of the facilitator, were analysed on a network by network basis. This was done by reading the journal and listing key words/phrases relating to the themes identified in Table 3.4 (p. 95 following). Significant data collected from the participant journal entries were recorded on a different matrix from that used to record findings generated by the network facilitator.

Table 3.4 Themes Related to the Key Research Questions

Data Source	Themes Related to the Key Research Questions
Participants	participant role; reactions to the CEPDC professional development approach; evidence participants were engaging in the action research process
Facilitators	facilitative role; structure of network meeting; the nature of group dynamics; challenges of working with adult learners; reactions to the CEPDC professional development approach
Project Officer	participant observer; key elements of networks; action research as a process for professional development; critical enquiry through reflective writing

Comparisons between the journal entries and data collected from other sources were made to either confirm consistencies or note inconsistencies in the data.

Conversations with a Purpose

Written accounts of conversations with network facilitators and participants recorded in my project officer's journal were located and read multiple times. Because these had been dated it was relatively easy to track any changing understandings that emerged over a period of time. Significant points were transferred to the recording matrix.

Semi-structured Interviews conducted by the Project Officer (Numeracy)

The facilitator's oral responses to the open-ended questions posed by the researcher were recorded on the interview schedule (Appendix 1). The purposes of the interview were to gauge general reactions to, as well as to seek clarification about, the professional development process; participant reactions to the networking idea; the facilitative role; the use of reflective journals, and the nature of any changing teaching practices. The questions were kept broad deliberately to enable the facilitators to tell their story.

Semi-structured Interviews conducted by the External Evaluator

The External Evaluator provided transcripts of group interviews with individual networks. These were read multiple times to identify key events and themes. The most significant points were highlighted to facilitate the comparison of responses between the different network groups. After comparing the similarities and differences among responses to each interview question the data relevant to the research questions were transferred to the network's matrix system referred to in the section sub-titled 'Compare and contrast recurring themes and issues among and across data sources' (p. 100 following).

Reflection Sheet

As each network participant completed a reflection sheet, every sheet was analysed to discover what individual participants from a network thought about

key areas related to the research questions. Responses for each question were summarised and recorded for each network. Similar responses were highlighted in green, while different responses were highlighted in orange to facilitate the search for patterns between the different networks. Relevant data were recorded under the given categories on each network's matrix. Any additional significant points that did not fit into one of the categories were listed in my journal for further consideration.

Questionnaire

Responses to the initial and supplementary questionnaire were interpreted and collated by the External Evaluator. The evaluator's final report summarising the findings was perused to identify new data and confirm data already recorded on the matrices.

Essentially four basic procedures were utilized to analyse the data collected. These were:

(i) read the corpus of data multiple times;

(ii) sort and categorise recurring themes and issues;

(iii) compare and contrast recurring themes and issues among and across data sources, and

(iv) delimit to focus on answering key research questions.

Read the corpus of data multiple times to identify recurring themes and issues

The purpose of multiple critical readings was twofold. Firstly, re-readings allowed the researcher to become familiar with the data. Secondly, broad categories and emerging patterns could be identified.

Sort and categorize recurring themes and issues

The various sources of data were analysed to derive the major themes evident Initially, data were sorted and categorised into two main categories: (i) networks as a mechanism for teacher professional development, and (ii) action research as a process for teacher professional development. Information pertaining to the different categories was recorded on a matrix (Appendix 4). A separate matrix was used to document data collected from facilitators and participants from each network. Data were cross-referenced to the relevant source (e.g. facilitator or participant). In order to analyse the data, subsidiary questions that were an extension of the original research questions were framed. These made it clear what evidence was being sought. The following subsidiary questions were used to guide the analysis of the data:

CEPDC Networks as a Mechanism for Delivering Professional Development

- What was significant about the CEPDC networks?
- Are networks an effective way of organising professional development?
- What insights into, and understandings about the CEPDC approach to teacher professional development were gained from the numeracy networks?

- What makes a productive network?
- How are teacher views and practices affected by their participation in the network?
- What support mechanisms need to be available to encourage effective networking and professional growth?

Action Research as a Process for Professional Development

- How did participants perceive the CEPDC's approach to professional development as being different from other professional development approaches?
- What are the perceived similarities and differences between such approaches?
- How did participants respond to this form of professional development?
- What were the criticisms of this approach?
- What issues emerge when teachers have greater control over their own professional development?
- What have been the changing understandings and practices of action research as a process for professional development within the CEPDC numeracy networks?
- How does this professional development approach facilitate the development of reflective practice among teachers?

- What modifications would improve the Consortium's approach to professional development?
- Did participant practices change after conducting action research in a network environment? How did they change? What factors influenced the change/s?

Compare and contrast recurring themes and issues among and across data sources

Once data collection began it quickly became apparent that a system for keeping track of data to make comparisons was imperative. A matrix (Appendix 4) was developed to achieve the data reduction needed for continuing interpretation and comparisons. A separate matrix sheet was used for each network, as well as one for the Project Officer. By ordering my data into matrices, I was able to revisit existing data, record additional data and reflect on any emerging patterns. This method provided a means for me to gain an overview of the findings at a glance, without the laborious task of wading through masses of journals and the other data collected. Of particular interest to the researcher were any similarities and differences in response among participants and facilitators and between the networks.

Delimit to focus on answering key research questions

Considering the abundance of data generated by the seven networks and other sources, such as the Project Officer and Project reports, it was necessary to revisit the key research questions to reorganise and reduce the data. Data on all the matrices were scrutinised to identify new categories. Key words (e.g. network facilitators, network meetings, network issues, essential features of an effective network etc.) relating to the two key themes, networks and professional development, were written on slips of paper and then organised into two groups, namely professional development and collegial networks. Within each group, key words were classified and sub-headingss were then assigned to each group, for example motives for joining a network group. Clearly there were too many categories, so I searched for broad themes (e.g. professional development, engaging in action research, problems encountered) that could be used to reduce the number of categories. Reorganising and renaming the categories was a continuing process until the final categories were developed. Table 3.5 (p. 102 following) identifies the final categories developed to organise the data and present the findings.

Table 3.5 Final Categories for Organising the Data and Presenting the Findings

Categories	Sub-Categories
The Networking Mechanism in Action	motives for joining a network; development of collaborative learning environments; participant perceptions of the network as a mechanism for delivering teacher professional development; network facilitation, and network meetings
Action Research as a Process for Teacher Professional Development	coming to terms with a new way of engaging in professional development; engaging in the action research process; benefits gained from using action research as a process for teacher professional development; difficulties encountered in using action research a process for teacher professional development

Validating the Data

A method of "triangulation" (Anderson, 1990, p. 175) was used to bring different kinds of evidence together so that they could be compared and contrasted. The basic principle underlying this idea was to collect observations of a situation from a variety of perspectives and then compare and contrast them. For example, one can compare and contrast accounts of network activities from one's own and the participants' point of view. Often, the accounts were

elicited through journal entries, data from interviews, and discussions with participants. The points where the data agreed and disagreed were noted. In cases of disagreement, the evidence was checked with another source. For example, comparisons between the journal entries and the reflection sheet were made to either confirm consistencies or note inconsistencies in the data. Engaging in purposeful conversations with network participants and network facilitators was another method used to validate the reliability of certain data.

3.8 Ethical Considerations

As with any research there is a need to be aware of ethical issues underpinning the conduct of action research and the use of qualitative data (Glesne & Peshkin 1992; Soltis, 1989). In addition to satisfying the demands of the University's human ethics review panel, other ethical dilemmas arose in a number of ways at different stages of the action research projects.

To meet the guidelines of the University's human ethics review panel, ethical clearance was sought and approved. Ethical issues concerned with matters of consent; confidentiality; protecting the rights of the participants, and ownership of the research were addressed. In accordance with the ethical procedures for research involving human subjects, written permission to use material generated by participants in all three projects was sought. Prior to signing a consent form, each participant was provided with an information sheet (Appendix 5) explaining

the nature and purpose of the research and the procedures to be implemented to ensure anonymity. Facilitators and participants were also informed that their participation in my action research project was voluntary and that they may have chosen to cease participation without penalty at any point in the study.

Even though "negotiation of access" (Stenhouse, 1981, p. 15) with employing authorities was not essential given that all network meetings occurred out of school hours, written permission was sought from the two employing bodies (Department of Education, Capricornia Region and Catholic Education Office, Capricornia Region) to involve some of their employees in an action research study. As part of the management structure of the CEPDC, throughout the lifetime of the project regular reports about the findings associated with the numeracy networks were provided to the employers concerned.

Also in keeping with the University's ethical requirements concerning confidentiality, to protect the anonymity of those involved in the research a numerical coding system was used to refer to the seven numeracy networks. No names or identifying characteristics have been included.

Other personal and professional ethical dilemmas that arose from my daily interactions with facilitators, participants and qualitative data included the subjective nature of qualitative data; my relationship with the facilitators and participants and problems of a professional nature. As a consequence of the

subjective nature of qualitative data, there was the potential to overlay it with my own beliefs and values. This was particularly true in two areas. Firstly, informal observations I made during network meetings differed sometimes from the accounts provided by facilitators in their journals. Secondly, during the two years I had the dual role as network facilitator and researcher, I was confronted with the dilemma of having to be critical about my own practice as a network facilitator. Being able to access multiple sources of data and triangulate the data was the main strategy applied to deal with these situations.

Prior to the commencement of the CEPDC activities in 1994 and in my role as a Regional Mathematics consultant, the relationship that I had with many of the teachers who became facilitators and participants was one of friendship. Consequently, in my role as researcher, I found that I was sometimes put in a position where I gained access to information given to me in the context of friendship, rather than in my role as researcher (Glesne & Peshkin, 1992). This seemed to occurr most frequently during the informal afternoon tea gatherings that took place prior to the network meeting commencing. Usually such information related to the overall management of the project, or what was happening in the network meetings including the informant's explanation of reasons for such events. If such information related to the overall management of the project, and depending on the significance of the matter, I might address it as a general matter in the Numeracy Newsletter I wrote. Information pertaining

to network oganisational matters, including the format of meetings however, was raised and discussed with the facilitator in a non-threating manner. It was then the responsibility of the network facilitator to determine if and how s/he would deal with the matter. Findings of this nature were recorded in my journal, but not recorded in documentation that was distributed publicly to avoid situations that might cause network facilitators or participants any discomfort.

One of the professional problems I encountered is what Singh (1994) identifies as "restoring knowledge to those from whom the information for the investigation originated" (p. 20). Specifically, efforts to realise this was done in two ways, namely by (i) engaging in professional dialogue with facilitators and participants, and (ii) documenting findings in newsletters, conference papers and project reports. All network facilitators and participants were issued with a copy of the newsletters, and copies of conference papers and project reports could be readily accessed. A second professional problem this researcher encountered when using qualitative data was what Solitis (1989) describes as placing the researcher in "face to face relationships with other human beings in which ethical problems of the personal as well as the professional are bound to arise" (p. 123). During some network visits I was confronted with the dilemma of whether to intervene or to remain a silent observer when a facilitator was handling a particular incident in a way that I believed was professionally inappropriate. Each dilemma of this kind was dealt with on an individual basis.

Thus, for the duration of the three interrelated action research projects ethical considerations were of paramount importance. Thoughts about protecting the rights of the participants; reflecting the views of the participants objectively, and maintaining the integrity of the research were considered continually when collecting the data, analysing the data and writing the report.

3.9 Delimitations and Limitations of the Research

Delimitations

Due to the complexity and sheer size of the CEPDC's organising project and because of my specific professional interests, this investigation was concerned only with the findings generated by seven of the twenty-nine numeracy networks. Hence, there are other areas worthy of research and a plethora of data that were not considered in this study.

Limitations

There are two significant limitations of this study. One pertains to the number of data collected by network facilitators and network participants in their roles as researchers, while the other deals with the interpretation and validation of the data and the subsequent findings.

Data gathered systematically in each of the action research projects was limited by the participants' willingness to share the data they collected and their action research findings. Therefore, in addition to the data collected by the network

facilitator, the external evaluator and this researcher, some networks provided an abundance of data collected by the participants themselves. The number of data provided by network participants varied within and across the seven networks. In some instances, where a relatively small number of data were provided by individual participants, their view of what occurred in network meetings may not be indicative of how others perceived the situation. Thus, the reliability of data depends very much on the observations of the individual participants and the network facilitator.

As this researcher is responsible ultimately for interpreting the data provided by a number of different numeracy networks and for synsthesising the overall learnings, it is possible that my interpretation of what happened and the subsequent group outcomes will be different from that held by participants in any one network. It is not my intention to generalise about what happened in a particular numeracy network, but rather to identify themes that are either most common or most different within and across the numeracy networks.

3.10 Conclusion

This chapter described the multi-level action research methodology utilised in the current study. The chapter also provided an overview of the research problem and described the role of the researcher. An explanation of the process used to select the seven numeracy networks was provided. The various techniques employed to collect the qualitative data and how these were used

were described in detail. The framework used to analyse data was explained, as were the limitations and delimitations of the study. Finally, the chapter included a consideration of relevant ethical issues as they applied to the study.

CHAPTER 4: RESEARCH FINDINGS AND DISCUSSION

4.1 Overview

This chapter focuses on the research findings in response to two of the three research questions framing the current study, namely:

- What is the value of using collaborative networks as a mechanism for delivering teacher professional development?
- What are the benefits/limitations of using action research as a process for teacher professional development?

From answers to these two questions, conclusions are drawn to answer the third research question:

- What are the significant implications of this study for future professional development programs?

Such will be the focus of Chapter 5.

A review is made of the implementation of the CEPDC approach within seven different numeracy networks. These networks produced large number of data which were analysed from two perspectives. First, they were analysed for evidence to establish the value of using collaborative networks as a mechanism for delivering professional development. Second, they were analysed to review the use of action research as a process for professional development.

Implications arising from the data analysis relating to the main research questions and the subsidiary questions identified in Chapter 3 are made in Chapter 5, as are recommendations for applying the approach in a range of settings.

4.2 The Networking Mechanism in Action

For me as a researcher, the network mechanism employed by the CEPDC, its meeting procedures, and the facilitation process were of particular interest. Following analysis of data, five themes emerged that pertained to the operation of the CEPDC Numeracy Networks. They embraced ideas to do with:

- motives for joining a network group;
- the development of collaborative learning environments;
- participant perceptions of the network as a mechanism for delivering teacher professional development;
- network facilitation, and
- network meetings.

Each of these ideas is discussed in detail in the section that follows.

Motives for Joining a Network Group

Participation in CEPDC networks was on a voluntary basis yet eighty-six teachers participated in the seven selected networks between June 1994 and

December 1996. Analysis of participant reasons for joining a network revealed five principal motives. They were the:

(i) influence and/or enthusiasm of colleagues who were already network members;

(ii) attraction of engaging in collegial collaboration;

(iii) opportunity to engage in self-directed learning;

(iv) potential for multi-level intersystemic cross-fertilisation of ideas, and

(v) opportunity for continuing professional development.

The Influence and/or Enthusiasm of Colleagues who were already Network Members

Participant comments and their enthusiasm for the notion of learning in a collegial network environment in 1994 was a significant motive for attracting new participants to engage with the 1995 and 1996 projects. When asked why they had joined a CEPDC network, participants responded in these ways:

> [I] heard from others that it is a worthwhile experience. (Participant-Network 4)

> I've been involved in this network group for the past 2 years and I have enjoyed the professional exchange of ideas and activities and support from other interested people. (Participant-Network 7)

> I joined a network last year, but I almost died of shock at the first session. Too much was expected of me, so I didn't return. Another teacher on staff remained in the network and she was so enthusiastic about what she learnt from others that I decided to try again. (Participant-Network 4)

The Attraction of Engaging in Collegial Collaboration

The collaborative approach of the CEPDC networks was one of the major contributions to the overall success of the project. Many participants welcomed the chance to join a cohesive group network established on the basis of the members' common themes of interest or need for the purpose of engaging in collaborative professional development activities. Another attraction was that the network afforded an opportunity for participants to be given time to plan, develop and evaluate aspects of their own classroom practice within a supportive environment. One facilitator wrote:

> The network has provided opportunity for participants to share ideas informally, to broaden their knowledge base, to present effective practices to colleagues, and to monitor changes in teaching practice. (Facilitator-Network 1)

Participants commented that the opportunity to share their observations of their classroom practice and their perceptions of their students' reactions to it with supportive colleagues was essential for the implementation of new learning approaches to continue. Collaboration with fellow network colleagues seemed to give participants the confidence to go beyond existing teaching practices and implement new strategies in the classroom. A participant remarked, "Encouragement of peers was an incentive to try new things" (Participant-Network 7). Generally, the CEPDC project was successful in utilising a collaborative approach in order to reinforce participants' commitment to sustain the change/s which they had implemented. According to one participant,

"Sharing and feeling valued by peers is a great tonic to encourage self-growth" (Participant-Network 4).

Another contributing factor towards teachers joining a network was that, at that time, many teachers considered teaching to be a lonely profession. Several facilitators and participants stated that there were few opportunities for teachers to meet to discuss and explore issues related to their professional practice. The CEPDC networks therefore, presented teachers with an opportunity to avoid working in isolation. As the following participant's comment indicates, it was "great to mix with other teachers who have a positive attitude to teaching" (Participant-Network 7). This notion seemed to be particularly appealing at a time when teachers perceived that education systems provided few opportunities for professional development. As one participant explained,

> [At] a stage in the teaching profession at the moment ... in the State System where a lot of teachers believe appropriate inservice is not being offered. (Participant-Network 4)

Some participants were attracted by the the chance to work collaboratively with other teachers, while others were quite simply attracted by the opportunity to enegage in professional development activities. This latter reason especially, was given frequently since the perceived view at the time was that there were few opportunities to engage in professional development.

The Opportunity to Engage in Self-directed Learning

When asked why they had joined a network, one motivating factor voiced by participants was that the CEPDC networks presented teachers with opportunities to assume greater responsibility for their own learning. Networks provided participants with a greater choice in, and ownership of their own professional development. According to participants:

> The group decided the direction the group would take. This allowed greater freedom and generated interest in what we were doing. (Participant-Network 4)

> [The] facilitator encouraged people to find the answer for themselves. (Participant-Network 7)

> [I]t's something that we have chosen to do, professionally it makes you keener to work on it, instead of having someone say, "On Tuesday next week you will be attending a session on ..." You're not the slightest bit interested in the topic, but you have to go there and sit and listen. (Participant-Network 4)

> Other professional development is instructor initiated, where the participants are passive learners. The network involves us in the process. (Participant-Network 7)

The Potential for Multi-level Intersystemic Cross-fertilisation of Ideas

To link educators across systems as a community of learners, the CEPDC promoted the establishment of networks that provided an opportunity for teachers to network within and across school systems and sectors. Networks that involved participants from the same school, as well as from a variety of schools, sectors or systems were established. Thus, a major incentive for joining

a CEPDC network was the opportunity to work with teachers from other systems and levels.

Generally facilitators didn't have a preference about the composition of the network. However, one person who facilitated a network for three years, felt very strongly about having participants from the different systems involved. She firmly believed that "[A] good cross of participants from other systems is essential. The more networking across systems, the richer the interaction among participants" (Facilitator-Network 4). Participants involved in intersytemic networks appreciated having the chance to draw upon the experiences of each system. A participant from Network 4 wrote, "The mix of participants from different schools and systems provided an opportunity for cross fertilization of ideas," while a participant from Network 5 stated,

> I'm loving working with P-3 mix and especially getting a perspective from the preschool teachers. This sort of shared learning would be terrific to enhance continuity within a school. The camaraderie between the state department personnel and the catholic education teachers is very natural... most participants are willing to share which enhances the learning as well.

After being involved in the project for two consecutive years, a participant from Network 7 remarked:

> The big plus for me in being a member of the CEPDC has been the meeting of teachers from other systems and schools-the sharing of ideas and resources and the genuine desire to improve knowledge and teaching practice.

On the other hand, participants in networks comprising teachers from the same system, but from different schools, valued the opportunity to exchange ideas, knowledge, practice and strategies and work with colleagues with whom they had previously not had the opportunity to work. This is evident from comments made by participants in Network 1 who indicated that "it was an opportunity to discuss on a professional basis with others our own classroom practices and strategies" and "... listening to other people's ideas is refreshing and can give you a new sense of direction". Networks composed of participants from different school sectors (that is, primary and secondary schools) valued the different perspectives and experiences that each person brought with them.

At the same time, participants from Networks 4, 5, 6 and 7 highlighted the value of working with teachers who taught a similar year level. This was particularly so for teachers from small rural schools, as revealed in the following comment:

> In the smaller schools, where we've only got one class for each grade, you don't find you're sharing ideas very much. It's nice to meet teachers teaching the same grade to hear what they're doing and bounce ideas off each other. (Participant-Network 7)

According to participants in Network 6, common areas of interest and need could best be explored by participants teaching the same or similar year level, working together. The central issue was not whether or not the network was intersystemic or a mix of teachers from the same system, but whether it provided

opportunities for participants with similar professional needs and interests to work together.

The Opportunity for Continuing Professional Development

Another motive for participants joining a network was that the CEPDC approach offered teachers an opportunity to engage in professional development on a regular basis. "Usually there is not the opportunity to implement, share and reflect plans" (Participant-Network 4). Another commented:

> I think this type of professional development has been lacking over my time as a teacher. Unfortunately most professional development is simply used as a means of informing the teacher of the changes ... how you will make this change ... ways you can make it happen etc. (Participant-Network 5)

Further,

> There are few opportunities where professionals are able to get together and discuss issues related to their profession. The opportunity the network gave for participants, of differing experiences and knowledge base, to regularly share and discuss issues was crucial for me as a learner. (Participant-Network 1)

Hence, having contact with the same group members was a strength of the project's network organisation.

The Development of Collaborative Learning Environments

The CEPDC approach was "based on the establishment of collegial networks which encouraged educators from all sectors to take charge of their own learning agendas through critical reflective enquiry" (CEPDC, 1996c, p. 3).

Within the coordinating project, the CEPDC adopted Cooper and Boyd's definition of a network as "a professional community organised around a common theme or purpose" (1994, p. 129). Numeracy networks were established throughout Central Queensland to provide teachers with an opportunity to engage in professional development which was self-motivated and encouraged them to take greater responsibility for their own growth as professionals. Each network was unique in terms of participant backgrounds and experiences; facilitator background experiences; size; location, and their focus and modes of operation.

From the outset, the very nature of the CEPDC networks engendered a collaborative approach to learning in that participants were bonded by their interest in a specific topic or issue and their commitment to the goals a particular network was trying to achieve. Despite this, facilitators discovered that a great deal of effort and skill was required on their part to create a collaborative learning environment in which mutual trust; shared responsibility for learning; risk taking, and critical reflection featured. Asking participants to decide collaboratively the goals, content, method and desirable outcomes for their network was ambitious, initially. For many participants these were unfamiliar responsibilities in the context of professional development. That caused some initial discomfort. A participant from Network 3 wrote in her journal:

> I looked to ... (perhaps unfairly) as the source of knowledge about the topic where I realise now she was the facilitator-one to help organise, conduct and encourage discussion ...

Participants acknowledged that working collaboratively on shared concerns enabled them to make greater achievements than when working in isolation. A participant from Network 6 reflected thus:

> I have doubts as to whether people would continue to achieve as much without the support of the group. Collegial support is critical.

Both facilitators and participants recognized that time was required for participants to develop collegial working relationships. Sharing similar experiences and interacting with the same group of colleagues continually over a period of time was an essential element of the CEPDC project. In networks where participants really got to know each other and were able to talk openly and honestly, a stronger learning community was created. These sentiments are confirmed by the following comments.

> The teachers worked together in a harmonious manner. Over time, they were more willing discuss, share ideas and support each other. (Facilitator-Network 4)

> Needed time to bond and develop trust, so we could share freely. (Participant-Network 4)

> The group has matured, they are relaxed about sharing their philosophies on things, sharing their failures, disappointments and successes. (Facilitator-Network 3)

Collaboration between participants outside formal network activities was also evident. Reports of participants meeting with network colleagues outside the scheduled meeting and sharing resources were described in journal entries. In one instance, two members (one from a government school and one from a non-government school) from Network 7 met in their own time to exchange resources and plan activities to implement in their own classrooms before the next network meeting.

Varying degrees of collaboration were observed within networks. However, the degree to which the group worked collaboratively depended on a number of factors. One issue, which arose in discussions with facilitators, was that of convincing participants of their ability to make a worthwhile contribution to the group's agenda. Initially, in new networks, facilitators spent considerable time and energy creating an atmosphere which encouraged everyone to contribute their ideas. When asked about the level of collegiality evident in their networks, facilitator comments suggested that collaboration occurred more successfully in intersystemic networks or networks involving participants from a number of different schools. One facilitator stated:

> I firmly believe that a mix of teachers from the State and Catholic systems enriches the time spent together. They are more open about sharing their ideas and supporting each other. (Facilitator-Network 4)

One explanation for this was that it was necessary for the facilitator and the participants to establish patterns of working together.

A significant issue relating to collaboration emerged in networks where there was a mix of continuing and new participants. Initially, new participants tended to stay in the background allowing the others to take the lead. Once new participants' confidence in their ability to make valuable contributions increased, however, the group began to function more cohesively. Such groups seemed to make rapid progress also when members were willing to take risks and share both disappointments and successes.

Many participants came to view the network as a 'comfort zone' where they could openly discuss their beliefs and practices and find support from their colleagues as they engaged in action research to enhance their curriculum knowledge and teaching skills. One participant from Network 5 noted, "Meeting to discuss your progress with your peers allows you to share successes and failures, as well as learn from the experiences of others". Several participants commented that it was reassuring to have their colleagues praise their ideas and trial their suggestions, for example, "Affirmation by peers is important and improves confidence" (Participant-Network 7). The feedback and encouragement given by participants during network meetings motivated teachers to continue to try different strategies in their classroom. Just as a participant from Network 4 commented that "[S]haring and feeling valued by peers is a great tonic to encourage self-growth", so too did a participant from Network 7: "The affirmation by peers is important and improves confidence to forge ahead in the classroom".

An unexpected outcome of the network experience was that even some teachers, who did not actively participate in a network, also benefited from the project. Informal networks were created in some schools, in the sense that participants collaborated informally with fellow teachers. As one participant observed,

> Others on staff are keen to try the activities and to see the work samples generated by my students. Sometimes they try a similar activity and send me samples of what their students did. I find this rewarding and the kids get a buzz out of it as well. (Participant-Network 7)

Within Network 7 such informal sharing and collaboration was fairly consistent over a two year period, resulting in another of the school's teachers joining a network subsequently. However, my observations were that this school level sharing varied from network to network and was greatly dependent upon the confidence level of participants to engage discussion with colleagues in his/her school site following network meetings.

Another factor that had the potential to affect the cohesiveness of the group was the level of commitment of the participant. Even though participation in a network was voluntary, in those instances where a teacher was persuaded by an administrator to join, it became apparent that the voluntary nature of the group was essential to its success.

Across all seven networks, there was evidence that the collaborative network delivery mode promoted teachers' commitment to the professional development

process. The participants' willingness to freely give up two hours of their own time to attend each network meeting attests to their commitment to the networking concepts. As one participant said:

> I haven't missed a meeting in two years. We use a consultative approach to identify our needs and then negotiate the direction/s we'll take. Becauses the approach is practical and I enjoy the professional exchange of ideas and the support of the group I'll continue to be involved. (Participant-Network 7)

Similarly a facilitator commented:

> It really is effective because it targets teachers' needs and interests. They are there because they want to be, it is not imposed. (Facilitator-Network 4)

According to the CEPDC participants and facilitators, networks can and do work, if the conditions for collaboration, cooperation, communication, commitment, continuing support and motivation are established and maintained. The ability of the CEPDC networks to provide opportunities for teachers to participate in forums for the exchange of information, the sharing of resources, and guidance for moving forward catered for the diverse needs of teachers.

> The network approach enabled participants, at long last to be selfish about their own learning and direct it to meet their own needs without the worry of having to go back and inservice other staff members...allowed us, as learners, to put ourselves first. (Participant-Network 1)

Participant Perceptions of the Network as a Mechanism for Delivering Teacher Professional Development

The fact that participants were treated as professionals, in that they could explore and develop innovations that were relevant to their professional needs and interests, gave the CEPDC networks creditibility and legitimacy in the eyes of the participants. A second contributing factor was that in most cases the network situation fostered teachers' basic self-esteem and confidence. Comments from participants expressed the need for a shared vision; a learning situation which supports adult learners; and a teacher facilitator to "guide the learning instead of being in charge of the learning" (Danaher, 1995, p. 28). The sense of ownership that participants developed toward the project reflected their support for the CEPDC network approach.

A key assumption underlying the project was that the expertise for significant teacher development resided within the participants themselves. However, not all participants espoused a similar belief. Several participants, initially, felt they had little to offer. A new network participant reflected after the third meeting, "I seem to be using everybody's ideas, but supplying none of my own. Maybe that will come later" (Participant-Network 7). Facilitators also observed a lack of confidence in some of the network participants. The teacher facilitator of Network 2 wrote, "Some had misgivings as to their ability to contribute positively". Convincing participants that their knowledge and classroom

experiences provided a rich source of information to draw upon and share with others was a continuing challenge for facilitators.

Participants expressed differing opinions about the degree of comfort they experienced with the role they were expected to adopt within a facilitated network. Responses of new participants, after the first network meeting, usually reflected uncertainty about the whole process. For example, "I have no idea where this will lead to. I don't think this is for me" (Participant-Network 3). It was not uncommon for a continuing participant, however, to relish the opportunity to respond to challenging situations. In the words of one participant, "I was able to challenge my own knowledge and understanding of the curriculum, and respond to the challenges presented by other participants in the group" (Participant-Network 1). Conversations with participants suggested that often their feelings about the participant's role were affected by prior professional development experiences thus giving rise to anxiety about being able to fulfil the role of a network participant. Another contributing factor was how well their role as a participant was negotiated at the first network meeting.

Other participants perceived that the network was effective in that it provided a context where the knowledge and experiences of participants were shared and valued. In the words of a Network 3 participant, "I was comfortable with the network approach, because my professional expertise and experiences were

always acknowledged". Participants from Network 4 particularly acknowledged the advantage of having continuing participants in the network group. The following comment from their facilitator corroborates this view:

> Discussing how they felt at various stages of the project was an advantage as new participants took comfort in knowing that others had had similar feelings. (Facilitator-Network 4).

From the continuing participants' point of view, responses during the interview indicated that they found their second or third year extremely beneficial in that they got further support to keep growing professionally. For example:

> Each year I build on my learning from the previous year. The group I'm in has been running for three years, so most of us are familiar with the CEPDC approach. Also, we are used to working with each other, so it is easier each year to take risks with your peers. (Participant-Network 4)

Participants acknowledged that their involvement in the project required a continuing commitment. The commitment and willingness of participants to continue their involvement in the CEPDC was illustrated by the number of participants who remained committed to the project, with many continuing as either a participant or a facilitator in subsequent projects. Nevertheless, the way in which participants interpreted their role played a major part in determining how effectively the network operated and what they gained personally from the CEPDC experience.

Network Facilitation

One of the unique features of the CEPDC networks was the use of paid faciliatators to work with a network group. Project funds were allocated to pay the facilitator for each network meeting they facilitated, and perhaps even more importantly, payment for travel and childcare costs was also offered to acknowledge the professional expertise of the factilitators.

Several issues with respect to facilitation emerged from the data. These are discussed in terms of the role and responsibilities of the teacher facilitator; the training for facilitators; support for teacher facilitators; the development of effective facilitation skills, and the facilitators' commitment to their role.

If networks were a place where the group leader just disseminated information and controlled the direction the group took, then facilitation would not be an issue. However, since the CEPDC networks aimed to create a collaborative environment where teachers of varied experiences felt valued, played an active part in the decision making process and contributed to professional discussions during network meetings the need for a highly skilled facilitator was apparent.

The Role and Responsibilities of the Teacher Facilitator

Facilitators were faced with the daunting task of being guide, mentor and resource person, in addition to assisting participants to acquire the skills necessary to adopt a more self-directive approach to their own professional

learning. Their role was both proactive and reactive. Participants' perceptions about the role and responsiblities of the facilitator varied, but were usually linked to how long the participant had been involved in the project. A participant involved in the project for two years stated that the "[R]ole of the network facilitator was to support, challenge and assist participants with the learning process" (Participant-Network 7). On the other hand, new participants were of the opinion that the role of the facilitator was to take sole responsibility for the direction the group took. For example, a participant from Network 3 wrote, "At the first meeting the facilitator needed to tell us what topics would be covered".

Prior to the network meeting, the major responsibilities of the teacher facilitator were to organize the venue and refreshments, and plan or prepare experiences, articles, or materials that might stimulate and support collegial discussions. During the meeting, the major responsibility of the facilitator related to modeling the use of collaborative learning strategies; providing input when necessary; monitoring group dynamics, and keeping the discussion focused in a productive manner. Keeping a record of attendance, disseminating project related material and forwarding evaluation material to the project office were also part of the facilitator's responsibilities. Thus, the role played by the facilitator was critical in terms of how the network group functioned and what were the subsequent outcomes.

One challenge for the project officer regarding the facilitator role was how to encourage them to view themselves as continual learners rather than experts with all the answers. Modifying teaching methods was extremely important as well, because most facilitators, as a consequence of their own professional development experiences, were more familiar and comfortable with a top-down instructional approach (Martin, Gray, & Moran, 1996). Few facilitators had previously experienced first hand the kind of professional development they were being encouraged to utilise, so the transition for some was extremely difficult. One facilitator who was experienced in delivering top-down instruction commented: "Losing my expert status and being put in the position of a learner again has been valuable. I learnt so much from the group" (Facilitator-Network 4).

The Training for Facilitators

As indicated above, most of the facilitators were more familiar with and comfortable with a top-down instructional approach. Even though four of the seven facilitators in the present study had been involved previously in conducting inservice for teachers, the CEPDC approach meant moving away from the 'expert' driven model with which they were most familiar. A further complication was that the majority of facilitators had little experience in conducting research on their own practice, let alone knowing what support to offer teachers engaging in classroom based research for the first time. Thus, a very important characteristic of the CEPDC Professional Development model

was the facilitator training that occurred prior to networks commencing operation.

As mentioned in Chapter 1, the 1994 and 1995 projects provided a one weekend training program to network facilitators. However, in 1996, two weekend programs were organised. The decision to conduct two separate trainings was influenced by instances whereby (i) some people had been a facilitator for as long as eighteen months; (ii) others had experience as network participants, and (iii) some were involved with the project for the first time.

Findings related to the teacher facilitator training programs were categorised into four areas: (i) developing a common philosophical understanding of the project; (ii) facilitating a network, and (iii) using action research as a process for teacher professional development. The last item will be discussed later in the chapter.

Developing a Common Philosophical Understanding of the Project

Since the philosophies underpinning the project were unfamiliar to most network facilitators and participants, as was an understanding of the structure and organisation of the project, it was important that facilitators were well informed about these matters to avoid inaccurate information being communicated.

Feedback from facilitators suggested that the information provided at the training was useful; however, it was only after living the experience of being a facilitator that they gained an enhanced understanding of what the project was really about. For example, after the 1994 facilitator training weekend one facilitator wrote, "I came away with a feeling that I wasn't too sure where it was going to go, where it was going to lead, what was going to happen" (Danaher, 1995, p. 33). Hence, in the 1995 and 1996 training sessions, continuing facilitators were asked to share their insights and understandings of the project. In addition, a Project Information folder was prepared for facilitators. Both these strategies seemed to better prepare facilitators for the task of developing the participants' understanding of the project.

Facilitating a Network

Clearly, attention needed to be drawn to teaching methods that were "facilitatory rather than didactic" (Brennan, 1995, p. 14). Part of the challenge, then, was to prepare facilitators adequately, so they were able to respond to the diverse needs of the adult learners with whom they were working, for example, how to deal with participants who were too self-conscious to contribute to the group discussions or the participant who dominated the discussions. Based on the findings of research conducted by Cooper and Boyd (1994), significant changes were made to the training program for facilitators after the first year. These researchers argue that for facilitators to be successful in working with adult learners who are expected to be more self-directed, they need to be coached in

ways of working collaboratively with their peers, dealing with dilemmas and ways of assisting adults to understand and manage change. Enhancing facilitators' skills in the areas described by Cooper and Boyd became a priority in subsequent training programs.

Support for Teacher Facilitators

The need for continuing support for facilitators was identified by both the facilitators themselves and the external evaluators (Brennan, 1994; Danaher, 1995, 1996). Facilitators required varying degrees of support and direction depending on their level of expertise and experiences. It was evident that some facilitators required continual input from the project officer to further understand certain aspects of the approach, while others required minimal support. In the case of Networks 2, 3 and 4 the project officer (Numeracy) and the facilitator either met in a face to face situation or linked up with a teleconference to reflect upon the previous meeting and discuss plans for the next meeting. This kind of intensive support was requested by the facilitators up to, and including, meeting three. Specifically, requests for support were frequently related to planning network meetings; providing strategies to involve participants actively in the running of meetings; assisting participants with their research projects; suggesting techniques to engage participants in journal writing, and developing questioning techniques to foster critical analysis of current practices.

In response to these identified needs, additional teleconferences, video conferencing, forums and facilitator meetings were offered after school and on weekends throughout the year. Despite acknowledging the value of this kind of support, however, some facilitators chose not to participate due to time constraints and personal commitments.

The Development of Effective Facilitation Skills

Originally, when establishing the 1994 Network groups, the Project Management Team assumed that effective classroom teachers with relevant experience and knowledge would be able to take on the role of effective facilitators. However, this was an unwise assumption. Brennan, the 1994 external evaluator, reported that teaching adults is not the "same as teaching children in schools", although there are a "number of overlaps", and obviously "teaching expertise" was drawn upon by facilitators as they managed network groups (1995, p. 14).

Initially, when selecting facilitators there were two selection criteria that were taken into consideration. The prime selection criterion for facilitators was the ability to demonstrate confidence and competence in their focus area, that is, Numeracy. Secondly, potential facilitators were required to demonstrate knowledge of skills appropriate for facilitating the learning of their peers. However, during the 1994 project, it became apparent that demonstrating confidence and competence in the focus area should not be the determining

factor when selecting facilitators. In the subsequent projects, facilitators needed to have both relevant content knowledge in the focus area, and the ability to implement a process approach. The latter required skills such as an understanding of adult learners' orientations to learning; effective facilitation procedures, including being able to draw upon the experiences and expertise of the participants and being flexible when the meeting took an entirely different direction from that which the facilitator had anticipated, and the ability to support and encourage participants to reflect upon their own practice.

It was clear that there was great diversity in the levels of confidence of the facilitators in each year of the project. This diversity depended upon a number of factors. Firstly, the facilitator experiences were quite different ranging from wide experience to no previous experience with facilitation of this kind. Secondly, the facilitators' understanding, knowledge of, and ability to apply a process approach to learning, as well as their ability to encourage participants to reflect upon their own practice varied widely. Thirdly, facilitators' confidence with the content of their focus area (Numeracy), together with their capacity to recognise their own current practices differed considerably. Fourthly, their willingness to improve their facilitation skills diverged. Finally, there was considerable variation in the amount of preparation undertaken by facilitators prior to a network meeting.

I discovered through my analysis of facilitators', participants' and my own journals, and of transcripts of interviews with the facilitators, that the role of an effective facilitator required the skills of:

- negotiating and developing a shared group agenda;
- creating a trusting and supportive environment;
- providing encouragement to and acknowledging the contributions of a variety of voices so that individuals didn't dominate the group discussions and sharing time, and
- making available resources that enhanced exploration of the group's research topic.

Effective facilitation was vital to the effectiveness of network groups as a mechanism for delivering professional development. There was recognition from participants in all seven networks of the need for an effective facilitator. Most participants acknowledged the educational leadership exercised by network facilitators in organizing meetings and supporting participants in their professional development. The role played by the facilitator was critical in terms of how the group functioned and what they achieved as well. Both participants and facilitators agreed that without a facilitator the network concept would not have worked as well as it did. A participant from Network 5 remarked, "We need the facilitator to challenge us to keep growing, otherwise we will become complacent".

Facilitators' Commitment to their Role

Another notable element was the energy and commitment to the facilitation role demonstrated by many facilitators. Although they were paid for each meeting that they conducted, many additional hours were spent on organisational matters, preparing for the network meeting; consulting with the project officer regarding concerns that arose from meetings, and participating in support meetings for them. One explanation for facilitators being so committed to the project was that they wholeheartedly supported the notion of undertaking professional development in a collegial network environment. One facilitator stated, "It was rewarding to work with participants who wanted to be there" (Facilitator-Network 1). Another facilitator commented:

> I strongly believe the CEPDC way works. Listening to the participants share what they have done, I am amazed at how confident they have become. I am constantly astounded by the preparation and efforts of the particpants. (Facilitator-Network 4)

Although the majority of facilitators readily acknowledged that their role was a challenging one, requiring a great deal of risk-taking and skill, it seems that what they gained from the CEPDC experience was worth the struggle and the times of frustration. Facilitators appreciated the opportunity to engage in professional development; the chance to review their own practice and acquire new skills and knowledge, and the opportunity for professional exchange with their colleagues. For example:

> Being a facilitator has enabled me to grow professionally. I've learnt new skills through working with adults. Sharing with others has extended my

> mathematical knowledge. Like my participants I've enjoyed the intersystemic nature of the networks. (Facilitator-Network 4)

Seemingly, the facilitator's commitment was partially inspired by the responses and efforts of their participants.

Network Meetings

Regular network meetings provided opportunities for participants to collaborate with others as they refined an aspect of their current classroom practice. The number of meetings, the structure of the meeting, the mode of delivery and duration were network specific. The seven networks reported in this study were all conducted in a face-to-face situation, with each meeting running for approximately two hours. All meetings took place outside school hours. Except for the first meeting, logistical decisions such as meeting venue, time and frequency of meetings were not determined by the facilitator, but were instead negotiated with the network members. In this section, the frequency of network meetings; the structure of the network meeting; essential elements for running effective network meetings, and reasons for some network meetings being productive and others being unproductive are explored. Participants' comments about the network meetings provide additional insights about the critical role such gatherings played in supporting their continuing professional learning.

Frequency of Network Meetings

A common theme that emerged from the data was the importance of the meetings taking place over a continuous time frame (CEPDC, 1996a). There was a sense that this regularity kept the participants focused in their research and committed to taking action in the classroom in between network meetings as revealed in the following journal entries.

> ... an important aspect of this type of professional development is that it is ongoing over a few months. A one off session does not encourage you to go back and change your classroom practice. But this here [the CEPDC] ... you go away and in three weeks time you know you're coming back and you're going to share it with the other participants and so you're going to do something. (Participant-Network 5)

> Participants feel committed to taking some kind of action after each network meeting, as not only is there the expectation that they will provide an update on action taken at the next meeting, but some feel that they will be letting members of the network down if they are unable to contribute. They recognised after the first couple of meetings, that the input sessions from participants are not as beneficial if only a few are able to share what they have been doing in their classroom. (Facilitator-Network 7)

Having the opportunity to meet frequently with the same group of teachers was obviously a unique experience for many, and as such, they relished the opportunity provided by the CEPDc networks.

Multiple sources of data confirm that both participants and facilitators recognised the importance of setting meetings to allow a sufficient interval of time between meetings to implement planned action in their classroom, before discussing and reflecting on their efforts with peers at the subsequent meeting.

Clearly, the amount of time between meetings was an organisational concern of the facilitator and his/her participants. Most facilitators agreed that it was necessary to meet every two to three weeks, rather than monthly, to keep participants on track, while some participants were of the opinion that regular meetings (every two to three weeks) motivated them to remain focused. Other participants stated that monthly or bi-monthly meetings would have been preferable to enable them to make progress with their action research. A participant from Network 4 clearly stated an advantage of having a longer interval of time between network meetings when she said,

> ... time between meetings needed to be longer so you could try something, and if it didn't work you could reflect on why it didn't work before trying again.

Some participants also perceived that a longer time frame would enable then to do justice to their action research project, as well as cope with the daily demands of teaching.

The Structure of the Network Meeting

Since the majority of facilitators were used to management models of professional development where information is presented to them, they were uncertain as to what should happen in a network meeting where participants were to be actively involved in constructing their own learning. Hence, consideration was given to what might happen in a network meeting during the facilitator training weekend. Facilitators agreed that there needed to be a general

structure for the network meeting, however they also requested that the structure remain flexible so changes could be made to cater for the interests and needs of each group. When asked what support facilitators might require in preparing for the first network meeting, a facilitator responded:

> Because this [CEPDC network meeting] is different to what usually happens in inservice sessions, I really have no idea how to fill in the two hours so the time is productive. A guide of some kind would be useful, otherwise the meeting might degenerate into a general discussion session with few outcomes. Perhaps a generic meeting outline, which we [facilitators] can modify to suit our style and accommodate the needs of our own group is needed. (Facilitator-Network 2)

Obviously there were major differences in the first meeting of any one network, depending upon whether the group was meeting for the first time, was a continuing group, or was a group with a mix of new and continuing participants. Generally, however the first meeting was devoted to (i) discussing the professional development approach to be utilised; (ii) identifying, discussing and negotiating roles; (iii) clarifying expectations, and (iv) developing a research focus. Initially, some participants thought the first meeting lacked direction, as is indicated in this journal entry written after the first meeting.

> The purpose of our meetings seems very broad. I felt that we were headed in no particular direction. I was expecting to be lectured to and given some direction. (Participant-Network 2)

Two meetings later, the same person wrote:

> Where at first I thought we lacked direction, now I could see that we were working at looking at better ways of improving our professional practices. (Participant-Network 2)

Most network meetings started with an icebreaker type activity to continue developing the collegial aspect of the group, as well as to further develop the group dynamics. Time was then provided for participants to engage in professional sharing. During the informal sharing time, participants discussed the progress of their research project and any achievements/issues related to the group's focus topic. A typical sharing scenario from a network meeting would depict participants sitting in small groups; sharing their excitement about an event in the classroom; enthusiastically showing samples of students' work, or passing on information about a useful resource. Sometimes it was a chance to express frustration about their perceived lack of progress with their research topic. Other times, the participants used the group as a sounding board to think through their practice. A participant from Network 7 recorded one advantage of engaging in professional dialogue with peers in a journal entry that stated, "The affirmation by peers is important and improves confidence to forge ahead in the classroom". Comments from facilitators and my observation notes also confirmed that the feedback provided by participants during the feedback session was often a catalyst for further action.

For many groups, the next stage of the meeting was a focus session, which concentrated on the research topic. It was important that the focus session not only centered on theory, but also considered ways to integrate the ideas presented into classroom practice. During the focus session, a range of strategies

such as inviting input from a guest speaker; viewing a video; discussing a professional reading, or having a participant make a presentation was employed. Towards the end of the meeting, the focus for the next meeting; how it might be investigated, and what action participants needed to take in preparation were discussed. Often, time was given to record these actions both at a group and at an individual level. Oral or written reflection either occurred at this stage or was an integral part of the different phases of the meeting. Essentially, the network meetings provided structure and support for sharing ideas and resources, and for instilling participants' confidence and professional worth.

Essential Elements for Running Effective Network Meetings

There were many in-built factors in the conceptualisation and design of the network meeting which influenced how effectively a meeting was run. When asked to indicate the essential elements which contributed to the overall effectiveness of a network meeting, there was common agreement among the participants and facilitators within and across the seven groups. Such elements were:

- negotiating and clarifying facilitator/participant roles;
- scheduling regular meetings and providing time to discuss, plan and reflect on practice with other colleagues;
- allowing sufficient time between meetings to implement planned action and reflect upon the event (approximately three to four weeks was recommended);

- maintaining a reasonable group size (between eight to twelve participants);
- negotiating clear goals and objectives for each meeting;
- taking an active role in the design and delivery of the meeting;
- being open to alternative ideas and willing to try new experiences;
- presenting a balance between theoretical and practical input;
- providing opportunities to discuss different strategies trialed in the classroom and the outcomes with supportive, interested colleagues;
- having organised and flexible facilitator/s;
- employing a range of effective facilitation strategies;
- allocating time in the meeting for oral and written reflection;
- providing time within the meeting for providing research updates, and
- receiving supportive feedback from peers.

Although it was highly likely that a meeting would be most effective if the majority of elements identified in the list above were present, that was no guarantee. Ultimately, the success of the network meeting depended upon the skills and ability of the facilitator and the willingness of participants to engage in the learning process.

Reasons for Some Meetings Being Productive and Others, Being Unproductive

Visits made by the Project Officer to network meetings resulted in numerous observations being made about events that affected the productivity of the meeting. First, those networks with a negotiated meeting agenda and a clear

purpose tended to be more focused and appeared to accomplish a great deal during their meeting. Second, in those networks where time for social interaction was scheduled before the meeting, participants had the opportunity to vent their frustrations, rather than complaining about problems of the day during the time allocated for sharing or small group discussions. Third, group discussions were an extremely worthwhile means of generating professional dialogue, although in some networks neither the participants nor the facilitator recognised when further discussion of an issue was no longer productive. Fourth, if some members of the group didn't come prepared for the session, even though the group had already agreed at the previous meeting to read an article, the level of participant contribution was affected. Finally, there was the issue of particular individuals dominating the discussion, which became a problem when certain contributions prevented others from engaging in the professional dialogue. A journal entry written by the facilitator of Network 3 after the second meeting recognised this potential problem: "[X] tends to dominate the discussions, I need to have in mind some strategies to deal with this."

Observations like these were often shared with facilitators in a problem solving situation so that strategies to address these problems could be devised. Together, the Project Officer and the facilitators learned how to avoid pitfalls that could limit the productivity of the network meeting. Each year, new learnings were used to inform the direction taken in the subsequent project.

Participants' and Facilitators' Views on the Network Meetings

Comments from participants and facilitators were a rich source of information, which helped me, as the researcher, to understand

- what actually happened during network meetings;
- which aspects worked well/needed improvement, and
- how the network meetings assisted participants to assume autonomy for their own learning.

Selected comments from participants and facilitators are arranged below in relation to these common themes.

What actually happened during network meetings?

Both facilitators and participants stated that the network meetings provided a forum for identifying professional needs; utilising the expertise of participants; engaging in professional discussions; exchanging ideas; reflecting on curriculum and pedagogical changes, and acquiring new skills. Participants were asked to contribute their ideas about how the network group should function and what direction the group would take as the following response indicates:

> The members themselves provided the input. We were asked what we thought and where we wanted to go next, and how did we expect things to work etc. (Participant-Network 3)

The professional expertise of all participants was utilised. For example: "All participants got a chance to be the expert, including the facilitators" (Facilitator-Network 5). Another participant stated that network meetings provided

opportunities for "feedback, help, new ideas and personal reflection" (Participant-Network 6).

Evidence supported the notion that the network meetings provided participants with opportunities to enhance their curriculum knowledge and gain new ideas and materials to use in their classroom. Written comments indicated that participants appreciated opportunities to discuss mathematics with their peers, engage in mathematical activities, and review resources during network meetings.

> We got to try a variety of different math activities. Seeing and hearing what others did enabled me to try things in my classroom with greater confidence. (Participant-Network 4)
>
> Opportunity to participate in hands-on mathemtical activities related to the research topic. (Participant-Network 6)

Which aspects worked well/needed improvement?

Aspects that worked well

Participants acknowledged that having the opportunity to mix with peers and engage in professional discussions was definitely a positive feature of the CEPDC networks. For example:

> We have been able to work out some workable solutions due to our group discussions. (Participant-Network 2)

and

> Meeting to discuss your progress with peers allows you to share successes and failures and do some meaningful learning. (Paricipant-Network 5)

Participants stated that it was important that their feelings and needs were accepted and not dismissed by the teacher facilitator.

> We have been able to voice our concerns. (Participant-Network 2)

> Our focus could ebb and flow depending upon the interests and needs of the group. (Facilitator-Network 5)

Another feature that worked well was the creation of a supportive and challenging network environment that fostered professional learning.

> [The] opportunity to work with my peers to confirm and develop new understandings was enhanced by the supportive and challenging environment that was established with the network meetings... (Participant-Network 1)

> I appreciated the honesty and openness of my fellow participants. (Participant-Network 5)

> Participants were given the opportunity to value efforts, have their self esteem built upon and were given encouragement to be responsible and independent. (Participant-Network 1)

Participant journal entries indicated that many believed that the meetings were effective because discussions and activities were relevant to their professional practice. One participant from Network 7 wrote, "[Meetings are] really effective because they target teacher needs and interests".

Conducting regular meetings over a period of time appealed to both facilitators and particpants: "Because this happens over a period of time you're continually

reflecting, acquiring and implementing new ideas" (Participant-Network 4). As well, many participants were relieved to find that others faced similar concerns and problems to those that they faced.

> Participants seem to take comfort in the knowledge that others are experiencing similar problems (e.g. journal writing). (Facilitator-Network 7)

Aspects that needed improvement

As part of the action research process, participants and facilitators were asked to identify areas where they perceived there was room for improvement. One area for improvement identified by both participants and facilitators was the reduction of the amount of project information presented at the first meeting. A second suggestion for improvement, made by participants, was for the employing bodies to offer some teacher release time in recognition of the amount of personal time devoted to network meetings and associated activities.

How did the network meetings assist participants to assume greater autonomy for their own learning?

Facilitators were encouraged to present participants with a range of opportunities where emphasis was placed on them making decisions, acting upon these decisions and thereby assuming greater responsibility for their own learning. As illustrated by a facilitator, "Participants determined the focus issue" (Facilitator-Network 5). Another participant stated:

> The direction of the network meeting was driven by the needs of the members. The facilitator responded to these needs with challenging readings, questions and activities. (Participant-Network 7)

Other participants recognised that by engaging in reflective journal writing and professional dialogue, as well as by conducting action research, they could, for example, "develop the skills to manage and maintain their own professional development" (Participant-Network 1).

Review

There were numerous challenges associated with establishing the CEPDC networks. These included previous professional development experiences of both facilitators and participants; limited knowledge among participants of the project and its particular approach to professional development; participant lack of confidence in their own ability to make worthwhile contributions, and the availability of skilled facilitators.

Overall, the approach of establishing networks of teachers to work collaboratively to achieve a common goal proved very successful as a mechanism for delivering professional development. One of the strongest attractions of the network concept was the continuing opportunity to draw on the collected professional knowledge of the network group. It is important to recognise that the network meetings were instrumental in providing a supportive collegial environment which "provided a catalyst for participants to review and

revitalise their own practice" (Danaher, 1996, p. 51). Not surprisingly, all networks indicated the importance of the facilitator. By far, the most important aspect of a network which contributes to its success is the facilitator. It was not necessary that they had an extensive background in Numeracy, although this certainly was an advantage, but it was essential that they understood adult learners: catered to a variety of learners; were organised; had credibility as an educator, and were committed to the CEPDC's approach to professional development (Danaher, 1996). Other significant points made about the use of facilitated networks included:

- the value of interacting with teachers from different schools and systems;
- an acknowledgement of the professional expertise that dwells in teachers, and
- the allowance of time for participants to become accustomed to a different style of professional development and the demands it makes of them in terms of adopting a more self-directed approach towards their own learning.

Finally, an approach of this kind not only broadens expertise and facilitates sharing of knowledge and experience, but also enhances feelings of collegiality and ownership. As one facilitator so aptly described,

> Networks are a time of colleagility, enjoyment, frustration, learning and afternoon tea. (Facilitator-Network 4)

4.3 Action Research as a Process for Teacher Professional Development

It was reported earlier in Chapter Three that the CEPDC's choice of action research as a process for professional development was underpinned by the belief that for professional development to assist teachers to better manage change, a self-directed learning approach needed to be adopted. Within the CEPDC networks action research provided teachers with a process where they could identify their own professional needs and determine what action needed to be taken to enhance and extend their discipline knowledge and skills. It was a means of challenging teachers to accept prime responsibility for their own professional development.

Throughout the three projects, multiple learnings were constructed about the utilisation of action research as a process for professional development. Themes about action research which emerged from an analysis of the data, were

- coming to terms with a new way of engaging in professional development;
- engaging in the action research process;
- identifying the benefits gained from using action research as a process for teacher professional development;
- identifying the difficulties encountered in using action research as a process for teacher professional development, and
- developing the skills of critical reflective enquiry through journal writing.

Coming to Terms with a New Way of Engaging in Professional Development

Action research as a process for professional development is certainly not new in Australia. However, for the majority of the CEPDC's participants and facilitators it was an innovation distinct from the accustomed inservice activities prevalent in the region. Brennan (1994) found that an action research approach to teacher professional development had not been experienced by most participants and facilitators involved in the 1994 Project. This was evidenced in their evaluation sheets and also in the majority's lack of initial skills in dealing with this new approach to professional development (p. 24). Data collected in 1995 and 1996 indicated similar findings for new facilitators and participants.

Facilitators found the CEPDC's approach to professional development was demanding, challenging and time consuming. However, all seven facilitators agreed that the action research approach adopted within the project was extremely effective. One facilitator summarised the feelings expressed by other facilitators in these words:

> It is really effective because it targets teachers' needs and interests. They are there because they want to be, it is not imposed (Facilitator-Network 6).

When asked whether the CEPDC professional development approach was worthwhile, one facilitator stated that:

> Participants felt they had autonomy over their own learning. The professional development was meeting their needs mainly because it was relevant to classroom practice. (Facilitator-Network 2)

Another commented:

> Obviously it works, because people keep returning. (Facilitator-Network 5)

Participants, on the other hand, expressed mixed feelings about the CEPDC's action research approach to professional development. Initially, many participants found the shift from an 'expert' driven approach, where the emphasis was on information given, to a more self-determined form of professional development where the emphasis was on addressing self-identified needs through action research to be an uncomfortable experience. Thus, at the outset of each project, there were a few reluctant starters. Comments written by two facilitators and a participant after the first network meeting confirm this.

> [P]articipants came along expecting to be inserviced rather than having to be actively involved. Will they all come back? From the dazed appearances of a few there could be some that drop out. (Facilitator-Network 5)

> At first they were tentative with the understanding that they would own the direction that they would take and that change and growth were part of the whole concept of action research. (Facilitator-Network 4)

> I was expecting to be lectured to and given some direction. As a group we had to direct ourselves, which was not as easy task ... as we all had different questions that needed to be answered. (Participant-Network 2)

The CEPDC's action research focus asked participants to take on much more responsibility for their own learning than they might previously have been required to do in other professional development approaches. Comments from participants about the high level of commitment required were made frequently.

When asked how the CEPDC's action research focus was different from other professional development approaches, a participant from Network 6 responded, "Required extreme and ongoing commitment". Initially, feelings of uncertainty and frustration about what lay ahead were expressed by most new participants.

> Where at first I thought we lacked direction, now I could see that we were looking at better ways of improving ourselves as teachers and improving our professional practice. (Participant-Network 2)

> Initially, participants felt stressed. Gradually they became more comfortable with the approach. (Facilitator-Network 1)

There was evidence of some participants experiencing discomfort: "[A]t first, the expectation was that I would stand and tell them what to do and make all the decisions" (Facilitator-Network 2). For some participants, this feeling of discomfort with the action research especially, resulted in them leaving the network in the early stages; for others it meant some professional disequilibrium for the first couple of meetings.

Another concern expressed by some participants was the perceived workload that this action research would impose on teachers who already led extremely busy professional lives. Comments such as "Two participants pulled out of the network becaused of the perceived workload" (Facilitator-Network 4), and "Seems to me like it will be a lot of work" (Participant-Network 5) were made.

It was clear that those participants who were willing to take risks discovered that engaging in a different process of professional development from that previously experienced could be professionally rewarding. The following comments reflect this view:

> Most professional development is simply used as a means of informing the teacher of the changes... how you will make this change...ways you can make it happen etc. However, the Consortium's approach of analysing where I am at now, questioning what I need to do to change/improve to allow quality learning for my students required me to do something in my classroom. (Participant-Network 7)

> Other professional development programs often fail because we don't have follow-up, advice, support and motivation from our peers once we try to implement new strategies and or curriculum. (Participant-Network 1)

For many continuing participants, the opportunity to engage in professional development in which they played an active role in the overall process was certainly a major incentive for their continued participation. Participants made statements like:

> Most professional development is of a lecture type experience where the participants are passive learners and not involved in the process at all. (Participant-Network 7)

> The group decided the topic and the direction the network would take. This allowed greater freedom and generated interest in what we were doing. (Participant-Network 4)

As with any new initiative, a period of adjustment was required by some participants while they became accustomed to an approach that included action

research and so contrasted markedly with their previous professional development experiences (Martin, Gray & Moran, 1996).

> At first they [participants] were tentative with the understanding that they would own the direction that they would take and that change and growth were part of the whole concept of action research. (Facilitator-Network 2)

During the 1995 and 1996 projects, it became very apparent that groups consisting solely of new participants took longer to adjust to the CEPDC action research approach than did groups comprising a mix of new and continuing participants. One explanation for this was that new participants were guided by the continuing participants. Several facilitators and participants recognised that this kind of professional development takes time because it is a developmental process, and consequently changes in practice are gradual. In the words of one participant:

> I really would like the opportunity again, as I feel I'd get so much more out of it as I now understand the process involved and I think a teacher's action research can be a tool for change/growth. (Participant-Network 5)

Engaging in the Action Research Process

As the majority of facilitators and participants were initially inexperienced with the action research process, getting started presented quite a challenge. Initially, a general lack of understanding of action research and its implications for educational practice slowed down the progress in this area in the majority of networks. Even though most participants and facilitators were familiar with the term action research, knowledge and understanding of what the process involved

was very limited. In the 1994 project, none of the participants had previously applied action research in a classroom setting, while only two of the seven networks facilitators, when they first began, had previous experience in conducting action research. Developing awareness and shared understanding of action research as a basis for collaborative professional development took time and patience.

Given the diversity of experiences with, and the varying degrees of understanding about action research among the participants, it was necessary for the facilitators to ascertain what they already knew about it and to develop within the network group a common understanding of action research and how it might be implemented in the classroom. Therefore, at the first network meeting participants were asked what they already knew about action research. Depending upon their response, facilitators provided specific information about the process and what was involved in conducting action research.

Feedback from the 1994 project confirmed that time was required to develop knowledge, skills and an understanding of the process. After reflecting upon the first project, additional time was devoted to exploring the concept of, and principles underlying action research and its implications for educational practice in subsequent projects (Martin, Gray, & Moran, 1996). Time constraints placed upon the project by the funding provider further complicated this issue. It also

became clear that the initial introduction to the action research process was critical. Findings revealed that a network's response to the action research process and the commitment participants perceived it required of them was greatly influenced by the facilitator's knowledge and understanding of it.

Determining the Research Focus

A requirement of the CEPDC project was that each network group defined a research problem related to the implementation of the National Statement on Mathematics and the Profiles as a focus for their action research. Identifying initial common ground around the interests and/or needs of the participants was not an easy task. Therefore, each facilitator employed a process to enable participants to focus their attention on an area of their classroom practice, related to the National Statement on Mathematics or Student Performance Standards, that needed to be changed or enhanced. After ideas for a research topic were generated, these were examined to see if there were related interests/concerns that could be clustered together. Once a focus was agreed upon, participants identified several different things that could be improved upon. A great deal of skill was required by the facilitators to narrow it down as the journal entry made by the Facilitator-Network 4 reflects: "Identifying a narrow focus was challenging". Participants then considered the research topic and brainstormed specific questions they had about that topic, before posing the research question/s collaboratively. If the group failed to reach a consensus about the research topic, the facilitator employed a process to eliminate options.

The research problem defined and agreed upon by the network group then formed the basis of the action research project that each participant conducted within their own classroom.

Clearly, the task of identifying and articulating a research focus posed a challenge to some networks: "[We] found it difficult to articulate our research focus" (Participant-Network 4). Another participant noted,

> I found it difficult to narrow down the focus for what it is that I really want to change/achieve from my research. There just seems to be so much and it's my personality to want to change it all now. (Participant-Network 5)

As the quotations suggest some difficulties arose because of differences in the 'state of readiness' of individuals in each group and the challenge of narrowing the focus. Despite the difficulty associated with this task, both participants and facilitators recognised that it was an effective means of undertaking an audit of their current practice and a systematic way of identifying an area to be improved. Continuing participants and facilitators commented that the task of identifying a research focus became easier in the subsequent project. It was clear that those groups who were able to articulate a clear focus at the first or second meeting were much more satisfied with their outcomes than were those groups who took much longer to decide upon a research topic. An important point which some facilitators and participants overlooked, especially if they were new, was to keep the research question small and focussed. Upon reflection, the facilitator of Network 2 commented: "We needed to narrow the focus, our focus was too

wide. Participants wanted to attempt too much". Each year continuing participants and facilitators became more skilled at identifying a manageable research topic.

Implementing the Moments of Action Research

Understanding within and across networks about the moments of the action research spiral and the kinds of actions one would perform in each, varied greatly among facilitators and participants. What follows is an explanation of how participants responded to each moment of the action research process, namely planning, acting, observing, and reflecting.

Planning

A valuable discovery from the 1994 project was that a more effective way to begin the action research project was to have participants collect some initial data of what already happens in the classroom in relation to the agreed upon area of research, then to reflect prior to making the first plan of action. The inexperience of some facilitators resulted in participants being asked to plan action to be taken in their classroom without giving consideration to what was already happening. Action such as this impeded the progress of some action research projects. The Facilitator of Network 3 wrote, "Before practice can be interrupted current practice needs to be understood".

Observations made during network visits also confirmed that one of the most important things to do when beginning action research is to clarify what the current situation is and what one is interested in and why before embarking on any major changes. In instances where participants launched immediately into identifying changes to be made without considering what was already happening, there was the tendency to overplan specific actions to be taken. On the other hand, in the case of Network 5 where participants gave serious consideration to what was already happening, their research projects were very focused and all participants made steady progress. Comments made by participants reflect this.

> Think about where you are. What do I want to improve? (Participant-Network 5)

> Reflecting on my prior classroom experiences I was aware of a need to investigate how I could use children's use of language in mathematics to gain understanding of their thought processes, rather than just concentrating on whether the answer was right or wrong. (Participant-Network 5)

Whether or not sufficient time was allowed for participants to conduct a situational analysis before identifying an area/s of practice to be modified and their abilitiy to pose evaluative questions, impacted upon the effective implementation of the planning moment.

When it came to identifying specific actions to be taken in the classroom, participants relied initially on the facilitator to guide them. Therefore, during the numeracy network meetings participants experienced strategies, ideas and

activities that provided insights into different ways of teaching mathematics. It was then up to the participants to decide whether or not these new ideas and activities could or should be incorporated into their classroom practice. As participants became more confident in identifying the kinds of action they wished to take, the degree to which they sought input from the facilitator decreased. Further, a common error made by a number of participants was to plan action that was neither manageable nor achievable within the existing time framework.

Both participants and facilitators gave reports about either not considering all of the circumstances surrounding the current situation or needing to modify the plan before implementation began. It was important that facilitators and participants realised that this was an inherent part of action research and that the best course of action was to re-plan, if necessary.

During the planning moment, participants were also encouraged to identify how they would monitor changes and collect data for each action planned. Lack of experience in systematically recording what was happening and why meant that participants required a great deal of encouragement and support to consider how they would monitor the effectiveness of action taken. Researcher obsevations noted that continuing teacher facilitators allotted time to introduce participants to various ways of recording what they were 'doing', 'observing' and 'learning' as they conducted their research (Martin, Gray & Moran, 1996).

Doing

The evidence confirms that all participants and facilitators were willing to proceed with the implementation of their action plans. However, in some instances a few networks were slow in getting started. In the case of Network 2, participants really didn't make a clear statement about what they intended to do and consequently attempted too many tasks. It was necessary for the participants under the guidance of their facilitator to revisit their first draft of planned action and revise it in light of what actions were manageable and would be most useful to carry out immediately. Reasons given by the facilitator and participants for delaying the implementation of action plans in Network 3 include the following:

> [There was] no time to proceed with planned action [because] too much was happening in the school. (Participant-Network 3)
>
> All participants were unfamiliar with how to take responsibility for directing their own learning therefore we didn't make sufficient progress in the first two meetings. Much time was spent introducing and becoming familiar with action research. Time was a constraint. Additional time was needed to enable participants to fully engage in the action research process. (Facilitator-Network 3)

Visits to numeracy network meetings highlighted the willingness and eagerness of participants to share what they had done and to discuss what happened. One facilitator wrote in her journal, "I'm truly amazed at what they [participants] have achieved, they are so excited about the changes they are making in their classrooms" (Facilitator-Network 4). Further, in Networks 3, 4, 5 and 7, participants basically took control of the network meeting when they were given the opportunity to share the action/s undertaken and the subsequent outcomes.

It was seeing what did and did not work within their workplace and the support from their peers that persuaded participants to continue experimenting with alternative approaches. Many participants acknowledged that their most effective and useful learning occurred by experimenting with new strategies, ideas or activities within the boundaries of their own classroom.

> [It] meant significant learning was acquired through doing, not just absorbing information. (Participant-Network 5)

When a participant was asked whether the actions he was implementing in his classroom were making a difference, he replied,

> The students enjoyed the open investigations. This gave me the confidence to do more collaborative group work etc. The other participants made me believe that I could do it. (Participant-Network 6)

Comments such as "I've achieved nothing! Where am I headed?" (Participant-Network 4), however, weren't an indication that something was wrong. Rather, they were responses to the struggles encountered whilst implementing moments of the action research process. Overall, there was much evidence to confirm that both participants and facilitators were able to implement, with varying degrees of success, their action plan or a variation on it.

Observing (Fact Finding)

The primary problem encountered with this 'moment' of the action research process was convincing participants of the need to monitor closely what was happening. Monitoring was essential to having a rational basis both for making judgements about the worthwhileness of what happened, and for planning

further. Facilitators, on the other hand, while willing to collect and document evidence, seemed to lack skills and confidence in determining what to document and exactly how much evidence to collect. Both these concerns were discussed and suggestions recommended during facilitator network meetings facilitated by the Project Officer.

Researcher observations of network meetings suggested that participants were not collecting and recording data systematically as they acted on their plan. The lack of evidence in the journal entries confirmed that few participants recorded the progress of their research efforts. On the other hand, oral presentations about their research projects indicated that participants were indeed monitoring changes in their practice and the effects these had on their students. With the exception of Networks 5 and 7, few participants wrote a detailed account of what happened. In response to this issue, facilitators reiterated the importance of recording ideas and impressions regularly in the journal in order to specify more accurately what actually happened when action was taken. Inevitably, time was needed to develop the skills required for collecting, documenting and analysing data.

Reflecting

Although reflective journal writing was intended to be the main strategy for articulating and focussing critical reflective enquiry, due to the developmental nature of these skills and the natural preference of some participants to engage in

oral dialogue, a combination of written and oral reflection was observed being utilised in all seven networks. Convincing participants of the value of reflecting deliberately on what happened, and of reviewing the action taken and the consequences of implementing their actions in a systematic way, was a continuing challenge. Reactions to the idea of reflecting critically on one's own practice were mixed. Perhaps one explanation for this was that the participants did not see the point of making reflections about their own practice. Another explanation was that participants lacked confidence, as is indicated by the question: "Why should asking questions and admitting flaws in one's teaching practices be such a frightening experience?" (Participant-Network 5). New participants, in particular, were very reluctant to record in writing their reflections about action taken in the classroom. One possible explanation for this was that they felt threatened by having to articulate problems and concerns associated with aspects of their classroom practice. A second explanation was that they were unfamiliar with the process and so additional time to practise and develop reflective skills was required.

For many participants, both oral and written reflection, initially, was either stating what had gone well, or giving an account of events. Thus, an example of a typical early journal entry was: "In our smaller groups we listed concerns we had about our research focus ..., then we did a mathematical activity" (Participant-Network 2). Others interpreted reflection as being 'critical', rather than critiquing their practice with a view to making an assessment on the basis of

the evidence of the worthwhileness of what occurred. Many participants failed to realise that reflection was essential to provide a basis for planning the next spiral in the action research process.

Another key issue related to reflection was knowing what questions to ask to guide the process. Participants were uncertain about what questions to ask, and initially, facilitators were uncertain about how to deal with this issue. In response to this concern, sets of guided questions to encourage reflection were written by the project officer and disseminated to facilitators. The intent of these questions was to help participants focus and guide their reflection. The following extract from a participant's journal illustrates how the guide questions had potential to enrich the reflection process.

> What I have learnt is to look at what I did and consider what happened and why. What could I have done better? What could I have done differently? Or how could I extend this activity? Whereas in the past once I'd taught a lesson or used a new strategy – well that's good, I've done that and then put it away. This way encourages you to do much better. (Participant-Network 4)

Another interesting observation was that most continuing facilitators over a period of time became more skilled at posing their own questions to guide reflection.

Data indicated that it was apparently very difficult for participants to find both the time and the opportunity to reflect upon their own practice. Hence, some of the network meeting time was set aside for reflection. An oral group reflection

was a highly productive way of discussing decisions and problems and explaining new learnings. A facilitator gave an example of how oral group reflections worked in her network.

> In groups, participants were encouraged to reflect on what action they had undertaken, what they had learnt and describe their next action. Some became very excited when they shared the outcomes of their research. (Facilitator-Network 5)

Unfortunately, such 'excitement' was denied this researcher as such group discussions were not audio-recorded.

Further, the evidence of oral reflection time provided opportunities and help for participants to reflect on feedback from their students as to the learning occurring as a result of action implemented. All seven facilitators found that providing time during the network meeting for oral reflections was invaluable for strengthening collegial relationships and for reinforcing participants' confidence in and commitment to the action research process.

Participants attempted to apply the four moments to guide their research, although, in many instances, they placed most emphasis on the 'planning' and 'doing', rather than on the 'observing' and 'reflecting'. Having stated this, there were notable exceptions. In Networks 1, 3, 5 and 7, the facilitators constantly revisited the action research cycle to assist participants to identify where they were in the spiral, and to consolidate their understanding of the process. In these networks, participants were actively engaged in all moments of the spiral. As

well, some participants in Networks 5 and 7 prepared a written account of their action research to make public its findings.

Another key factor that influenced effective engagement in the action research process significantly was the level of support available to participants and facilitators. Support for participants was provided by the facilitator and their collaborative efforts with other participants. Facilitators who engaged in action research found that the continuing support offered by other facilitators and the project officer played an instrumental part in strengthening their knowledge of the process and developing their research skills and hence, the quality of their action research experience.

Some participants' and facilitators' efforts demonstrated their ability to undertake classroom or network based research projects using the process of action research to implement and evaluate the changes. Notwithstanding that, implementing the action research process was not a simple task; it took time and effort for both participants and facilitators to embrace action research. However, in my role as a network facilitator, I found that problems experienced in engaging in the action research process were dealt with more easily the next time the same or similar problems were encountered as the facilitator was able to draw upon their prior experiences and those of the continuing network participants.

Identifying the Benefits gained from Using Action Research as a Process for Teacher Professional Development

Evidence from the journal entries, interview transcripts and evaluation reports indicated that where participants and facilitators adopted an action research process, they reaped several professional benefits. Beyond the obvious benefits of acknowledging teacher professionalism and enhancing teacher confidence and competence, other specific gains identified from the data collected focused on changing beliefs and attitudes and improving classroom practice.

Acknowledging Teacher Professionalism

Involvement in the project provided important professional recognition and affirmation for participants. Of key importance was the process of commencing network activity with the participants identifying needs and/or concerns. By articulating research topics that they identified as being both practical and relevant (as opposed to their experience with previous traditional inservice models where an 'expert' imposes an agenda on participants), they felt their professionalism was being acknowledged. In the words of one facilitator, "[It] allows teachers the freedom to explore and research areas of expertise, practice or interest that are relevant to their professional needs" (Facilitator-Network 6).

Enhancing Teacher Confidence and Competence

Participants and facilitators agreed that an action research approach was motivational and sponsored ownership. Over a period of time it became evident

that by engaging in the action research process, both facilitators and participants grew more confident in their own abilities. By risk taking; collaborating with colleagues; engaging in professional dialogue, experimenting with new strategies, and having the opportunity to apply and reflect upon their learning, participants and facilitators became more self-assured and willing to try new approaches.

There was a marked increase in the participant confidence in dealing with curriculum and pedagogical related issues. This increase in confidence was in part the result of their growing familiarity with the content; listening to other teachers share their classroom experiences, and trialing different teaching strategies as part of their action research project. One participant commented, "I believe the network experience has given me the motivation and confidence to 'have-a-go' (Participant-Network 7), while a facilitator stated, "Developing mathematical activities has had a significant impact on developing the participants' own confidence" (Facilitator-Network 5). Evidence overwhelmingly supported the notion that engaging in the action research process contributed to participants' enhanced confidence and competence.

Changing Beliefs and Attitudes

Participants identified changes in beliefs and attitudes ranging from little alteration to their thinking about mathematics education, through to significant changes in their thinking about basic beliefs of teaching and learning. They

commented about using concrete materials to make learning more interactive; encouraging students to discuss and write about mathematics, and using a more open-ended approach to learning. It should be noted, however, that the extent to which changes in beliefs and attitudes such as those nominated actually affected what was happening in the classroom depended very much on individuals.

Attitude changes were obvious to facilitators and the researcher although they appeared less obvious to some participants. Many participants displayed a more confident approach when sharing action taken in the classroom during network meetings. Positive changes in their ability to articulate their action research project to network visitors such as the Project Officer and the External Evaluator were also observed.

Improving Classroom Practice

Specifically, one of the major benefits of the action research undertaken through networks was that it presented participants and facilitators with a way of examining their own practice critically and to make it more visible and explicit. Findings indicated that as a result of experiencing degrees of success with their action research projects, participants became more self-assured and willing to try different approaches in their classroom. "Through action research and the sharing of ideas, changes have occurred in [my] classroom practice" (Participant-Network 5).

Many participants believed that the changes they had made to their practice as a result of their action research project would be sustained far longer than the superficial changes which they had previously made in response to isolated professional development activities which offered no, or limited, follow up support. Participants felt that because the professional development was spread over a few months, was self-directive, and time was allowed for reflection, it was more likely that change would occur.

> An important aspect of this type of professional development is that it is on-going over a couple of months. A one off session does not encourage you to go back and change your classroom practice. (Participant-Network 7)

One of the most obvious benefits to participants was that it was a means for testing learnings in the classroom and making improvements as the following comment suggests:

> Action research is now part of classroom practice so that continued improvements can be made. (Participant-Network 4)

Evidently the combined experiences of returning to the classroom; experimenting with a new idea or strategy in their classroom; reflecting on the outcomes; sharing their findings with other participants, and receiving feedback, led to changes in practice. When asked whether the CEPDC experience had made a difference to their classroom practice, responses verified that indeed some changes had been made. For example:

> I have changed a few teaching practices, for example I now use group work. (Participant-Network 3)
>
> Through sharing ideas with other teachers I was introduced to the process of children evaluating their own learning. This has influenced me to part with some of my traditional assessment and replace it with some self-assessment items for the children to do. (Participant-Network 5)

Another comment demonstrates an attitudinal change about teaching methods:

> To experience first hand this type of learning makes all the difference between passive and active learning a reality. This in itself has motivated me to rethink my teaching style. Using equipment, working in groups and discussing maths are now regular activities in my classroom. (Participant-Network 7)

For some participants, the excitement about the changes brought by the process employed was obvious as they articulated their responses. Some participants seemed to be rejuvenated and appeared to take a renewed interest in their teaching. However, the extent of these changes in attitude and practice is only really known by the participants themselves.

It was also clear that change will be effective only if an individual perceives a need to change an aspect of his/her practice. For the change to be long lasting, it needs to be accompanied by a change in beliefs. Time to reflect, to experiment, and to engage in collaborative work with peers was acknowledged by facilitators and participants as being critical for such long term change to be effected. Thus, although during the life of the project participants implemented and sustained the

innovations they found to be effective, it is not known whether or not changes in practice were sustained and extended beyond the life of the project.

Identifying Difficulties Encountered in Using Action Research as a Process for Teacher Professional Development

In spite of the successes achieved, it would be misleading to ignore some of the difficulties encountered. It is not uncommon for any change process to generate problems. In fact, the resolution of problems is a key feature of action research. Given the developmental nature of the CEPDC projects, participants, facilitators and project officers encountered a number of difficulties whilst engaging in, and sustaining an action research approach to their own professional development. Addressing these issues when they arose assisted all those involved to enhance their learning about action research as a process for professional development. Apart from the obvious difficulties of unfamiliarity with the process and lack of experience in applying action research, other problems related to implementation and sustainability emerged.

Unfamiliarity with the process was the major cause of difficulties experienced. Action research as a process must be clearly explained and understood by both facilitators and participants. From the outset, participants needed to be clear about what was expected of them. Discussing questions such as why, what, when, where and how to research should have been critical aspects of the introduction to action research. In those networks (such as Networks 2, 4 and 6)

where participants were not given specific information at the first network meeting about what was involved in undertaking action research, they expressed feelings of uncertainty and frustration about what lay ahead of them. After the first network meeting a participant from Network 2 wrote, "I'm getting nowhere fast".

Participants expressed unease about the reflective moment of the action research process. Reflecting on practice informed by data collected to specifically address an identified area of concern was not something which was a regular feature of their teaching. Exposing one's practice to systematic scrutiny by colleagues and self was often a stressful experience, at least in the beginning.

Usually the biggest concern for the project officer and the facilitators was 'getting started'. This concern arose because prior to their involvement with the project, many participants and facilitators had no first hand experience of engaging in action research. Some participants used action research simply as a one-off problem solving strategy, clearly defining a problem at the outset, and ceasing their action as soon as they felt they had arrived at a satisfactory conclusion, which may well have been after a single cycle. For instance, facilitators raised a number of issues in relation to their role as a facilitator of professional learning. One of these was the importance of finding a practical way to introduce the action research process. Another was finding a more practical approach to assist network members to collect and record their research

findings. A number of facilitators commented that participants required continuing support, some more than others, to sustain their action research project, as in "[S]ome participants needed constant encouragement and support with their action research project" (Facilitator-Network 5). This presented a major problem for all seven facilitators as they had other professional commitments which prevented them from assisting and supporting participants outside the networking meeting. There were exceptions to this situation in the case of Networks 1 and 2, however, as both the facilitator and a large number of the participants were based in the same school.

From the project officer's perspective, the major difficulties were related to preparing the facilitators so they felt sufficiently confident to introduce the action research process to their network participants. Developing the facilitator skills to pose reflective questions was another challenge, as was knowing how to sustain action research groups; develop improved ways of using action research, and offer insights into how an action research process can be used to develop a new culture of professional development.

Developing the Skills of Critical Reflective Enquiry through Reflective Journal Writing

In Chapter 1 it was explained that the CEPDC project chose to use the tool of journal writing to develop the skills of critical reflective enquiry. The CEPDC's

decision to adopt the journal as a strategy was influenced by the literature's and the project consultant's recommendation that it is a valuable reflective tool.

In the first project, keeping a reflective journal was a requirement for facilitators, while all participants were strongly encouraged to keep a reflective journal. For both groups, the purpose of the journal was to document the progress of their action research projects; record data and new ideas, and report on critical incidents that occurred in the classroom or during network meetings. However, due to it being both an optional task and one that was unfamiliar to most, many of the participants elected not to engage fully in the journal writing process. Therefore, in the subsequent two projects, one of the requirements for participants in the numeracy networks, was that they maintained a journal.

Allowing each facilitator to take responsibility for introducing the idea of the journal and negotiating the keeping of the journal greatly affected how this reflective tool was received by participants. Over the three-year period, it emerged that the enthusiasm and skill with which the facilitator introduced the journal depended on the value that facilitators placed on keeping a journal themselves. Their perceptions of its efficacy, therefore, either enhanced or limited the effective use of the journal as a reflective tool.

According to Holly (1984, 1997, p. 1),

> There are no hard and fast rules for journal keeping. Each of us must develop procedures and orgnisation according to style and purposes.

However, knowing that most participants and facilitators had limited experience in keeping a journal, it was necessary to provide a structure as a guide. A recording method which was sufficiently flexible to accommodate the personal preferences of facilitators was devised and agreed to with facilitators prior to networks commencing their meetings. The approach used by facilitators involved using a double entry layout (Berthoff, 1981). The first entry written on one page of the journal was a description of the facts, while on the opposite page the writer recorded thoughts about what happened and possible implications for future action. In the case of participants, instead of using the double entry layout, each faciliator posed a series of questions to encourage and help to frame reflection. Initially, the project officer prepared guide questions for facilitators to assist in this process. Slowly, facilitators developed their own reflective questions to prompt participant responses to issues and concerns. Again, the degree to which this happened depended on the value the facilitator placed on journal writing.

Since a journal is a personal document, the writer is usually the only one to read it. In the case of this project however, participants were asked from the outset if they would be prepared to share their writing with the project officer

(Numeracy), as the journal entries would provide an important source of data for making judgements about improving aspects of the project. Surprisingly, all participants in the seven networks were willing to share their journals. In the case of the facilitators, part of an agreement regarding their roles and responsibilities meant that they would share their journals with the project officer in any case. This was with the understanding that all journals would be returned to the author.

Although there was no expectation that participants would share their journals with anyone other than the project officer, it was observed that in Networks 3, 4, 5 and 7, the facilitators encouraged participants to share excerpts from their journals with each other. After a meeting a facilitator wrote, "Journal entry readings went well. Some individuals commented on a more personal level today" (Facilitator-Network 3). Another facilitator wrote:

> The journal sharing is working not as a 'secret revelation time' but more as a time to share any concerns that have arisen since the last meeting or discoveries that have been made. Not all prepared to share but that's not a problem. (Facilitator-Network 2)

These collegial discussions of journal entries proved to be beneficial for a number of reasons. Firstly, participants were curious to find out what others were writing about in their journals. Secondly, they provided an opportunity for other participants to act as a sounding board and provide comments and suggestions for concerns raised by the writer. Finally, it was a means of assisting

participants to develop greater self-confidence in their own capabilities, as they learnt more about their own practice through their reflective writing.

Throughout all three Numeracy projects, it became evident that the skills of reflective writing were developmental, requiring time, perserverance and regular practice to master. Summing up some of his thoughts on reflective journal writing, the external evaluator wrote, "Skills such as reflective journal writing are developmental, and they require practice and persistence" (Danaher, 1996, p. 8). The following comment by a facilitator also highlighted the developmental nature of journal writing:

> They [participants] didn't know what to write in their journals. Only a couple of participants are using their journals, so the time we spent re-visiting what kinds of entries might be made was well spent. Next meeting, I will definitely include time at the end of the meeting for participants to write in their journals. (Facilitator-Network 3)

It also took time for attitudes about the value of journal writing to change, as indicated in one journal entry: "I find when I leave the meeting, that I don't write in my journal. I'm still not committed to it, yet" (Participant-Network 4). Insights such as these indicated that both the facilitators and the project officer needed to consider alternative strategies for supporting and training participants in techniques for monitoring and documenting their practices through reflective writing.

While all the participants and facilitators engaged in the journal writing process eventually, they varied considerably in terms of both their preparedness to complete entries and their commitment to the process. Many participants and facilitators found reflective journal writing onerous. They claimed that the method created too great a burden given their existing workloads. Comments about finding time to write entries in their journal regularly were made frequently. Some participants, particularly those involved with the project for the first time, quite openly discussed their reluctance to maintain a journal. Indeed, one facilitator commented, "I feel some participants dropped out because they didn't feel confident about keeping a journal" (Facilitator-Network 5). When asked for their opinion about keeping a journal on a regular basis, participants made statements such as:

> I liked the idea in principle. Unfortunately, I never reflected soon enough after the process to put all thoughts to paper. (Participant-Network 3)
>
> I think it is a good idea, but I find doing it a burden. (Participant-Network 4)
>
> I think it is a really good idea, even though it doesn't come eas[il]y to me. (Participant-Network 4)

It seemed that whereas many participants were not opposed to the idea of reflection per se they opposed, to varying degrees, the recording of reflections about their own practice in writing.

There was also diversity of opinion among participants about the value of maintaining a reflective journal. Some participants felt particularly that there was little tangible value in either the process or the outcome. Unfortunately, they believed that the journal was kept more for the benefit of the evaluator and the project officer, rather than for their own benefit. Comments made by the project officer and some of the facilitators about how the journals would provide important data about how to improve the project probably contributed to this belief. During a network visit, I asked participants how valuable they found the experience of keeping a journal. Participant responses led me to write the following entry in my journal.

> Participants do not realise that entries written in their journal are an important part of the reflection process inherent in the action research spiral. Obviously, some participants think it is a checking device for the project officer to evaluate their participation. (Project Officer-Numeracy)

Clearly, these participants had not considered how journal writing could be a valuable resource for their own professional development. Some participants did not understand that it was the thoughts they recorded in their journals that pointed to new questions, which in turn, led to new directions in thinking and ultimately, to an altered understanding of the research problem.

In fact, initially, few participants viewed the journal either as a document that could be used to evaluate their own progress, or as a resource to refer to periodically. In one of the 1996 networks, the facilitator invited continuing

participants to share their impressions of maintaining a journal. In the words of the facilitator:

> [The] group was more accepting of the journal once [two participants] explained the value they discovered in keeping one last time, as well as the ups and downs. (Facilitator-Network 4)

Another continuing participant in the same network stated, "Initially, I thought it was a pain. Now I find it is useful to go back and read what I have written" (Participant-Network 4). Towards the end of the third project, it was evident that an increasing number of facilitators and participants were realising that the journal had the potential to be a valuable planning and teaching resource for them.

Participant and facilitators' journals varied widely in the degree of critical reflection evident in the entries. Some reported events at network meetings or their classroom, with relatively little attempt at analysis or evaluation. Others clearly demonstrated that the author had engaged in critical thought about his/her own practice, expressed by Danaher (1995, p. 14) as "considerable synthesis of thinking and feeling". For example, the following entry demonstrates the use of verbs as evidence of mental processes at work:

> Many of the things that I currently do will remain in place as I work from the familiar zone to the unfamiliar zone, changing only one thing at a time. At this stage, the planning process that I use will remain the same. I had considered moving from the use of literature as the focus or the element that combined the unit of work to more real life aspects such as construction, ... However, I think at this stage, I will stick with using literature as I undertake an all out effort to become familiar with the

National Profile and Statements and apply them to my planning. (Participant-Network 1)

Further, the use of probe questions as guides for pursuing the action research in some journal entries illustrated participants' willingness to be self-reflective. For example, the above journal entry from a participant in Network 1 was written in response to the probe question: What things about my practice have remained the same?

It was noted that critical reflective entries were found more often in the journals of continuing participants and facilitators. This was to be expected as these people were more familiar with the technique, that is, those who had prior experience within networks of the process, had had time to practise and develop their journal writing skills over an extended period of time.

To overcome resistance to journal writing, as well as to develop the teacher-writers' skills, facilitators employed a variety of strategies. Each year these strategies were refined and effective ones were shared among the various network facilitators. Modeling the technique of reflective journal writing; voluntary sharing of journal entries either with a professional buddy (or the whole network group), and allowing time during the network meeting for participants to reflect in their journals appeared to be the most effective strategies employed. As the facilitator from Network 4 observed, "[A]llowing

time for reflection during the meeting was well received and a good strategy to encourage the non-writers". As the network meetings continued, reluctance in keeping a journal slowly dissipated. "Some participants came to feel written reflection was important, they hadn't previously thought this" (Facilitator-Network 4). Once again, this example demonstrates that time is required for attitudes about journal writing to change and for participants to recognise the value of this strategy as a component part of the action research (learning) process.

Without question, encouraging participants and facilitators to keep a reflective journal was a continuing challenge in all three projects. Despite the difficulties encountered, the strategy of establishing journals as an integral part of the action research (learning) process was not abandoned. Instead, the process was modified to reflect learnings about reflective journal writing as a strategy for articulating and focussing reflective enquiry. Generally, the third year of the CEPDC's operations reflected a growing level of confidence among continuing facilitators and participants in keeping a reflective journal, as evidenced by this reflection.

Review

Action research seemed particularly well suited to the project's aim to have participants accept prime responsibility for their own learning, in that

participants explored ideas and resolved issues and concerns themselves by interacting with colleagues, trying ideas in their classroom, and reflecting on their practice, while facilitators focussed on how to enhance their facilitative skills. Whereas implementing an action research approach made a difference to both how participants performed in their classroom and how facilitators worked with their network groups, facilitators tended to focus on how to enhance their facilitative skills.

Both participants and facilitators recognised and valued the potential of engaging in a professional development approach that began with the needs of the participants. Clearly, participants developed a heightened sense of ownership and valued participating in the action research approach to professional development adopted by the CEPDC. "Participants felt in control of their professional development. Nobody coming in and saying do this" (Facilitator-Network 6). When asked how the CEPDC action research approach was different from other professional development approaches, a participant stated, "It developed participant ownership, and made relevant theoretical connections to classroom practice." (Participant-Network 7). Despite these positive findings, for the majority of new participants a period of adjustment was needed while they became familiar with, and developed understanding of the action research process and the demands it made of them as researchers.

Both participants and facilitators varied in their understandings and perceptions of the process of action research. Generally, a lack of understanding of action research and its implications for educational practice meant that progress in this area in the majority of networks took much longer to develop than the time constraints of the project allowed. Having stated this, the action research process was accepted, understood and engaged in to varying degrees by an increasing number of participants and facilitators over time.

Overall, the majority of participants and facilitators gained some benefit from the experience of engaging in action research.

> My action research was not massive nor earth shattering but it has revitalised my teaching career and provided an ongoing impetus that will benefit all aspects of the pre-school community. (Participant-Network 5)

Each year of the project, an increasing number of participants who engaged in the action research process reported that they gained an increased sense of satisfaction and accomplishment in their professional lives. However, it should be noted that this appreciation of the action research process as a means of effecting and understanding change usually became apparent towards the end of the project. Participants made statements like the following, "You have to experience it though, to realise the value that you do get out of it" (Participant-Network 4.

Interaction among the participants and the facilitators, and their growing confidence in their own abilities to conduct meaningful research and present it to their peers, were thus successful outcomes of the project.

4.4 Conclusion

This chapter has presented and discussed the findings that emerged from the study. Findings presented focussed on the use of collaborative networks as a mechanism for teacher professional development and the successes and difficulties encountered in implementing an action research approach to teacher professional development.

Findings about the networks highlighted both the challenges and the rewarding outcomes of using collaborative networks as a mechanism for delivering professional development. The motives for joining a network; the development of collaborative learning environments; participant perceptions of the network; the role of the teacher facilitator, and the structure of the network meetings were considered. Although there were a number of challenges that emerged during the implementation of the CEPDC networks, the evidence has shown that the resulting outcomes demonstrated the value of utilitising collaborative networks as a mechanism for delivering teacher professional development.

In respect of the benefits and limitations of engaging in action research as a process for teacher professional development, the findings indicated that although a number of challenges were encountered, there were also positive gains made. In terms of the limitations, early progress was impeded by lack of understanding of the action research process by both facilitators and participants, as well as the lack of necessary skills to engage in some of the 'moments' of the action research process. However, over a period of time as participants and facilitators developed an understanding of the process and grew more confident in their own abilities, they became more skilled in applying the action research process. One of the most significant benefits for participants was the development of self-confidence in their own ability to apply action research to effect change in their own classroom. Overall, the action research approach adopted by the CEPDC proved to be motivational, and sponsored ownership among some participants.

From the findings, it is clear that the learning that evolved from the CEPDC projects has the potential to imply some recommendations for future professional development initiatives, the implications of which will be explored further in Chapter Five.

CHAPTER 5: LOOKING BACK, MOVING FORWARD

5.1 Overview

This chapter looks back on the CEPDC coordinating project to draw conclusions from the findings presented in Chapter 4 in order to respond to the third research question, What are the significant implications of this study for future professional development programs? The most significant findings and related implications to emerge from this study focused primarily on the delivery mode employed and the process used to implement the CEPDC approach. Therefore in the first instance, the recommendations are concerned with the utilisation of collaborative networks to deliver teacher professional development. In the second instance, the recommendations focus on engaging in action research as a process for professional development which is more teacher centred. However, both sets of recommendations are also useful in terms of supporting individual teachers, schools, professional associations and/or education systems seeking to adopt a similar approach to that used by the CEPDC.

5.2 Implications: Collegial Networks as a Mechanism for Delivering Professional Development

There are a number of factors related to the composition, organisation and implementation of the CEPDC's networks that impacted directly on how effective these were in creating a collaborative learning environment that

fostered and supported self-directed enquiry learning. The experiences of the CEPDC networks offer other professional development providers practical suggestions on selecting, training and supporting facilitators; establishing collegial networks, and facilitating networks.

Selecting, Training and Supporting Network Facilitators

The roles and responsibilities of the facilitators and the degree to which they have the potential either to enhance or inhibit the operations of a collaborative learning environment have already been discussed in Chapter 4. It was evident from the findings presented there, that the facilitation role is central to the success of the collegial networks as a mechanism for delivering teacher professional development. A facilitator needs to have a clear understanding of the facilitation role as conceived by the CEPDC, as well as being committed to developing further the facilitative skills required for a process approach to professional development. Other professional development providers adopting a similar approach to that of the CEPDC need to give serious consideration to three areas. These are the selection processes used to choose facilitators; the provision of appropriate training for facilitators, and the continuing provision of support for the facilitators.

Selecting Network Facilitators

Given the CEPDC's experiences, the choice of a network faciliator is an extremely important decision. Adequate time must be allowed for selecting

facilitators however, with all three CEPDC coordinating projects, this was not possible. In fact, the timeframe available for implementing each of the CEPDC projects adversely affected the process used to select facilitators. For instance, the time constraints placed upon the project by DEET, the funding agent, for expending funds and completing evaluation requirements meant that the actual time available to conduct the selection procedures for facilitators was relatively short. Decisions about the amount of time required to train facilitators; establish networks, and conduct regular meetings over a number of months, reduced significantly the amount of time available for the selection process and put unnecessary pressure on both the project officers and the applicants.

Facilitator positions were advertised in local newspapers and facilitators were appointed on the basis of a written application only. Originally, the intention was to select facilitators who demonstrated content knowledge in the focus area (Numeracy), as well as knowledge of facilitative skills. In reality, facilitators in all three projects were selected primarily because of their content knowledge, as applicants were either classroom teachers or educational advisers with little or no prior experience with the kind of facilitative role they were expected to assume. An exception to this practice was when individuals who were involved in more than one project, as either a participant or a facilitator, applied to be a facilitator.

Based on the findings of this study, the criteria used to select facilitators should embrace three areas. First, facilitation skills are essential, especially when utilising a professional development approach which is unfamiliar to most participants. A facilitator needs to have a clear understanding of the facilitation role as conceived by the CEPDC, as well as to be willing to develop further the facilitative skills required for a process approach to professional development. Second, it is essential that potential facilitators have some experiences with, and knowledge of the focus area, in this case, numeracy. Although this study has already identified that competent teachers are not necessarily effective facilitators, findings also indicate that having expertise in the area under investigation was a distinct advantage. Having knowledge of, and experience with, the focus area meant the facilitator could support issues that came up for discussion; access relevant resources; suggest possible directions for professional dialogue that otherwise may not have been considered, and share their own experiences.

Third, the facilitator needs to be someone whose professionalism is respected and valued by his or her fellow colleagues. The facilitator of Network 3 initially experienced great difficulty in establishing a network group, simply because she was recognised neither in the field nor for her capacity to lead. Written comments from participants confirmed that in those networks where the professionalism of the facilitator was highly valued by the participants, it

appeared that they were willing to take risks because of their respect for, and trust in the facilitator. Finally, consideration must be given to all three areas when selecting facilitators to maximise the potential of the network environment to support participants as they engage in a more self-directed form of professional development.

After the conclusion of the first project, there was an opportunity to explore an alternative option for selecting facilitators. Network participants involved in the first project were approached and encouraged to apply to become a facilitator. This was the case for Networks 2, 5 and 6. The study showed that there were distinct advantages in having a network participant become a facilitator. One was they had lived the network experience and were therefore familiar with the approach and the processes involved. A second advantage was they had witnessed how another facilitator dealt with some of the situations that they would be confronted with. Yet another advantage was that they could draw upon their own personal experiences as a participant, thus giving them credibility with the participants. The transition from participant to facilitator seemed to be a natural step in that most participants could utilise their positive/negative experiences to create the kind of network environment required to foster collaborative learning.

Training Facilitators

Not only did the study confirm that the facilitator's role was a challenging one, it also emerged that the nature and content of the facilitator training program had significant implications for how effectively the network functioned. Therefore, program planners need to consider the kinds of experiences needed and the skills required to adequately prepare facilitators for their roles and responsibilities.

Findings from the study showed that due to the intensive nature of the training, it is vital that the program minimises the amount of direct instruction and models adult learning principles such as collaborative group work, and role playing possible network scenarios (Danaher, 1995). Opportunities to model/practise process skills that will promote reflective practice, for example journal writing, are essential items in the program. Further, time must be devoted to issues specific to the focus area. If possible, the expertise and experiences of continuing facilitators should be utilised to the maximum when training new facilitators.

Providing Continuing Support for Facilitators

Facilitators were no different from the participants, in that they required support and encouragement throughout the learning process. Given the complexity of their role and the evolving nature of the project, continuing support became a necessity. Providing continuous support in the form of consultations; assisting with the preparation of network material, and visiting network meetings were

essential to the implementation of a new approach to learning. Initially, the facilitators looked to the project officer for substantial support. However, the degree of support decreased as they gained more confidence. Encouraging facilitators to conduct their meetings on different days enabled the project officer to support the facilitators more equitably.

Since visits to network meetings by the project officer were an integral part of the support mechanism, it was important that both facilitators and participants understood the purpose of these meetings. The initial intention for the project officer to visit each network group at least once needed to be reviewed. The reason for this is that after the first project, the researcher concluded that there needed to be at least two visits, one at the beginning of the network meetings and the other closer to the final meeting. Multiple visits (at least one during the first two meetings and one toward the end) would enable the researcher to note any differences in how the meeting ran and confirm with the participants any perceived changes in the facilitation of the network meeting. These visits, albeit time consuming, were an essential part of the monitoring and support structures.

Establishing Collegial Networks

Although the basic format of a network seemed simple and straightforward, in reality, establishing, organising, facilitating and maintaining a network group was complex and required a great deal of energy by the facilitator. Observations confirmed that continuing facilitators coped with the task much better the

second time round. It is also evident that the continuing facilitators and participants benefited from a longer period in the project.

Probably the most effective mechanism used to advertise the establishment or regrouping of a network was the promotion carried out by continuing participants and facilitators. If, for whatever reason, a network delayed commencing operation for an extended period of time, it was noted that the pressure was on the facilitator/s to fit the minimum number of meetings into the timeframe dictated by the funding body. Despite concerns such as this, the establishment of the CEPDC networks created a new situation for undertaking professional development in the region.

Facilitating Networks

There is little doubt that the CEPDC networks have played a significant role in filling a vacuum for professional development activities within Central Queensland. As the findings indicated, the majority of participants recognised the value of using a facilitated network as the mechanism for delivering professional development.

When reflecting upon the characteristics of 'best practice' identified by Crowther & Gaffney (1994), the researcher noted that a number of these were evidenced in network activities. In particular, the networks fostered opportunities for collaborative planning; needs based planning; sense of

ownership; active engagement; participant commitment; interactive action research; follow-up, and reflection.

Two factors that were found to have the potential to affect the degree to which participants actively engaged in network activities were the design of the meeting agenda and the extent to which participants were involved in the collaborative decision making process. Both these factors have implications for other professional development approaches seeking to encourage the active participation of participants in the decision making process.

Preparing the Meeting Agenda Collaboratively

Some CEPDC networks offered a rare opportunity for the participants to be involved in negotiating the meeting agenda. At first, some participants were reluctant to express their opinions, while others were over ambitious about what they hoped to achieve. Nevertheless, it was a valuable exercise for participants to engage in. An interesting observation was that when the group assumed greater ownership for the agenda, then there seemed to be a higher level of personal gain from the session.

Making Group Decisions

Involving participants in the decision making process would be a desirable characteristic of any professional development program aiming to encourage

participants to take a more active role in their own professional development. One way this was addressed in the CEPDC networks was, at the end of a meeting, to draft collaboratively with participants an agenda for the next meeting. Looking back at my observational notes about the network meetings, I realised that it was important that the decision to complete a special task before the next meeting be a group decision, not a facilitator decision. In Network 7, the facilitator asked the participants, "What are you prepared to do before the next meeting?" to clarify that this was their decision, not hers. In this case, the participants decided to enhance their own knowledge about 'Working Mathematically', and observe how this area of mathematics was already being addressed in their current classroom programs. In Networks 3, 4, 5 and 7, the facilitator summarised whatever decisions the group made at the end of the meeting so that everyone had a common understanding of the agreement. Some of these facilitators revisited the summary of the agreed decision at the next meeting to prepare participants for the sharing session. There were occasions when a network group ran out of time and the meeting concluded either without a decision, or with a decision being made too swiftly. In these instances, it was observed that the next meeting was usually not as productive because the facilitator had assumed sole responsibility for determining the focus of the meeting.

Now that the CEPDC networks are no longer operational, the challenge for CEPDC participants and facilitators and other interested teacher facilitators is to consider how the network concept or a modified version can be incorporated into the existing educational settings.

5.3 Implications: Using Action Research as a Process for Teacher Professional Development

Action research as a process for teacher professional development is not new in Australia. However, for the Central Queensland participants and facilitators involved in the CEPDC projects this approach was certainly an innovation. It was something that had not been experienced by them before, as evidenced in their evaluation sheets and also, as Brennan (1995) reported, in the majority's lack of initial skills in dealing with this new approach to professional development.

These skills included managing timeline and timing issues; facilitating the action research process effectively; engaging in the action research process; providing support, and utilising journal writing as a tool for reflective enquiry.

Managing Timelines and Timing Issues

It was mentioned previously that timing issues were of concern when selecting facilitators. Similarly timing issues had a major impact on the conduct of the

participants' action research projects. The problem for the CEPDC projects was the limited timespan in which the project had to be implemented. Due to the participants' and facilitators' unfamiliarity with the project; the network approach, and the professional development process being used and the philosophies underpinning it, a considerable amount of time in the first couple of meetings was devoted to laying the groundwork.

Another time related matter was that the scheduling of network meetings also needed to take into account the "particular rhythm of the school year" (Brennan, 1995, p. 10). In some instances action research plans needed to be modified to accommodate school and district priorities.

Facilitating the Action Research Process Effectively

As the majority of participants and facilitators were initially inexperienced with action research projects, this had significant implications for how the action research process was presented to facilitators. In turn, the way in which facilitators introduced and managed the process with their network participants had significant implications for how participants reacted to it. If facilitators were uncertain of the process and what it involved, then this inevitably led to some misconceptions and feelings of frustration on behalf of the participants. Uncertainty about whether or not they were following a recognised procedure was a major concern for some facilitators and participants. In those networks

where the process was modeled and clearly explained, participants seemed to have a shared understanding of the process. They were not necessarily confident, but participants seemed to be more willing to take a risk and engage in the action research process. One strategy, which seemed to work effectively, was revisiting the action research moments of the spiral during network meetings. In network groups where this occurred, participants were more able to engage in dialogue about their action research projects and appeared to be more confident in their own ability to implement the different moments of the action research spiral.

In the final year of the project, funding was provided to engage a university lecturer with expertise in the methodology of action research to address facilitators during the training program. This strategy, plus increasing the amount of time devoted to exploring the action research process, seemed to fill in for continuing facilitators some of the major gaps in their understanding of the action research process. On the other hand, new facilitators needed further opportunities to discuss and clarify their understanding with the university educator, fellow facilitators or their project officer.

Engaging in the Action Research Process

Clearly, engagement in the action research process provided both participants and facilitators with a greater choice in selecting a topic that was either a

professional need or an interest. However, the task of identifying a research focus was initially difficult. Participants frequently commented that one of the qualities they valued about action research was that they had ownership of their professional development. Some professional gains were evident even when participant research efforts were overshadowed by lack of understanding of the process; concern about trying something different, or endeavouring to do too much.

A number of factors impinged on the degree of engagement of participants and facilitators. For example, the willingness of participants and facilitators to engage fully in the process at the collegial network level had a significant effect on the research outcomes of individuals, as well as the network group. Another factor affecting engagement was that of some facilitators overlooking the need to consider and discuss the benefits of action research as a process for teachers undertaking continuing professional development. A further factor was the extent to which the need for opportunities to acquire and practise specific skills such as data collection and recording techniques were provided.

Opportunities for participants to share and discuss their experiences and feelings as they moved in and out of the moments of action research were not highly valued at first. Realisation of how important these events of sharing and receiving feedback about the progress of their research projects came later,

when they became more accustomed to drawing upon the collective wisdom of the group.

Providing Support

Participants needed constant encouragement to persevere with their action research projects. Support structures to develop both the skills required and confidence in their ability to apply the process in a classroom situation were built into the network meetings. Encouraging participants to work collaboratively in the design and implementation of their action plans was one way of developing confidence and clarifying their understanding of the process. Providing opportunities for participants to explore ideas and resolve issues and concerns themselves by interacting with peers was consistent with the principles/assumptions underlying an action research process.

Utilising Journal Writing as a Tool for Reflective Enquiry

Journal writing was promoted in the network sessions as a tool for reflective enquiry, a means for assisting participants to think about their classroom practices and the beliefs associated with those actions. Rarely did new participants indicate that the journal writing either helped them to reflect on their teaching or had been helpful in their professional development. Undoubtedly the perceived lack of skills, as well as limited to no previous experience with journal writing, resulted in the experience being received so unfavourably. Gradually,

continuing participants became more comfortable with the journal writing process as they practised and gained increased confidence.

Despite participants stating that they found journal writing to be an onerous task, facilitators persisted with encouraging participants to write in their journal before, during and after network meetings. A number of facilitators discovered that the use of other reflective techniques such as responding to guide questions and encouraging participants to engage in professional dialogue received a more positive response from participants. It would be worthwhile considering the use of a range of reflective tools to accommodate the varying preferences of participants, as the key is to persuade participants to engage in the process of reflection.

5.4 Recommendations for Collaborative Networks Using Action Research for Teacher Professional Development

The overall CEPDC approach may not have been particularly innovative as a form of professional development in other settings, but for Central Queensland teachers this project offered possibilities which were rarely, if ever, available to them (Brennan, 1995). It is also recognised that the findings emerging from the current study may be interpreted in alternative ways. Nevertheless, it is believed that the findings and subsequent recommendations have the potential to provide guidelines for others, such as individual teachers; schools; school communities,

and professional associations contemplating either the use of collaborative networks to deliver meaningful teacher professional development or engagement in action research as a process for professional development. Based on the findings of this study, a number of recommendations have been developed concerning the use of collaborative networks as a mechanism to deliver teacher professional development, and the utilisation of action research as a process for teacher professional development.

Recommendations: Using a Network Mechanism to Deliver Teacher Professional Development

The CEPDC's networks offered teachers a chance to negotiate the area of focus; determine the direction/s the group would take to address their concerns and needs; view themselves as learners; explore the beliefs inherent in their own practices; develop a sense of ownership about their own professional development, and acknowledge their own professionalism within a supportive collegial environment. However, it is the way in which the CEPDC networks were organised and implemented with continuing multi-levels of support and essential monitoring structures in place, that contributed to their achievements. The very fact that some groups operated for three years attests to the success and validity of the network as a vehicle for support and growth. Hence, it is recommended that:

- Facilitators should be identified through expression of interest, with specified criteria for selecting teacher facilitators being identified.
- Initial training should be provided for teacher facilitators. It is also recommended that the needs of both new and continuing facilitators be taken into account.
- Continuing support should be provided for facilitators to further enhance their facilitative skills.
- The composition of network groups should be heterogeneous to bring diversity of experience to the network group.
- Consideration should be given to organisational matters such as the number of network participants, and the actual time span available for network activities.
- Participants should be treated as professionals and given opportunities to share their expertise with other colleagues.
- Network activities should facilitate teachers talking with each other about their teaching.
- The network environment should provide a situation where participants are able to receive support and feedback, and where they are able to reflect.
- Network participants who are interested in becoming, and demonstrate the potential to become a teacher facilitator should be encouraged to become teacher facilitators.

- Networks should function independently without outsider input, although greater benefits are more likely to emerge if a project officer or coordinator is available to provide support to facilitators by way of providing advice; organising training as needed; disseminating information, and recommending resource materials.

Recommendations: Using Action Research as a Process for Teacher Professional Development

Based upon the research findings, teachers who engaged systematically in monitoring, reflecting on and improving their own practices reached the stage where they were, with varying levels of confidence and success, able to review and improve aspects of their classroom practice. Engaging in action research encouraged teachers to take risks and actively seek solutions to professional dilemmas. Action research provides teachers with a means to respond to the continuing process of change.

However, the effective facilitation of the action research process, the facilitator's understanding of the process and his/her ability to guide it, and the participants' confidence in their own ability to engage in the process can impact significantly on the effectiveness of action research as a process for professional development. Therefore, it is recommended that:

- Action research as a process for teacher professional development should be explained clearly to both facilitators and participants in order to facilitate understanding of the process and what is involved. If possible, an educator from a local university, who has expertise in classroom based action research, should be engaged to assist with this task (Danaher, 1995).
- The role/s of teachers as researchers and the type of involvement required to undertake an action research project should be made explicit from the outset.
- Teachers should be provided with opportunities to collaborate in the design and implementation of action research, so they can clarify and enhance an aspect of their practice.
- Teachers should be provided with opportunities to engage in professional dialogue about the progress or non-progress of their action research projects.
- Strategies to further develop the facilitators' and participants' research skills should be utilised.
- The provision of continuing support (e.g. teacher facilitator of a network or an administrator in a school) is essential to sustain momentum and engagement in the moments of the action research spiral.
- If the skills of reflective enquiry are to be developed through the use of reflective tools, such as the journal, then the journal writing process should be explained, modeled and practised.

- Both facilitators and participants should recognise that change in beliefs, attitudes and practices will take time and that at times it could be a painful experience.

Both sets of recommendations emphasise the importance of teachers as learners having time and opportunity to work together collaboratively; adopting a continuous approach to professional development; engaging in the process of change through reflecting on, and critically examining their beliefs and practice, and building on their professional expertise.

Notwithstanding the above, it is the professionalism, cooperation and commitment shown by participants, facilitators, the project officer and the management team which realise the success of projects such as the CEPDC.

5.5 Conclusion

This study highlights how the CEPDC's approach of establishing collegial networks to support voluntary groups of teachers as they engage in self-initiated classroom based action research is an effective means of providing professional development opportunities. Clearly, the CEPDC model in its entirety, with its teacher facilitated networks; focus on creating colloborative learning environments; support and monitoring structures; teacher facilitator training program, and the action research process approach to learning has significant

implications for others. Individual teachers; school/district staff; education systems and professional associations could use the findings of this investigation to initiate and inform their own enquiry oriented professional development. With the impending implementation of new syllabuses and a student outcomes based assessment program, by the Queensland Schools Curriculum Council over the next five years a model such as that utilised by the CEPDC should be considered. The reason for such a recommendation is that among its strengths are its ability to build on the existing expertise of teachers; promote self-directed growth, and enhance the professionalism of teachers.

As is evidenced by this study, the lived experiences of the network participants and facilitators provided a rich source of information about the successes and obstacles encountered while implementing an alternative model of professional development. From the researcher's perspective, it was a rare oppportunity to experience an approach to professional development that has the inherent capacity to assist teachers to manage and implement change.

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Appendix 1

Interview Schedule for Network Facilitators

Name: .....

Professional Development

1. Tell me what you think/feel about this form of Professional Development?

Facilitated Network

2. So, what happened in your network? What worked and what did not and why?

Curriculum Practice

3. Did you notice a before and after in relation to the teaching practice of your participants?

Focus Area

4. Has documentation relating to your focus area affected your participants' teaching practice? (Documentation such as National Statements, Profiles, policies etc.)

Project as a whole

5. What do you think about the project as a whole, looking outside of your network as well as inside?

Appendix 2

Additional Discussion Prompts for Facilitators

1. Approach to Professional Development

a) Describe your network.

b) Is this process of professional development worthwhile?

c) What characteristics of this approach to professional development are critical for success?

d) To what degree did participants in your network take responsibility for their own learning?

e) How has this experience enhanced your own professional development? (What did you learn about: action research, adult learning, the teaching and learning of mathematics?)

2. Network Facilitation

a) Were there any limiting factors for you as a facilitator?

b) Did you feel you could respond to your particpants' needs?

c) What facilitation strategies did you find worked well with your participants to encourage the sharing of ideas and professional dialogue?

3. Teaching Practices

a) To what extent were teachers familiar with the National Statements, Profiles or Key Competencies prior to joining a network?

b) What evidence is there to suggest that participants' understanding, knowledge and application of the National Statement, Profile or Key Competencies have been enhanced?

c) What instances can you recall where participants were reconceptualising their beliefs about learning, teaching and education generally?

4. Facilitative Support

a) How could the overall approach used in the project be improved to enhance/support your role?

b) Would you facilitate a network like this again? Why/Why not?

Appendix 3

Reflection upon your Network Experience

Please indicate which focus area network you participated in:

Literacy **Numeracy** **Vocational Education** **Middle Schooling**

1. **Explain the approach your network used.**

_____

_____

_____

2. **Describe how the CEPDC's approach is different from other professional development programs you have been involved in.**

_____

_____

_____

3. **Did your network experience make a difference to your classroom practice? Please explain why it did or did not. If it did, please describe the change/s and the factors that influenced you to make this change.**

_____

_____

_____

Appendix 4

Data Recording Matrix

Areas of Learning	Key Questions	Emerging Themes	Surprises	Direct Quotation by Participants	Direct Quotation by Facilitators	Future Implications/ Recommendations	Significant Points
Professional Development							
Facilitated Networks							
Curriculum Practice							
Focus Area							

Appendix 5

Dear CEPDC Numeracy Network Participants and Facilitators

I am undertaking a research project to fulfill the requirements for a Master of Education through Central Queensland University. The focus of this study is to explore the use of collaborative networks as a mechanism for delivering teacher professional development and to investigate the potentional of utilising action research as a process for teacher professional development. I am also interested in the implications of this study for future professional development programs for mathematics educators.

You are invited to participate in this research project. Participation is voluntary and if you decide to participate you may withdraw at any stage without incurring any penalty. Please complete the attached consent form if you are willing to participate.

I am seeking your consent to use your journal/portfolio, reflection/evaluation sheets and my observations of network meetings as a source of data for making generalisations about professional development within the context of the CEPDC numeracy networks. Your involvement in this study would require no extra work on your part as the material I wish to use is part of the work you are already undertaking through your involvement in a numeracy network.

The actual names of participants will not be given in the report and any names that might be used will be pseudonyms for individual participants and facilitators and a coding system for network groups. Participation or non-participation in this study is not related to assessment in any University units.

Your involvement in the Capricornia Educators' Professional Development project does not obligate you to assist with my study. Participation in this study is purely voluntary and you may withdraw from the study at any time. If you are prepared to give your consent please complete the form below.

Feedback on the study will be made public in the form of an oral/written reports, and can be gained from requesting a written summary of the research findings or accessing a copy of the completed thesis.

Yours sincerely,

.....

Debbie Martin

CEPDC Project Officer (Numeracy)

..... 1996

Consent Form

I hereby agree to participate in the study, A Review of Collaborative Teacher Networks Using Action Research to Enhance Professional Development, on the understanding that my participation is voluntary and that I may withdraw at any point, without incurring any penalty. It is my understanding that my identity will remain confidential, and that this study is not related to my academic standing in units which I might be studying at the University. I acknowledge that I can request a summary of the findings of the research and access the completed thesis. I give my consent that any material generated through my involvement in the CEPDC Numeracy Networks may be used as part of the data collection for your study.

Name (please print): .....

Signature: .....

Address: .....

.....

.....

Date: .....

I wish to have a copy of the written summary of the research findings. YES NO

I wish to have access to a copy of the final thesis. YES NO

Please return the consent form to:

Debbie Martin.

C/- Faculty of Education

Central Queensland University MC 4702

Thank you!