

**CONTINUOUS PROFESSIONAL LEARNING COMMUNITY OF MATHEMATICS
TEACHERS IN THE WESTERN CAPE: DEVELOPING A PROFESSIONAL
LEARNING COMMUNITY THROUGH A SCHOOL-UNIVERSITY PARTNERSHIP.**

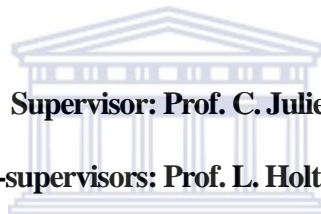
A full thesis submitted in fulfilment of the requirement for the degree Doctor of

Philosophy

in

Mathematics Education

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Abstract

Ways of enacting effective professional development (PD) and professional learning (PL) of teachers are diverse and often contested and therefore needs sustained inquiry (Schuck, Aubussona, Kearney, & Burden, 2013). The “quick fix” mentality that is endemic to most including those aimed at educational systems leads to very superficial implementation of improvement strategies, including teacher development. These strategies are usually bureaucratically mandated and superficially implemented in a top-down manner. One of the critical drawbacks of such superficial implementation of top-down improvement strategies is that it fails to appeal to teachers because of their historical experiences of such short term and intermittent improvement interventions.

This study focussed on the development of a Professional Learning Community (PLC) as a possible continuous professional teacher development (CPTD) model with a promise to deliver effective CPTD. Literature in this regard indicates this model of CPTD as highly effective to support sustained teacher development. The efficacy a PLC is predicated on a collaborative and relational approach to teacher development and professional learning underpinned by a microclimate of commonality.

The initiation of PLCs is a complex task. It requires a deep understanding of the processes involved in orientating teachers to processes that involve reflective dialogue and collaborative inquiry. Hence this study sought to investigate experiences of teachers in a PLC established through an alliance involving teachers, didacticians and education officials.

This study found that the PLC signifier conveys significant meaning for teachers in terms of their engagement in the PLC. Moreover, teachers’ experiences of the PLC model confirmed the generally accepted features of a PLC. The importance of having a common vision, norms and standards was shown to be an important dimension of the PLC. Besides the fact that the active promotion of this shared vision by the PLC leadership and other education

administrators was highlighted, teachers in general accepted the importance of being reflective practitioners. Despite this belief in the value of collaborative reflection, this study found that it does not take place as often as one would expect. This is, to some extent, due to the timetabling arrangements at most schools in the sample.

Findings of this investigation provided evidence that it is possible in a PLC to effect a shift from professional development to professional learning. This is consistent with literature in this regard, for example, Benken & Brown (2010) support this argument by indicating that CPTD should be viewed as professional learning that is sustained over time.

However, the issue of sustainability is an important challenge. This study revealed that teachers see sustainability as a function of three important variables, namely, recognition by school leadership and administrators, support from the organised teacher movements and subject organisations, and teacher commitment.

Important affordances of a PLC identified through this study are *relational agency*, *epistemic agency* and a *micro-climate of commonality*. These affordances are viewed as important enablers of collaborative inquiry and reflective dialogue and underscores the community aspect of a PLC.

Keywords

Continuous Professional Development, Teacher development, Professional Learning Communities, Professional Learning, Collaboration Inquiry, Reflective Dialogue, Relational Agency.

Declaration

I CHARLES RAYMOND SMITH hereby declare that this thesis, “**CONTINUOUS PROFESSIONAL LEARNING COMMUNITY OF MATHEMATICS TEACHERS IN THE WESTERN CAPE: DEVELOPING A PROFESSIONAL LEARNING COMMUNITY THROUGH A SCHOOL-UNIVERSITY PARTNERSHIP.**” is my own work; that it has not been submitted before for any examinations or degree purposes, to another University or for another qualification.

CHARLES RAYMOND SMITH

SIGNED: DATE:



ACKNOWLEDGEMENTS

I have been inspired to undertake this thesis journey by my commitment to lifelong learning. This journey has been supported by my family as well as my PLC colleagues in the LEDIMTALI project.

My participation in this project would not have been possible without the support of Professor Cyril Julie. I greatly appreciate the professional advice, intellectual rigor and the friendship which underpinned our discussions about Mathematics teachers and developing their mathematical practice in a situated and contextualised way. He has provided me both with rich learning experiences and a role model of what a professional researcher and teacher educator should be.

I thank my other two promoters, Professor Lorna Holtman and Professor Juliana Smith. Their feedback and encouragement has helped me to keep this research study grounded in good research practices. They have strengthened my thesis because of the time they took time to give thoughtful responses to each chapter. In the process they continually challenged me and enabled me to grow intellectually and in so doing moulded my entry into the professional community of scholars. Professor Smith deserves a great deal of thanks for her role in shaping the technical aspects of this study,

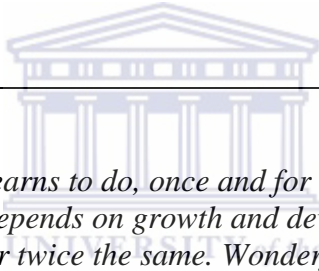
My heartfelt thanks go to my family. Firstly my wife and closest friend, Jenny, my son Peter, and my daughter Ray-Anne., I thank my loving wife, Jenny, for her support, endurance, and understanding. Without her support, this phase of my journey as a professional researcher would never have run its course. She has seen me through every moment, providing emotional support, enduring countless nights alone when I sat in front of my computer; and offering her unconditional love and support. This work and the knowledge I have gained in the process would never have been possible without her.

DEDICATION

I dedicate this work to the memory of my parents, John David and Micky Maria Smith for demonstrating through word and deed, how hard work, perseverance, dedication to career and family and an unwavering trust in Almighty God, make life meaningful.



Education has increasingly become the battered profession. On a daily basis we hear damning statements – denigration, abuse, misinformed criticism – about the dire state of education. In the main, these statements are made not by educators but by politicians, education bureaucrats, the media, members of the corporate sector and other self-appointed experts. The standard of those entering and practising teaching is generalised and criticised as poor, and university faculties of education are said to be staffed by out-of-touch ideologues who produce graduates unfit for teaching. Teacher unions are seen as nothing more than self-serving rabbles and schools as war zones. Our school students are fit for neither society nor work. Such views, if expressed often enough, enter popular consciousness and become accepted as truth. Those involved with all aspects of education need to find their voice to reject the misinformed, persistent, harmful rhetoric and indeed bullying that at present is going largely unchallenged in the public arena and, worse still, informing education policy. In doing so, it is imperative that evidence-based reasoning is employed, rather than defensive, apologetic excuse making. In engaging with the wider community and stakeholders to promote the cause of education, professionalism is essential. (Dinham, 2013)



Teaching is not something one learns to do, once and for all, and then practices, problem-free, for a lifetime ... Teaching depends on growth and development, and it is practiced in dynamic situations that are never twice the same. Wonderful teachers, young and old, will tell of fascinating insights, new understandings, and unique encounters with youngsters, the intellectual puzzle and the ethical dilemmas that provide a daily challenge. Teachers, above all, must stay alive to this. (Ayers, 1993)

List of acronyms

Acronyms	Meaning
AfL	Assessment for learning
ANA	Annual National Assessments
CAPS	Curriculum and Assessment Policy Statement
CPD	Continuous professional development
CPTD	Continuous professional teacher development
CREDE	Center for Research on Education, Diversity & Excellence
DBE	Department of Basic Education
FAQ	Frequently asked questions
INSET	In-service Education and training
ISPFTED	Integrated Strategic Planning framework for Teacher Education
LEDIMTALI	Local Evidence-Driven Improvement of Mathematics Teaching and Learning Initiative <i>the</i>
LMK	Legitimate mathematical knowledge WESTERN CAPE
LLL	Life-long learning
MDG	Millennium Development Goals
NEEDU	National Education Evaluation and Development Unit
NSC	National Senior Certificate
OECD	Organisation for Economic Co-operation and Development
PCK	Pedagogical content knowledge
PD	Professional development
PL	Professional learning
PLC	Professional Learning Community
PP	Productive practising

PRESET	Pre-service education and training
SACE	South African Council of Educators
SACMEQ	Southern Africa Consortium for Monitoring Educational Quality
SCK	Specific content knowledge
SR	Spiral revision
TIMMS	Trends in International Mathematics and Science Study
TIMMS(R)	Third International Mathematics and Science Study Repeat
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UWC	University of the Western Cape
WCED	Western Cape Education Department



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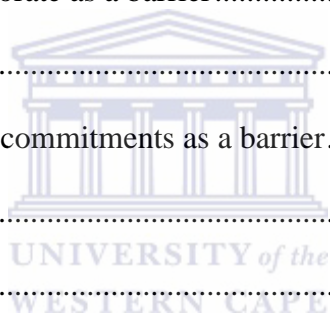


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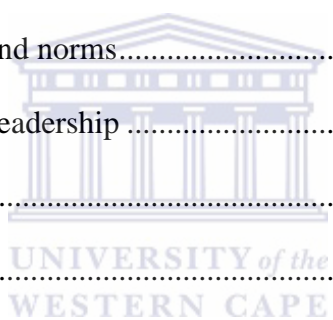
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Chapter 1: Introduction and Overview

Effective communication with teachers is a critical element of any successful professional development. Teachers are the foundational component of any educational system. It is vital that adequate attention is focused on appropriate and effective training of these teachers. Ideally, professional development offers a means of collaborative support and training to collectively conquer challenges facing teachers both in and out of the classroom. The need for continued professional development is widely accepted.

Amy Beavers, University of Tennessee, USA (2009)

1.1 Introduction

Ways of enacting effective professional development and professional learning of teachers are diverse and often contested and therefore needs sustained inquiry (Schuck, Aubusson, Kearney, & Burden, 2013). The “quick fix” mentality that is endemic to most educational systems leads to very superficial implementation of improvement strategies, including teacher development. Generally these strategies are of a “one-size-fits-all” nature and are bureaucratically mandated. One of the critical drawbacks of such superficial implementation of top-down improvement strategies, is that it fails to appeal to teachers because of their historical experiences of such short term and intermittent improvement projects. (Hord, 1997).

De Clercq and Phiri (2012) note that countries in Africa are now introducing new forms of teacher development (TD) to address the challenges of a constraint on resources available for TD. In South Africa in particular the school cluster system of TD is being implemented. This system TD is delivered by grouping teachers from neighbouring schools for the purpose “to improve the quality of education by enabling the sharing of resources, experience and

expertise among clusters and facilitating school administration by pooling resources from several schools to be shared equally” (De Clercq et al, 2012, p. 79). However, Jita and Ndlalane (2009; 2012) argue that the mere presence of cluster structures does not lead to effective TD as this requires certain preconditions.

1.1.1 Background

Most researchers, for example, Ball and Cohen (1999), Borko (2004), McLaughlin and Talbert (2001), believe that high quality continuous professional teacher development (CPTD) subscribe to the following criteria:

- (i) It grounds teachers in both content and pedagogy.
- (ii) It affords teachers the opportunity to practice new ideas in contexts similar to their classrooms.
- (iii) It is sustained over time.
- (iv) It offers a community of peers and coaches that provide support as well as opportunities to collaborate, and
- (v) It is resource-rich.

What is needed to improve the quality of CPTD is a nurturing and supportive culture where teachers collaborate with one another, with school administrators and academics from universities in order to improve the quality of teaching and learning. Astuto, Clark, Read, McGree and Fernandez (1993) argue that we need to see the establishment of school based professional development structures. This is consistent with the criteria given in the previous paragraph, especially with the first two, namely grounding teachers in both content and pedagogy and affording teachers the opportunity to practice new ideas in contexts similar to their classrooms.

Astuto, et al (1993) proposed three related school based community structures that may serve to improve the quality of CPTD:

- The professional community of educators,
- Learning communities of teachers and students, and
- The stakeholder community of the school.

This study focusses on the development of a Professional Learning Community (PLC) as a CPTD model, informed by the fact that literature seems to indicate this CPTD model holds the promise to support sustained teacher development (Schuck et al 2013). The PLC characteristics of “a shared impetus to learn, the collegiality of a community, and the focus on collaborative learning would be expected to lead to successful professional learning” (Schuck et al, 2013:6).

1.1.2 Problem statement

CPTD is globally viewed as an important component of any education system. The reason for this view is the belief that CPTD contributes to quality teaching and learning. Hence it is imperative that there is a sustained research undertaking to extend our knowledge base of how to design appropriate systems and programmes for effective and efficient CPTD interventions in order to improve the performance of teachers and the learning outcomes of their learners in Mathematics classrooms across the system. Some of the imperatives that necessitate ongoing CPTD research are:

- school improvement initiatives,
- the introduction of new curricula,
- systemic changes within the education system, and
- improving the professional knowledge and skills of teachers.

(Ingvarson, 2005; Duncombe & Amour, 2004; Good & Weaver, 2003;

Jeanpierre, Oberhausen & Freeman, 2005, Guskey, 2002)

From this vantage point, this study seeks to investigate a model for the sustainable CPD of Mathematics teachers in the Western Cape through an alliance between teachers, didacticians and education officials.

1.2 Research Problem

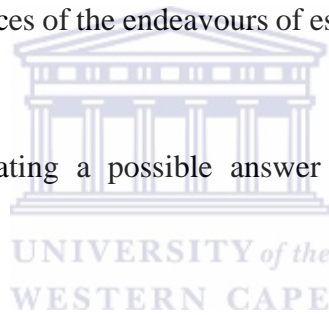
The need for sustained research efforts into CPTD programmes and strategies inspired this study. Hence this thesis is an undertaking that strives to add to the existing knowledge base with respect to CPTD programmes and strategies, especially in the South African context.

1.2.1 The main research question

The main research question that directs this study is:

What are teachers' lived experiences of the endeavours of establishing a Professional Learning Community?

The testbed for investigating a possible answer to this research question is the LEDIMTALI Project¹.



¹ Ledimntali is an acronym for Local Evidence-Driven Improvement of Mathematics Teaching and Learning Initiative and is a collaborative project¹ at the University of the Western Cape (UWC) between schools and the university. The initiative is an outcome of the commitment of the First Rand Foundation, in partnership with the First Rand Foundation and the Department of Science and Technology (DST) to Mathematics education in South Africa, with a special focus on teacher education and improvement of learner performance. The initiative is administered by the National Research Foundation (NRF) and this FirstRand Foundation South African Maths Education Chair is situated at the University of the Western Cape.

1.2.2 Subsidiary Questions

1. How do teachers in the LEDIMTALI project give meaning to the concept of a PLC?
2. How do teachers experience the salient features of a PLC?
3. What are the factors that promote or hinder the establishment of a PLC amongst Mathematics teachers in different schools in the LEDIMTALI project?
4. What are the factors that may promote sustainability of a PLC as perceived in the LEDIMTALI project?

1.3 Rationale for this research

Professional Learning Communities (PLCs) according to Hunter and Black, (2011) hold much promise in “developing sustainable networks of teachers of Mathematics who engage in developing effective pedagogy” (p.94). The powerful impact of a PLC according to research reports, is evidenced in the learning opportunities that are afforded to all participants (Brodie, 2013 and Fullan, Hill & Crévola, 2006). This view is supported by Lave and Wenger (1991) who argue that “social participation is a process of learning, that is, people acquire and use knowledge when engaging with one another to pursue shared goals.” Wenger (1998) expresses the view that pursuing shared goals in a PLC leads to a fivefold constellation of outcomes as illustrated in the Figure 1 below:

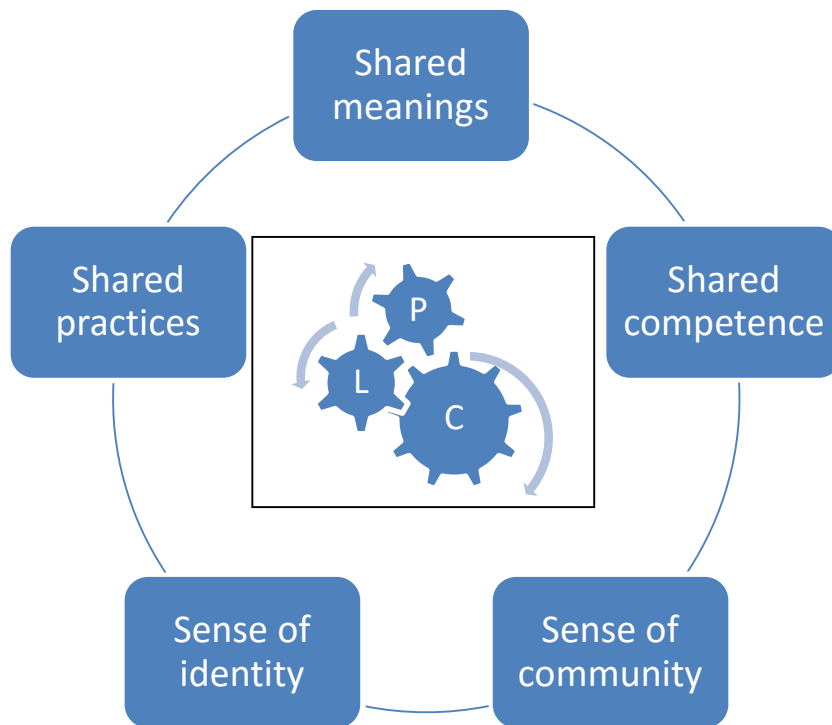


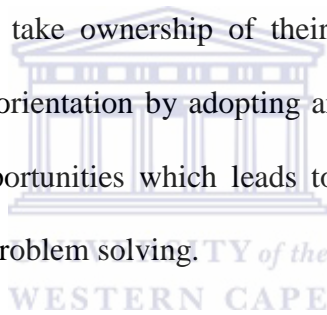
Figure 1: The fivefold outcomes of professional development in a PLC
(Adapted from Wenger, 1998)

These outcomes as given in Figure 1 above, may be elucidated as follows:

- (i) Shared practices are the result of a collaboration that leads to shared routines, artefacts, conventions and histories.
- (ii) Shared meanings are constructed during collaborative discourses and produce a language by which participants can talk about their changing experiences and abilities, and to explain the way things are in their own classrooms and beyond.
- (iii) Shared competence: Participants in a PLC develop practices, which represent both individual and shared competences, in order to do what needs to be done.
- (iv) A sense of community is created by the way that relational agency is enacted and the way participants talk about the social arrangements they employ.

- (v) In the final instance, participants grow a sense of identity. This sense of identity is the result of being immersed in a shared history and notions of who they are and how they fit into the PLC.

Research has shown how certain forms of PD initiatives in education have been ineffective with little to no noticeable change in classrooms (Darling-Hammond & McLaughlin, 2011; Nolan & Hoover, 2004; Peery, 2004). So the notional efficacy of PLCs are further given credence by Stoll (2004) who highlights the outcomes and benefits of participating in a PLC as represented in Figure 2 below. The Figure highlights the benefits which may be ascribed to the creation of a learning culture. This learning culture is underpinned by a collaborative and a relational support architecture and sustained by the fact that in a PLC, teachers take ownership of their own learning and development. Teachers develop a learning orientation by adopting an inquiry stance. Hence the PLC affords teachers learning opportunities which leads to individual as well as collective knowledge construction and problem solving.



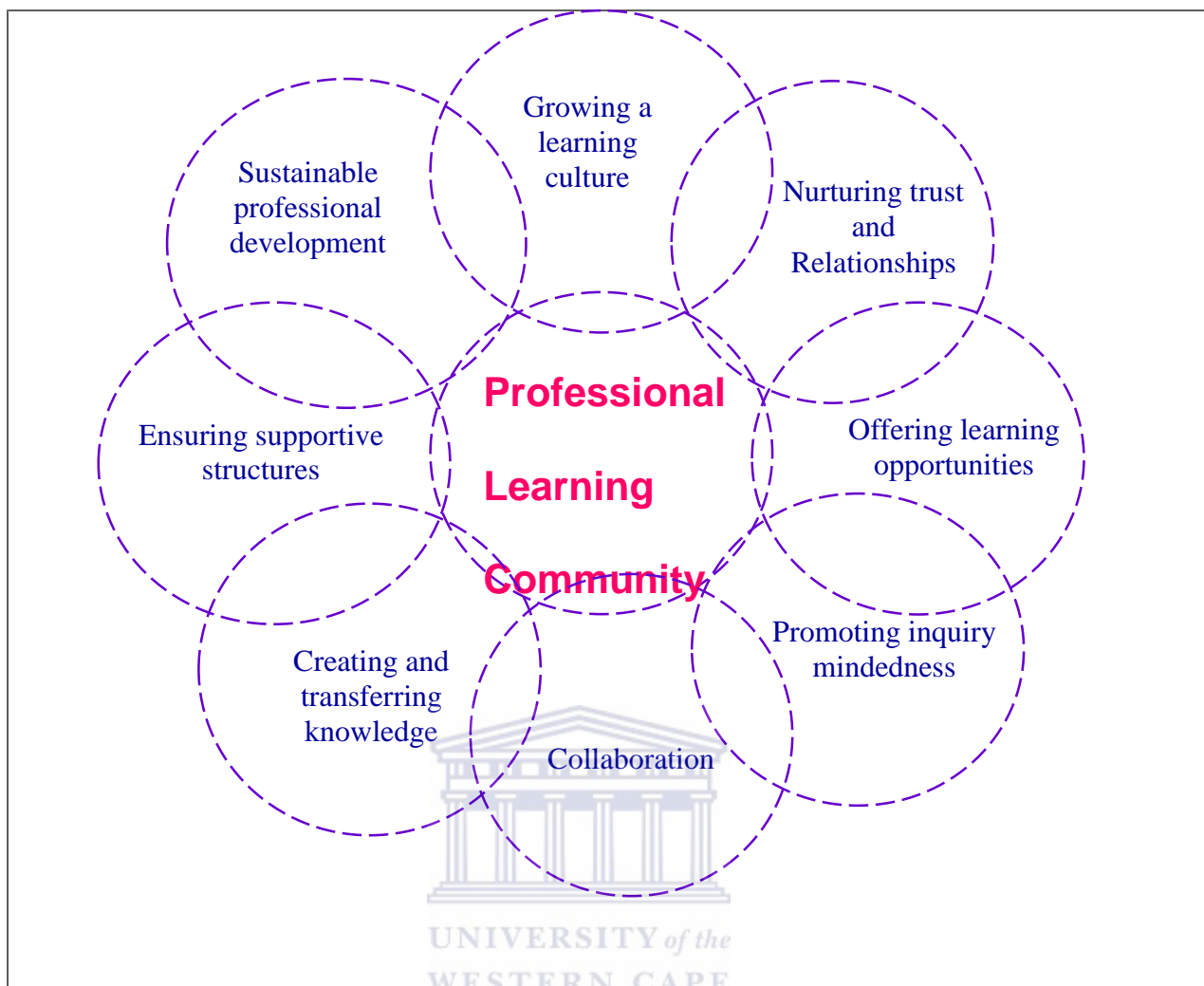


Figure 2: A summary of PLC benefits
(Stoll, 2004)

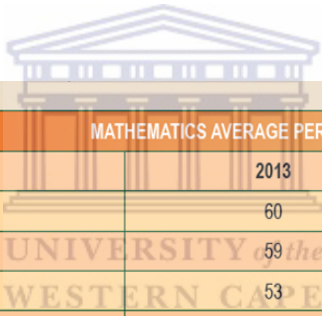
Noting the benefits of a PLC as explained in section 1.3, this research envisages to contribute to an understanding of the establishment of sustainable CPD of Mathematics teachers and to investigate processes and issues involved in the establishment of PLCs within the South African context.

Teachers need ongoing support to maintain effective practice throughout their career. Hence there is a need for intentional and focused PD on a continuous and sustained basis. In the South African context, teachers were confronted by a number of changes in the education system as well as the introduction of new curricula. These changes introduced new approaches to teaching and learning as well as new mathematical content into the schooling (National

Curriculum Statement, 2011) system. However, the prevailing practice at that time was that teachers only received a very limited type of workshop style orientation or training to prepare them for changes in the curriculum. The prevalent underperformance of South African learners in Mathematics, as reported in various systemic assessments of Mathematics performance exacerbates the challenges that teachers in South Africa face (Howie, 2003; 2004).

Examples of these assessments conducted in the South African schooling system include the National Senior Certificate examination (NSC), the Annual National Assessments (ANA) as well as international assessments such as TIMMS, TIMMS(R) and SACMEQ. Table 1 and Table 2 illustrates the latest of these results available to me at the time of writing this thesis.

Table 1: ANA results 2012 - 2014



GRADE	MATHEMATICS AVERAGE PERCENTAGE MARK		
	2012	2013	2014
1	68	60	68
2	57	59	62
3	41	53	56
4	37	37	37
5	30	33	37
6	27	39	43
9	13	14	11

(Source: DBE Report on the Annual National Assessments in 2014)

Table 2: NSC results 2011 – 2014

2011			2012			2013			2014		
Wrote	Achieved 30% & Above	% Achieved	Wrote	Achieved 30% & Above	% Achieved	Wrote	Achieved 30% & Above	% Achieved	Wrote	Achieved 30% & Above	% Achieved
224 635	104 033	46.3	225 874	121 970	54.0	241 509	142 666	59.1	225 458	120 523	53.5

(Source: DBE Technical Report on the NSC in 2014)

The results that may exert the greatest influence in terms of intervening in South African schools are the ANA and the NSC results. Indeed, the results of systemic assessments in the South African educational contexts are useful for establishing the needs for CPTD. Scheerens, Glas, Thomas and Thomas (2003) make this point very clear by asserting that all forms of systematic information gathering and making some kind of judgment on the basis of this information may be used for decisions on the day-to-day running of education systems. This data-informed approach is as relevant for envisaged systemic interventions as it is for site-based decision-making.

Given the context outlined above there should be a serious effort by all stakeholders to implement effective CPD programmes for all Mathematics teachers in the South African schooling system.

1.4 Research objectives

This study aims to generate some understanding of how the CPTD of Mathematics teachers in the Western Cape Province of South Africa may possibly be realised through the implementation of a PLC structure. In particular the research will advance some understanding within various sectors in education apropos processes and matters involved in instituting a PLC structure amongst teachers of Mathematics across different schools.

The research objectives for this study are to investigate:

1. How teachers in the LEDIMTALI project make meaning to the concept of a PLC.
2. How teachers experience the salient features of a PLC.
3. The factors that promote or hinder the establishment of a PLC amongst Mathematics teachers across different schools in the LEDIMTALI project.
4. The factors that may promote sustainability of a PLC as perceived in the LEDIMTALI project.

1.5 Significance of this research

Firstly, this research will add to the existing knowledge base regarding the issues that promote or hamper the establishment of PLCs. This is especially pertinent for the context of the participating schools in the Western Cape. Secondly, this study may add to our contextual understanding of the processes of sustaining CPTD initiatives. Thirdly, this study will hopefully generate information that may be used by educational leaders, educational managers and lead teachers to design implementation strategies for teacher development such as involving teachers in PLCs. Lastly, this research will most probably add to the South African research literature regarding CPTD and as a consequence support the implementation of the Integrated Strategic Planning Framework for Teacher Education and development in South Africa (ISPFTED), 2011 – 2025.

1.6 Context for this research

In this research, I investigated and analysed data from the LEDIMTALI PLC with a view to understanding the pivotal processes in establishing, nurturing and sustaining of PLCs. Ledimtali is an acronym for Local Evidence-Driven Improvement of Mathematics Teaching and Learning Initiative and is a collaborative project at the University of the Western Cape

(UWC) between schools and the university. The membership of the PLC is constituted of Mathematics teachers from 10 schools, teacher educators and mathematicians from the Education and Mathematics faculties at the University of the Western Cape (UWC) as well as officials from the Western Cape Education Department (WCED).

The PLC meets about nine times a year for afternoon workshops on a monthly basis during the first three school terms. In addition members get together three times a year over a weekend in a teacher institute. A teacher institute in the context of this PLC is a weekend breakaway workshop, starting on a Friday afternoon and ending on the Sunday afternoon. It normally takes place in a suitable conference centre.

The teacher institutes provide a space where the members of the PLC are able to interact without the distractions of time, family commitments and other extra mural responsibilities. In this context they are immersed in their engagement with professional learning activities, relationship building and educational problem solving.

The LEDIMTALI partnership is based on the premise that results from the analysis of current, actual classroom teaching practices and local conditions should guide initiatives for CPTD. This premise accounts for the origin of the project name, the Local-Evidence Driven Improvement of Mathematics Teaching and Learning Initiative (LEDIMTALI). The major epistemological underpinnings of the project are twofold:

- (i) The legitimate school Mathematics knowledge is the knowledge that is assessed in time-restricted high-stakes school examinations.
- (ii) Teaching should focus on thoughtful emphasis on the “practising and consolidation of concepts and procedures” and “mathematical process skills” driven by the weighting accorded to these two components in the time-restricted high-stakes examinations (Julie, 2011, p. 4-5).

The aspect *legitimate mathematical knowledge* as espoused in this paragraph, implies that the local South African syllabus as prescribed by the Department of Basic Education (DBE) is taken as the basis for teaching, learning and assessment. The aspect of the high stakes final examination, commonly referred to as the National Senior Certificate (NSC) examination represents the culmination of teaching and learning. Hence the curriculum, currently referred to as the Curriculum and Assessment Policy Statements (CAPS) and the way it is examined in the Matric examination inform CPTD interventions. The practical implication of this is that the current school syllabus for grades 10 to 12, as well as the approved textbooks and exemplar examination papers are the important boundary objects which sets the standards for PD inputs regarding specific content knowledge (SCK) as well as pedagogical content knowledge (PCK) of teachers. These boundary objects will also inform specific strategies employed in the project such as designing activities for spiral revision (SR), productive practising (PP) as well as assessments for learning (AfL).

The LEDIMTALI project adopted an epistemological stance which asserts that the Legitimate Mathematical Knowledge (LMK) is the Mathematics embedded in the South African Curriculum (CAPS). This is the basis on which all PLC professional development activities in the project. The rationale behind this epistemological stance is that all learners at the project schools will have to demonstrate competence in their final examinations. This is especially true for the National Senior Certificate (NSC) examination at the end of Grade 12.

This epistemological stance will then be supported by particular epistemic commitments such as intentional teaching, spiral revision, assessment for learning and working with feedback (Julie 2013). Figure 3 below illustrates the LEDIMTALI epistemology:

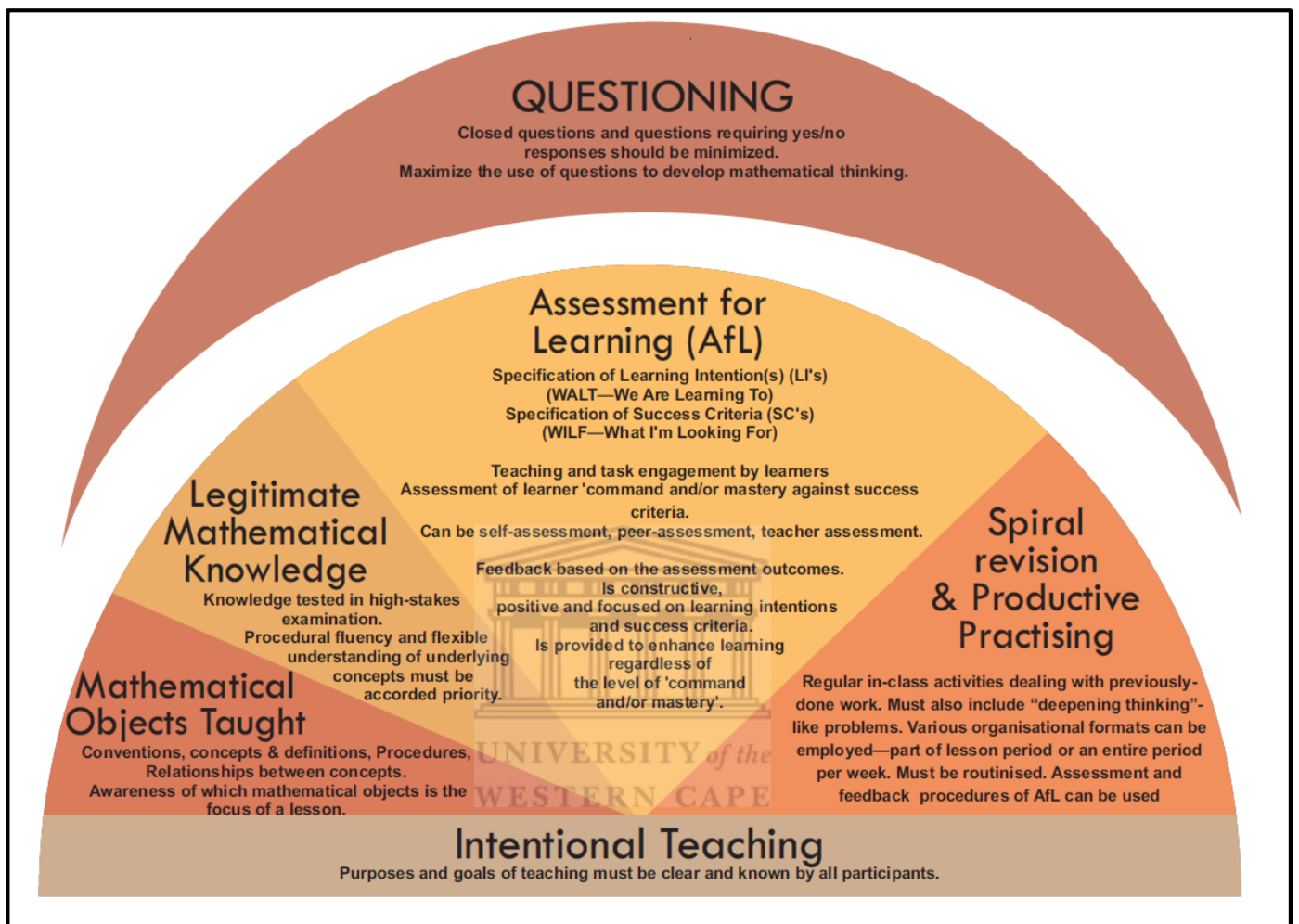


Figure 3: The epistemological underpinnings of LEDIMTALI

1.7 Life-long learning (LLL)

Life-long learning may be defined as the ongoing pursuit of knowledge for either personal or professional reasons. It is universally accepted as an important aspect in the life of every person. One of the important considerations in the pursuit of LLL is the developing of a literate society. Secondly the pursuit of LLL has as its outcome the establishing of 21st century competences in the population of each and every country globally. Importantly one must understand that the term LLL recognizes that learning is not confined to childhood or the classroom but takes place throughout life and in a range of situations. Hence the annual

conferences between UNESCO and the Ministries of Education of African Member States, such as their Durban Statement of commitment in 1998 came up with the following resolution:

We commit ourselves to an expanded role for education which should be a lifelong process, a continuum which transcends schooling systems and which focuses on the building of a learning society (UNESCO 1998: 4).

This resolution was again strengthened in their 2002 declaration:

Promoting lifelong learning in Africa entails the creation of literate societies, the valuing of local knowledge, talent and wisdom, the promotion of learning through formal and non-formal education, and taking the best advantage of the new information and communication technologies and the dividends of globalisation. (UNESCO, 2002: 1)

This thesis locates CPTD in the context of LLL. Goodson and Sikes, (2001) point to an important connection between the notion of lifelong learning and CPTD. The notion of lifelong learning as espoused by Goodson and Sikes, (2001) incorporates the learning by teachers grounded in their daily classroom activities and experiences. Hence there is a clear association between LLL and CPTD. Benken and Brown (2010) support this argument by indicating that CPTD for teachers should be sustained over time and as such fits the definition of LLL which indicates that it is ongoing and supports professional and personal development.

1.7.1 Ways in which lifelong learning for teachers may take place

Benken and Brown (2010) indicate that this lifelong PD for teachers must provide them with opportunities to grapple with issues of teaching and learning, confront current thinking and practices, and negotiate new and novel solutions to educational problems. The way in which this LLL should be enacted is described by Postholm (2012) by suggesting that the ways in which life-long learning for teachers may be realised may include:

- 1) Attending and participating in workshops as well as long and/or short university courses,

- 2) Job-embedded by continually reflecting on their own practice and the learning of their students,
- 3) Observing colleagues in practice and giving feedback in an interactive way, and
- 4) Informal conversations with colleagues (p. 406).

1.7.2 Dimensions of Lifelong learning (LLL)

Shrestha, Singh and Wilson (2008) describe three important dimensions of Lifelong learning as illustrated in the Figure below:

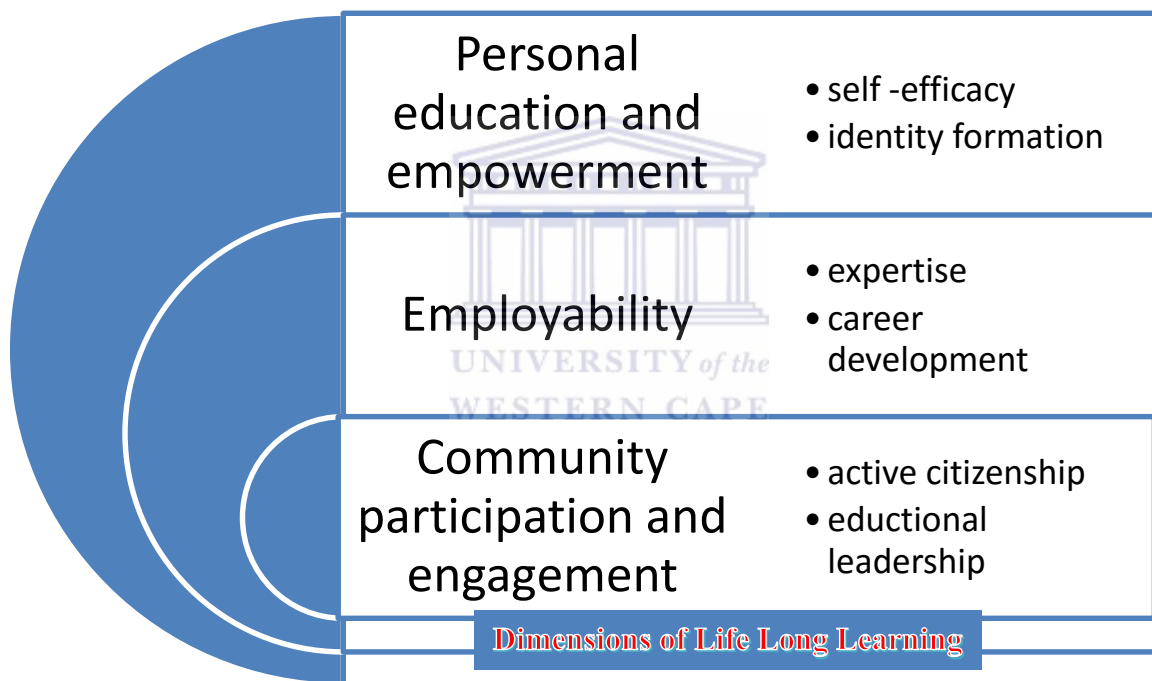


Figure 4: The dimensions of Lifelong learning

The dimensions of lifelong learning as illustrated in Figure 4, indicates important areas in which teachers may seek growth are discussed below:

1.7.2.1 The Personal dimension of LLL

Lifelong learning plays an important role in establishing and building a teacher's identity as a professional person. This aspect of the teacher's personality is classified as personal growth

because it strengthens a self-worth and standing as a person in society. This enhances the teacher's self-efficacy to the extent that the teacher is able to display the confidence regarding any engagement in societal and professional contexts.

1.7.2.2 The Professional dimension of LLL

Besides the teacher's role in his/ her community as a citizen, the teacher also functions in the role of an educator. This is an important role in society at large, but more importantly in educational circles where the teacher renders a service to the public and is seen as accountable to the public.

As a professional educator, the teacher develops a deep understanding of the links between theory and practice through a process of LLL. In this way, the knowledge structures of his/her discipline or subject becomes embedded in the act of teaching as well as engaging with colleagues. Through LLL the teacher as a professional person fulfils the need for continued intellectual stimulation and professional relevance.

1.7.2.3 The Political dimension of LLL

Through LLL the teacher fulfils his/her obligation and duty to develop a sense of activism regarding policy and organisational matters. In addition LLL, when situated in a structure such as a PLC leads to the forming of professional relationships between individuals and groups of teachers. Leadership capacities are developed and engagement in extra-curricular activities encouraged.

1.8 Professional development of teachers

Life-long learning as an imperative for CPTD is a given. CPTD refers to any activity aimed at enhancing the knowledge and skills of teachers by means of orientation, training and support (Lessing & De Witt, 2007). CPTD involves all learning experiences, and interventions, formal or informal that aim to improve classroom practice and as a consequence, student

learning. CPTD learning experiences and interventions may include informal activities such as attending conferences, formal subject meetings and discussions, short one day workshops to transfer specific information and extended training courses at institutions of higher education in order improve qualifications.

In support of the conceptualisation of CPTD espoused in the previous paragraph, the following description of CPTD by Day (1999) is fitting for the current study:

Professional development consist of all natural learning experiences and those conscious and planned activities which are intended to be of direct or indirect benefit to the individual, group or school and which contribute through these to the quality of education in the class room. It is the process by which, alone or with others teachers review, renew and extend their commitment as change agents to the moral purposes of teaching, and by which they acquire and develop critically the knowledge, skills and emotional intelligence essential for good professional thinking, planning and practice with children, young people and colleagues through each phase of their teaching lives (p.4).

The significance of the above description of CPTD for this study resides in the fact that Day (1999), speaks to the purpose as well as the enactment of CPTD in a holistic and coherent manner. The discourse about CPTD may only become meaningful and practicable if both dimensions, i.e. the purpose and the implementation of CPTD is well understood.

1.8.1 Formal and informal professional development

In accordance with Day (1999), it is necessary to consider both the informal as well as the formal aspects of CPTD. The informal dimension of CPTD typically occurs as teachers, on a daily basis, discuss ideas to refine lessons or share classroom experiences. Corridor or staff room conversations where learner progress is discussed and ideas shared on how to improve effectiveness are also important instances of informal PD. Formal CPTD activities include attending and participating in workshops as well as long and/or short university courses. Formal CPTD activities are generally linked to organisational goals and are typically mandated CPTD activities, but this may not always be the case, as they may be teacher-initiated as well.

This research will be contextualised within the CPD of Mathematics teachers in 10 schools involved in a collaborative project, through a tripartite alliance between a University, the provincial education department and the schools themselves. The main objective of this research will be the investigation of the formation of a PLC among the Mathematics teachers at these schools.

1.9 The South African context regarding teacher development

Bertram (2011) expresses concern with the failure of many CPTD interventions in the South African context:

There have been a huge number of professional development initiatives for teachers in South Africa over the past two decades, and yet we have seen little change in the quality of education in the country. The reasons for this are very complex, encompassing the social and material conditions in which teachers work, the ongoing legacy of apartheid in the form of disorganised and dysfunctional schools and the radical nature of the recent curricular reforms (abstract).

Bertram (2011) further argues that the failure of many well-intended interventions can be ascribed to a lack of focus and not taking cognisance of research findings with regard to effective professional development. Recent developments within the South African context, however, indicate that the South African government is very serious about CPTD (Luneta, 2013; Ono & Ferreira, 2010; De Clercq & Phiri, 2013). In 2008 the South African Council of Educators (SACE) produced a report called “The design of a continuing professional teacher development (CPTD) system.” SACE (2008) uses the following definition of CPTD:

Activities undertaken individually or collectively by educators throughout their careers to enhance their professional knowledge, understanding, competence and leadership capacity; in particular to increase their mastery of the curriculum and their teaching areas, their skill in teaching and facilitating learning, their understanding of children and young people and their developmental needs, and their commitment to the best interests of their learners and their schools, the well-being of their communities and the ethics of the education profession (p. 3).

This is an important definition for the South African context because it frames all CPTD activities undertaken by teachers in the South African schooling system. Furthermore, SACE (2013) describes six purposes for CPTD:

1. To improve schooling and the quality of learner achievements.
2. To coordinate professional development activities with a view to achieving sharper focus and effectiveness.
3. To revitalise the teaching profession and foster renewed commitment to the profession's seminal role in the development of our country.
4. To contribute to the responsible autonomy and confidence of the teaching profession.
5. To enable the profession to re-establish its professional standing and role in advancing the ideals of social justice.
6. To acknowledge the effective participation of teachers in PD activities which are priorities for the education system and the teaching profession.

In addition to the above, SACE (2013) envisages the participation of teachers in CPTD activities in the following categories and according to certain principles. Professional development activities will be grouped into three kinds according to the main basis of their priority:

1. Teacher priority activities are those chosen by teachers themselves for their own development and the improvement of their own professional practices.
2. School priority activities are undertaken by the school leadership and staff collectively and are focussed on whole school

development, the institutional conditions for the improvement of learning, and improved teaching.

3. Profession priority activities have directly to do with enhancing the professional status, practices and commitments of teachers in areas of greatest need, as defined by the Department of Education, SACE, national teachers' unions or other national professional bodies.

The CPTD system will operate according to three rules:

1. A member is required to earn 150 PD points per rolling three-year cycle.
2. A member may be awarded no more than 90 PD points in one year, except when the member earns 90 points for completing a formal qualification, and
3. A member is required to earn at least 30 PD points in each of the three priority categories during each rolling three-year cycle.

In terms of the above framework, the national Department of Basic Education (DBE) developed a strategic plan to implement CPTD across the entire education system (Steyn, 2010).

1.9.1 Integrated Strategic Planning Framework for Teacher Education in South Africa (ISPFTED)

The National Policy Framework for Teacher Education and Development is an attempt to address the need for suitably qualified teachers in South Africa (Department of Education 2007:5). This policy focuses on two complementary sub-systems: Initial Professional Education of Teachers and Continuing Professional Teacher Development (CPTD) (Department of Education 2007:2).

The Department of Basic Education (DBE) has developed a strategy for teacher development, called the Integrated Strategic Planning framework for Teacher Education and Development in South Africa: 2011 – 2025 (ISPFTED). In a booklet (ISPFTED, FAQs, 2011) with frequently asked questions that accompanies the policy framework, it is stated: Most importantly, teachers will be helped to take responsibility for their own professional development. Teachers can do this by:

- Learning how to identify gaps in knowledge through (i) interpreting learners' results in national and other assessments; and (ii) taking user-friendly online and/or paper-based diagnostic tests in specific subject/learning areas;
- Actively learning with colleagues in Professional Learning Communities (PLCs);
- Access funding to do quality-assured courses that are content rich and pedagogically strong and that address their individual needs;
- Understanding the curriculum and learning support materials, preparing lessons and delivering them competently; and
- Signing up with the SACE Continuous Teacher Professional Development (CPTD) management System and achieving the targeted number of Professional Development (PD) points.

By involving themselves in these activities teachers will ensure that each one is the author of his/her own PD.

1.9.2 Studies conducted in the South African context

Coupled with the CPTD framework discussed in section 1.9, there are also studies which indicates the urgency of CPTD in the South African context. By way of example, this thesis refers to two of these studies. The reason for selecting these studies are that they represent

initiatives supported by the South African government to work towards quality education for all its learners. The first report is South African and the second report is regional, including a number of sub-Saharan countries in Africa.

1.9.2.1 The NEEDU report (2012)

The National Education Evaluation and Development Unit (NEEDU) is a unit which is an independent unit reporting directly to the Minister of Basic Education. Its purpose is to provide the Minister with an accurate account of the state of schools in South Africa. Of particular interest for this study is the comment on PD:

If the diagnosis offered in Section 2 (*sic*) is correct, then capacitating teachers by one or other model of providing knowledge resources must be the most important factor in any reform strategy for schools. This has been long recognised. Over the last two decades billions of rands have been poured into what we have called teacher subject knowledge capacitation, through a plethora of teacher in-service training (INSET) programmes, while the pre-service (PRESET) sector has been radically restructured in the last 10 years. However, there has been general dissatisfaction with these efforts, with INSET widely perceived to be ineffective, while any improvement in the quality of beginning teachers awaits demonstration. These views were confirmed by NEEDU respondents during visits to schools, district and provinces in 2012 (p.14).

1.9.2.2 SACMEQ III Report (2010)

“The challenge of providing quality basic education for all our children is not only at the heart of the Millennium Development Goals (MDG) set by the international community, but it is actually a social commitment which every government owes the citizens of its country.” (Angie Motsheka, South African Minister of Education in the foreword to the South African Report.)

SACMEQ is an acronym for: Southern Africa Consortium for Monitoring Educational Quality. The SAQMEC III project was conducted in 2007 and represented South Africa’s second participation in the regional study involving 15 member countries. The countries comprising this consortium are Botswana, Kenya, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania (mainland), Tanzania (Zanzibar), Uganda, Zambia and Zimbabwe. Of particular interest to this study is the reference to teacher education, both pre-service (pre-set) as well as in-service training (inset). The following pertinent findings regarding pre-set and in-set, are taken from the report (page 12):

Pre-service training:

Formal initial training of teachers is the responsibility of the institutions of higher education. The duration of training of training is 4 years and includes exposing trainees to real teaching situations. There has been growing concern that the turn-around rate of trained educators does not meet the requirements of the education system. Relatively small numbers of students at higher education students show interest in following teaching as a career. A relatively small number of HEIs provide teacher training. The result has been acute shortages in the numbers and quality of suitably qualified teachers. The most acute shortages have been in teachers of Mathematics, especially in the Foundation phase. These shortage prevail despite the government offering bursaries for students, especially in the scarce subjects such as English, Mathematics and Physical Science.

In-service training

In-service training or continuous professional development (CTDP) is an integral component of the comprehensive teacher development strategy in South Africa. The department of basic education has the responsibility to ensure that every teacher receive a minimum amount of in-service training in a defined period. The terrain of providing CTPD is open to non-governmental organisations as well.

1.10 Professional Learning Communities (PLCs)

According to Sargent and Hannum (2009) teacher PLCs provide environments in which teachers engage in regular research and collaboration and have been found effective as a means for connecting professional learning to the day-to-day realities faced by teachers in the classroom.

PLCs emerged during the last decade of the previous century. (Dufour and Eaker, 1998; Sakney, Walker & Mitchell, 2005). Professional Learning Communities or PLCs has its roots in the organisational learning movement (Senge, 1990) which proposed the idea that organisations can learn. The business sector embraced this concept and it became quite influential in guiding organisational development. Organisational learning is all about the people within the organisation and how they relate to each other and the organisational culture that exists within the organisation. Drejer (2000) explains this important perspective by stating that “organisational competence typically resides in the relationships norms, memories, habits, and skills of a network of people” (p. 41).

There is a growing corpus of research in South Africa investigating the PLC concept, especially since the publication of the Integrated Strategic Planning framework for Teacher Education in South Africa: 2011 – 2025 (ISPFTED:3, April 2011). This research is an attempt to answer the question: What are the processes and issues involved in establishing a

Professional Learning Community by exploring teachers' experiences in the LEDIMTALI PLC.

1.11 Research design

The research was conducted in the tradition of a qualitative research design. This will be expanded in Chapter 3.

1.11.1 Research approach

The study was also conducted in the spirit of a hermeneutic phenomenological approach.

1.11.2 Validity and reliability

The importance of safeguarding the validity and reliability of qualitative research is well espoused in literature. (Creswell & Miller, 2000, Denzin & Lincoln, 2009, Guba & Lincoln, 1998). Lewis (2009) argues that "As the qualitative researcher is often perceived as the research instrument, he or she must ensure that the information he or she reports/records is accurate, not oversimplified or misinterpreted" (p. 7).

Kvale (1996) suggests that in order to ensure that the researcher remains truthful the following aspects of data gathering and analysis must be taken into account:

- (i) Analysis methods: are the interviews interpreted the same by different researchers?
- (ii) Answer reliability: did the researcher ask the same question in several ways?
- (iii) Coder reliability: are the interviewer asking the same thing in an unbiased manner?
- (iv) Critical checking: is all researchers asking critical questions to test the interviewee's story?

- (v) Follow-up questions: are all researchers using follow-up questions to ensure the collection of thick, rich data?
- (vi) Leading questions: are interviewers avoiding leading questions that may solicit a desired response, but not necessarily an accurate response?
- (vii) Transcription: are interviews and observations being transcribed correctly and accurately?

1.11.3 Data gathering

This study employed in-depth semi-structured interviews with individual teachers as well as focus group interviews with selected groups of teachers across schools in order to cross check the data.

1.11.4 Analysis of the data

The data was analysed using the *Framework Approach*, which according to Pope, Ziebland and Mays (2000) lends itself to this type of phenomenological research.

1.12 Ethical considerations

All the interviewees were informed about the research and its purpose and that their participation in the interviews were voluntary. Permission was obtained from the interviewees to record the interviews. Permission was sought from the principals of the schools where the interviews with teachers took place. Ethical clearance was sought and obtained from the University.

Pseudonyms were used in the thesis to protect the interviewees and confidentiality and anonymity was maintained at all times. Consent was also sought and obtained from the Western Cape Education Department to conduct research in the schools.

1.13 Limitations of the study

Whilst phenomenological studies are claimed to be successful in uncovering some of the complex dynamics that direct social actions and meaning making, I am cautious not to overstate the possible findings of this research. Secondly there is always the problem of representation due to the linear nature of the process of writing a research report. In the process of reporting on a research project, there is a beginning, middle and a conclusion. This structure does not always portray reality, as certain events and insights do not necessarily unfold in a linear way.

Furthermore, it is accepted that individual participants may not be able to articulate their understanding clearly. Creswell (2013) argues that interviews present limitations since they produce data that have been filtered through the interviewer.

1.14 Delimitations of study area

The reporting process requires that the researcher delineates and describes the areas for reporting clearly and presents the report logically and coherently. Hence this investigation only focussed on the process and issues as observed in the project schools and the deliberations between the participants. This situated knowledge that is constructed during the research process, can therefore not be generalised over the entire cohort of schools in the Western Cape. Findings of the study may be regarded as tentative and open to further to scrutiny.

1.15 Overview of the Study

The study is organized into 6 chapters.

Chapter 1 is the chapter that deals with the introduction and overview of the study. In this chapter the main research question is introduced. The chapter also provides an overview of CPTD and considers some reports that establishes the need for CPTD in the South African context.

Chapter 2 presents a review of the literature that builds the theoretical framework for this study. The literature review starts with a section on the role of PD, presentation of the concept of professional learning communities, and a discussion of effective leadership practices that support professional learning communities.

Chapter 3 provides an overview of the research methodology and includes the research design, sample information, and the instruments used in this study. In this chapter I explain the difference between Qualitative and Quantitative research and then proceed to discuss the ontological and epistemological underpinnings of this study.

Chapter 4 focuses on the presentation of the research data. This presentation follows the sequence of research questions formulated in chapter 1. In the presentation I provide justifications for the findings by providing instantiation quotes from the interviews conducted.

Chapter 5 consists of data analysis and interpretation framed by the four subsidiary questions. This chapter draws on the principles of the *Framework approach* to interpret the findings and refers extensively to the literature survey in chapter to provide links between the research findings and the extant literature on PLCs and professional learning.

Chapter 6 concludes the study by summarising the research findings. This is followed by a reflection on the extent to which the study answered the main research questions. Some recommendations for practitioners, as well as suggestions for further research are also provided.

1.16 Conclusion

This chapter provided a brief orientation to the research. In this chapter the aim as well as the significance of this research is presented. The next chapter focusses on the available literature regarding CPTD and PLCs in order to build the theoretical framework for the research and interpretation of the research findings.

Chapter 2: Literature Review

If we are to facilitate the professional development of teachers, we must understand the process by which teachers grow professionally and the conditions that support and promote growth. (Clarke & Hollingsworth, 2002:947)

2.1 Introduction

Chapter one outlined the importance of CPTD and introduced the research problem, which is exploring a CPTD model through investigating the establishment of a PLC for teachers of Mathematics in a sample of schools in the Western Cape. This model was implemented through the LEDIMTALI project at the University of the Western Cape.

This chapter reviews the available literature relevant to CPTD and PLCs. This literature review seeks to establish the current knowledge in the fields of CPTD and PLCs. The results of this literature review was used to establish a theoretical framework that underpinned the study and in practical terms led to the construction of my conceptual framework.

Furthermore, the literature reviewed for this chapter formed the theoretical framework for this study. For this reason this literature review has been configured by considering the essential topics that would frame the study. It may thus happen that some of these sections repeat conceptions and formulations as there is bound to be overlaps with regard to certain topics, for example professional development (PD) and continuous professional development (CPD), or life-long learning (LLL) and professional learning (PL).

2.2 The rationale for the professional development of teachers

Ingvarson (2005) argues that PD of teachers is an important intervention on the part of educational administrators and school leaders to improve the quality of teaching and learning in schools. This is what Ingvarson (2005) had to say: “Professional development for teachers is now recognised as a vital component of policies to enhance the quality of teaching and

learning in our schools” (p. 2). There is general support amongst educationalists for the need of CPTD to improve the quality of teaching (Nicolae, 2014; Galindo, Lee, & Yoder, 2014; Borko, Koellner & Jacobs, 2014; Wilson, Mojica & Confrey, 2013). We may thus conclude that CPTD is one of the key strategies whereby the education system seeks to improve the quality of teaching and learning in schools.

2.2.1 Perspectives on quality teaching

Globally, there is now a growing emphasis on providing quality education for all learners. Dinham (2013) refers to initiatives by organisations such as the Organisation for Economic Co-operation and Development (OECD) and the United Nations Educational, Scientific and Cultural Organisation (UNESCO) on improving the quality of teaching for all learners, regardless where they find themselves. So quality teaching and hence quality learning for all now became the mantra in educational systems. Wang, Lin, Spalding Klecka and Odell, (2011) posit that “it is generally accepted that quality teaching plays a major, if not the most important, role in shaping students’ academic performance” (p. 331).

Whilst quality teaching is quite an amorphous concept which is difficult to quantify, the following representation of teaching quality by Wang, et al (2011) provides some direction in the quest of researchers and educational leaders to capture this concept of quality teaching in tangible terms. The Table 3 below provides a summary of their perspectives on quality teaching.

Table 3: Perspectives on quality teaching

Perspective on quality teaching	Implications for CPD
<p>A cognitive resource perspective</p> <ul style="list-style-type: none"> This perspective involves a teacher’s knowledge, skills, beliefs and dispositions 	<p>Since the determining factor for quality teaching is seen as knowledge, skills and beliefs, CPD should focus on</p> <ul style="list-style-type: none"> Changing teachers’ beliefs Deepen content and pedagogic content knowledge Expose teachers to alternative models of teaching
<p>A performance perspective</p> <ul style="list-style-type: none"> This perspective emphasises what teachers do in their classroom practice 	<p>If quality teaching is a function of what teachers do in the classroom, CPD should equip teachers to reflect on their own practice through:</p> <ul style="list-style-type: none"> Coaching and mentoring Peer visitation and interactive feedback
<p>A teaching outcomes perspective</p> <ul style="list-style-type: none"> This perspective maintains that quality teaching is defined in terms of teaching outcomes, i.e. student achievement. 	<p>In this perspective quality teaching is measured by the learners’ achievement in examinations, CPD should equip teachers with the skills to prepare learners for assessment and so the focus of CPD should be</p> <ul style="list-style-type: none"> Assessment of learning Assessment for learning Drill and practice methods

(Wang, et al, 2011)

Having thus established the first reason for CPTD, literature also indicates another reason for engaging teachers in CPTD, and that is systemic improvement in the educational environment.

2.2.2 Professional development as a lever for systemic improvement

The second reason for CPTD relates to systemic improvement, either in the form of introducing new curricula, new content, new policies or simply attempting to improve the efficiency and the efficacy of the schooling system. This is predicated on the supposition that teachers have the biggest ‘in school’ influence on student achievement and school improvement in general. Hattie (2009), places teachers at the centre stage of CPD initiatives by noting the effect sizes of various role-players or interventions in terms of learning outcomes

of students. In summary CPTD as an improvement strategy is employed by education administrators and school managers for the following reasons:

- to implement school improvement strategies (Hargreaves, 1994; Bolam 2005; Duncombe & Armour, 2004),
- teacher effectiveness and learner achievement (Good & Weaver, 2003, Jeanpierre, et al, 2005) and
- to implement educational or curricular reforms (Guskey, 2002, Ingvarson, 2005).
- Quality teaching and learning (Wang, et al, 2011).

Luke and McArdle (2009) identified the following sources that provide a rationale for engaging teachers in CPTD: State or provincial policy priorities; empirically identified problems; student cohort needs; curriculum renewal; new workforce demands; operational imperatives; and projected future needs (p.239).

Literature provide us with an abundance of evidence to justify prioritising the PD of teachers as an integral aspect and responsibility in any education system. In the section that follows I will explore how CPTD is defined in literature.

2.3 The professional development of teachers

Literature presents us with various definitions of PD. Most of these definitions of PD refer to both formal and informal learning experiences and processes in which teachers are engaged in CPTD undertakings.

2.3.1 Definitions of CPTD

The following examples are lifted from literature in order to show the spectrum of conceptualisations of CPTD. The description of PD by Joyce and Showers, (1996) as “formal and informal provisions for the improvement of educators as professionals, as well as in terms

of the competence to perform their teaching duties” is typical of how some researchers view CPTD (p. 6). A second definition of CPTD is provided by Gall and Renchler (1985). They view CPTD as “efforts to improve teachers’ capacity to function as effective professionals by having them learn new knowledge, attitudes and skills” (p. 6). The third definition of CPTD is provided by Fullan (1995) who defines PD as “the sum total of formal and informal learning pursued and experienced by the teachers” (p. 265). The final definition of CPTD that warrants a mention, is that of Day (1999):

Professional development consist of all natural learning experiences and those conscious and planned activities which are intended to be of direct or indirect benefit to the individual, group or school and which contribute through these to the quality of education in the class room. It is the process by which, alone or with others teachers review, renew and extend their commitment as change agents to the moral purposes of teaching, and by which they acquire and develop critically the knowledge, skills and emotional intelligence essential to good professional thinking, planning and practice with children, young people and colleagues through each phase of their teaching lives. (p.27)

The definition formulated by Day (1999) provides a comprehensive description of CPTD. In this definition he attempts to capture CPTD in all its manifestations and nuances.

This definition highlights the following aspects of CPTD:

- All learning experiences that teachers are exposed to,
- Planned and incidental learning opportunities,
- Individual as well as group learning experiences,
- Improving both teaching practice and pupils’ learning outcomes,
- Teachers becoming change agents, and
- The moral purposes of teaching linked to the purpose of CPTD.

In summary we may conceptualise CPTD as learning opportunities afforded to professionals such as teachers and academics which includes all formal and informal learning experiences on and off-site. Such learning affordances may include informal activities such as

attending conferences, formal subject meetings and discussions, short one day workshops to transfer specific information and extended training courses at institutions of higher education in order to improve qualifications.

One of the most important learning affordances for CPTD available to teachers is on-site also referred to as job-embedded learning. This construct becomes the focus of the next section.

2.3.2 Job-embedded CPTD

Elmore (2002), distinguishes between two formats of PD, namely traditional PD and job embedded PD. He characterises traditional PD as a top-down model of teacher development, arising from policy mandates where experts are contracted to present workshops and seminars on what they consider to be what teachers need. This assumes a transmission type of in-service training based on their own materials. This material is frequently packaged into bite-sized units and delivered devoid of context in which teachers work and in a didactic manner reducing teachers to passive recipients of information.

On the other hand job-embedded PD locates PD within the school or district context. This approach is predicated on the supposition that teacher learning is situated and should be mediated in ways that are relevant to their needs and addresses the needs of their students as well (Stoll, Bolam, McMahon, Wallace, & Thomas, 2006). Job-embedded PD may also be delivered in formal or informal settings (Hager, 2004).

Finally, regarding job-embedded PD various researchers suggested that teachers need to be provided with more opportunities at their schools, in their classrooms, to understand, *experience*, and reflect on innovative methods. They claim that PD that is on-site and *experiential* in nature is critical to motivate teachers to try effective instructional practices and create a desire to change the curriculum in a meaningful and viable way (Darling-Hammond

& McLaughlin, 1995, 2011; Joyce & Showers, 2002; Nolan & Hoover, 2004, 2008; Peery, 2004).

2.3.3 The paradigms underpinning CPTD

Various paradigms underpin the implementation of PD interventions. The important understanding emanating from considering some of these paradigms is that it creates an awareness of the various agencies and concomitant power relations involved in CPTD. In this regard the schema presented by Chin and Benne (1969) is very informative. These researchers identify the following paradigms underpinning change processes in society: the rational empirical, the power-coercive and the normative re-educative paradigms. Table 4 summarises the attributes of each paradigm as espoused by Chin and Benne (1969) as it would apply to CPTD interventions at school level:

Table 4: The paradigms underpinning CPTD

	The paradigms underpinning CPTD		
Attribute	Rational-empirical	Power-coercive	Normative re-educative
Philosophy	Based on expert information	Compliance and sanctions	Professional growth
Approach	Technisist	Bureaucratic	Socio-cultural
Target	Fix the parts	Fix the parts and fix the people	Fix the school
Initiated	Top-down	Top-down	Collaborative
Drivers	Experts Consultants Researchers	Officials Consultants	Teachers Partnerships
Power relations	Expert-trainee	Employer-employee	Shared leadership and co-learning

(Adapted from Chin and Benne, 1969)

The value of this schema is that it assists researchers and other CPTD agencies to understand *how* and *why* role-players in the CPTD arena may react in ways they sometimes do or why CPTD facilitators or providers may encounter resistance or a lack of cooperation by

teachers in CPTD activities. It also explains the tensions between the central prescription of PD programmes and their optimal realisation in local school contexts.

One needs to be careful not to become dogmatic about the distinctions in the schema. It is a useful analytical tool, but it cannot be used to judge the merits or otherwise of a particular approach. Each of these paradigms may have its value or strong points, depending on the context or the purpose of a particular CPTD intervention. This argument is supported by many researchers. Hargreaves and Fullan (2012), for example, found that central policy mandates and priorities were frequently the impetus for effective school-based PD and changed classroom discourse and practice. At the same time, findings of the PD research and the consistent message from school reform literature is that effective PD is locally-based and operational at the levels of school, district and teacher clusters (Cochran-Smith, 2001; Little, 2000; Welner & Oakes, 2008).

2.3.4 Models of PD

Literature describes a variety of PD models. Kennedy (2005) for example, identifies nine PD models: (1) the training model, (2) the award-bearing model, (3) the deficit model, (4) the cascade model, (5) the standards based model, (6) the coaching/mentoring model, (7) the community of practice model, (8) the action research model, and (9) the transformative model.

On the other hand some researchers such as Desimone (2009) provide a broad classification of CPTD interventions and mention the following types of CPTD models: the transmission type, the transition type, and transformative type of CPTD.

Lawless and Pellegrino (2007) classified the approaches to PD into four categories: (a) organizing one-shot workshops; (b) using design-based components as part of the curricula; (c) using a mentoring model; and (d) using train-the-trainers model. The diagram below provides a visual summary of typical PD models found in literature.

Figure 5 is an illustration of how these different models articulate with each other. The Figure also exemplifies some of the qualitative features of the different models in terms of modality, teacher autonomy and innovation.

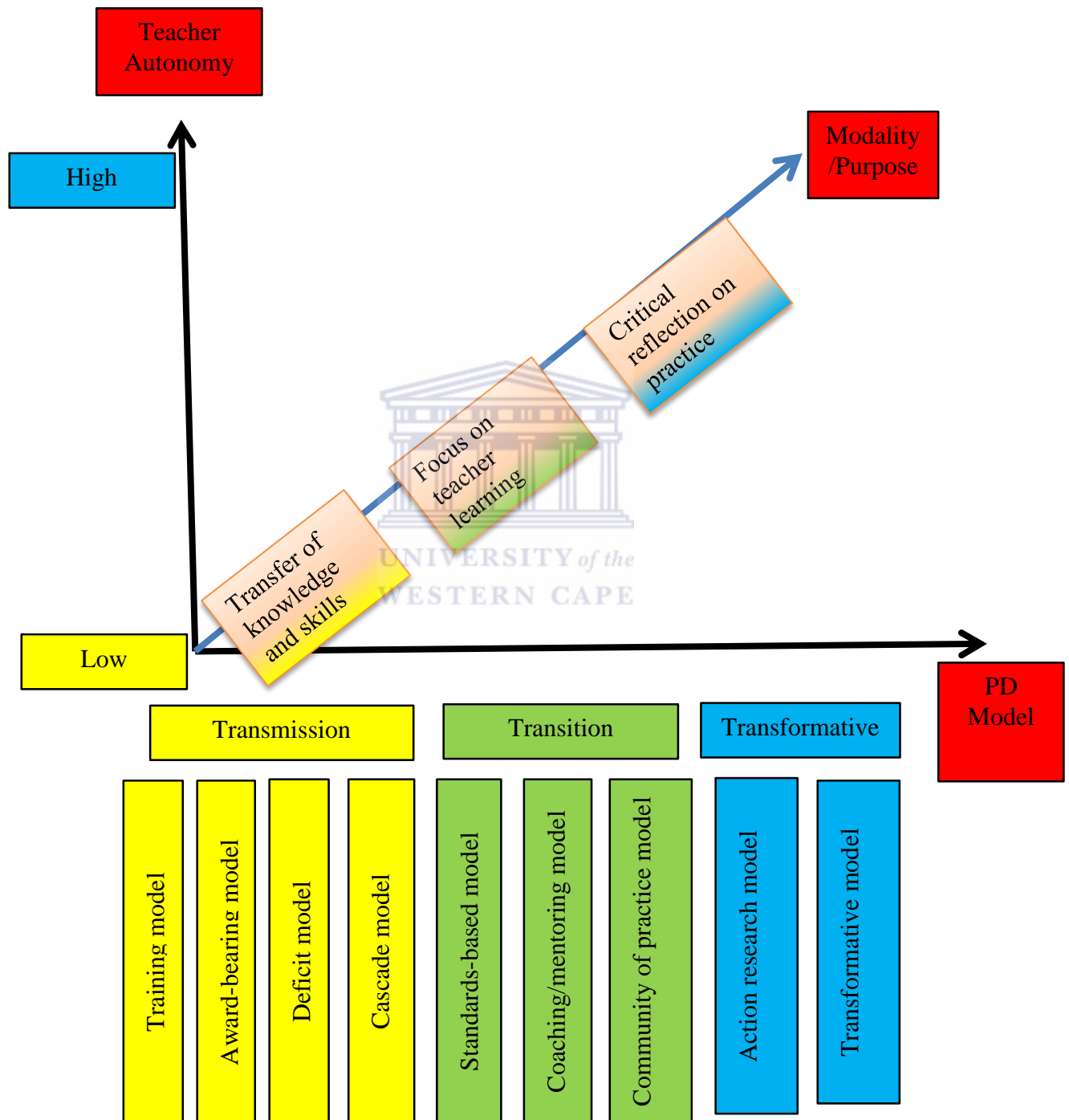


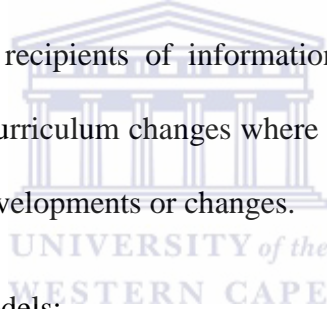
Figure 5: A typology of CPTD models

(Adapted from Kennedy, 2005)

This diagram alludes to a number of PD models. Some of these models will now come under review. Let me firstly deal with the models that constitute the continuum of the horizontal axis.

2.3.4.1 Transmission type of PD models:

These include the training model, the award-bearing model, the deficit model and the cascade model. The models will each be discussed later. The transmission model can be regarded as the traditional model for PD. It is usually initiated in a top down, technocratic way and supports a high degree of centralised control. Hence it is rated low in terms of teacher autonomy. The model suggests that it is used to transmit knowledge or convey information to teachers regarding new content, methods or policies. Hence it is always expert driven and teachers are sometimes passive recipients of information. It is, however, useful in the implementation of system wide curriculum changes where all the teachers in the system need to be informed about the latest developments or changes.



2.3.4.2 Transition type models:

These models include the standards based model, the coaching/mentoring model and the community of practice model. Each of these models will be discussed in subsequent sections.

2.3.4.3 Transformative type models:

These models include the action research model and the transformative model.

2.3.5 The nine PD models

2.3.5.1 The training model:

Kennedy (2005) describes this model as follows:

This model of CPD supports a skills-based, technocratic view of teaching whereby CPD provides teachers with the opportunity to update

their skills in order to be able to demonstrate their competence. It is generally 'delivered' to the teacher by an 'expert', with the agenda determined by the deliverer, and the participant placed in a passive role. While the training can take place within the institution in which the participant works, it is most commonly delivered off-site and is often subject to criticism about its lack of connection to the current classroom context in which participants work (p. 237).

Despite criticism, this model is an effective way of introducing new knowledge (Hoban, 2002). However, it sometimes fails to help teachers to implement this new knowledge in the classroom as the training is delivered by a subject specialist or expert that does not know the context in which this new knowledge must be implemented or does not provide on-site support when the teacher tries to implement the new knowledge and skills in the classroom.

2.3.5.2 The award-bearing model:

This model emphasises some form of credit or award, for example new qualifications being conferred upon teachers after completing a course of study at a tertiary institution or PD provider. It often happens that the motivation in this case has nothing to do with the improvement of teaching and learning, but rather a way of ensuring further movement along a teacher's career path.

Kennedy (2005) indicates that since most of these courses are accredited or validated by the university, the control or structure of these courses rests with the service provider or the university.

2.3.5.3 The deficit model:

This model employs interventions that are designed to address perceived deficits in teacher performance. This is usually identified through deficits in student learning outcomes. Nonetheless, this model seems to ignore organisational, managerial and contextual factors that may contribute to poor learner performance. (Rhodes & Beneicke, 2003). Kennedy (2009) is of the opinion that this model ignores the systemic causes for poor learner performance:

While the deficit model uses CPD to attempt to remedy perceived weaknesses in individual teachers, the root causes of poor teacher performance are related not only to individual teachers, but also to organisational and management practices. Indeed, to attribute blame to individual teachers, and to view CPD as a means of remedying individual weaknesses, suggests a model whereby collective responsibility is not considered, i.e. that the system itself is not considered as a possible reason for the perceived failure of a teacher to demonstrate the desired competence (p. 239).

2.3.5.4 The cascade model:

This model can also be referred to as the “train the trainer model” and is commonly employed in situations where resources are limited. This model involves a layered training programme. Departmental officials, for example, curriculum advisors or “lead teachers” attend a centralised training programme and are required to disseminate this information to all other teachers. It is the opinion of researchers that the information gets diluted or distorted in the next layer. Hayes (2000) describes this weakness of the cascade model as follows: “However, using trainers drawn from successive tiers of the cascade also has potential disadvantages, the principal one being dilution of the training—less and less is understood the further one goes down the cascade” (p. 137). He further explains the reason for this by arguing that: “A prime cause of failure is concentration of expertise at the topmost levels of the cascade, allied to a purely transmissive mode of training at all levels” (p.138).

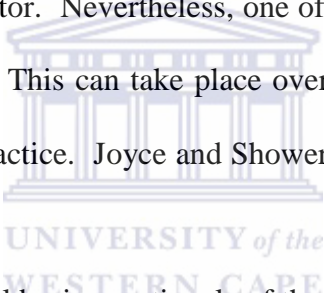
2.3.5.5 The standards based model:

This can also be referred to as a competence based model. The approach to PD is based on profession-defined standards and values (Ingvarson, 1998). Kennedy (2005) claims that the emphasis is on the standard for demonstrable competences set by the authorities. It addresses the “what and how” to teach and as such its approach is also technisist in nature and a behaviourist perspective to learning (p. 241). Ingvarson (2005) extolls the virtues of this model by noting that:

The key features of a standards-based system are that standards are formulated and reformulated from time to time by teachers and professional bodies and are grounded in professional expertise and research. These standards, in turn, provide goals for professional development that constitute a stable, challenging and long-term agenda for professional development. The standards transcend the policy goals of particular employing authorities (p.130).

2.3.5.6 The coaching/mentoring model:

The coaching/mentoring model of PD is rooted in a one-on-one relationship between two teachers or a teacher and a subject specialist/expert from another institution. Although it can be a collegial relationship, practice points more to a hierarchical relationship in a novice/experienced or expert mentor. Nevertheless, one of the strengths of this model is that PD can take place at the school. This can take place over a period of time and can lead to sharing ideas and reflecting on practice. Joyce and Showers (1982) explain this model in the following terms:

- 
- (i) Study of the theoretical basis or rationale of the teaching method;
 - (ii) Observation of demonstrations by persons who are relatively expert in the model;
 - (iii) Practice and feedback in protected conditions (such as trying out the strategy on each other and then on children who are relatively easy to teach); and finally
 - (iv) Coaching one as they work the new model into their repertoire, providing companionship, helping each other learn to teach the appropriate responses to their students, figuring out the optimal uses of the model in their courses, and providing one another with ideas and feedback (p. 5).

2.3.5.7 The community of practice model:

The community of practice involves a number of teachers working collaboratively. This may happen in the context of one subject department at a school, within the entire school or across schools. The community of practice may also involve outside experts sharing their

knowledge with members of the community. The relationship that drives this community of practice is dependent on the theory of social learning (Wenger, 1998; Boreham, 2000). Glazer and Hannafin (2005) explain that in a community of practice, professional development is socially negotiated among members in the community based on mutual engagement in a community that values reciprocal interactions. In this way newcomers are continually supported and mentored. As the neophyte teachers gain knowledge and experience in classroom practices through their engagement with others, they become capacitated to infuse fresh ideas and strategies into the discourse.

2.3.5.8 The action research model:

The action research model is based on teachers engaging in a critical reflection about their own practices. As such it offers an alternative model to the passive role of teachers inherent in transmission type models (Burbank & Kauchack, 2003). It thus have the potential to lead to transformative practices within a school. Teachers are encouraged to team up with colleagues or university lecturers to enrich the discourse or expose themselves to other perspectives. Having made this observation of involving outsiders in action research the research itself is embedded in the context of the teacher's daily activities at school.

2.3.5.9 The transformative model:

Kennedy (2005) indicates that the transformative model of teacher development draws a number of its processes and features from other models and hence it may be described as an eclectic model that focuses on the processes and conditions that will lead to transformation of the individual or school. The transformative model of CPTD promotes a perspective of teacher development that moves away from “the top-down mandated one-shot workshops”. Coolahan (2002) contrasts the “top-down” approach of traditional models of in-service education with what is described by OECD (1999) as a “bottom-across” approach whereby teachers in clusters

of schools may collaborate on professional learning and development activities. Coolahan (2002), in a working paper commissioned by OECD, locates this trend within the wider policy agenda of lifelong learning and identifies certain desirable characteristics associated with successful in-service provision, as follows:

- It should incorporate both on and off-site school dimensions;
- Teachers should have a greater role in setting the agenda and being actively engaged in an experiential process;
- In many countries, through training of trainers' courses, teachers have been assisted to work with their peers as facilitators and team leaders. This gives rise to a sense of empowerment and confidence building which cultivates a good *esprit de corps*; and
- Collaborative, interactional techniques are very much in favour, rather than lectures to large groups (p. 27).

2.3.6 The PLC model

In outlining this model, I intentionally did not group it with the previous nine models. The reason for this is that this model is the testbed for this study. The PLC model stems from the work of DuFour and Eaker (1998) and has attracted attention in research on school improvement and transformation. It is located in the transformative type of PD models. Much of the current research on school improvement uses this model as a framework (Dufour 2004).

McLaughlin and Talbert (2006) define a PLC as a model for PD where teachers work collaboratively to reflect on practice, examine evidence between practice and student outcomes and make changes that improve teaching and learning.

A PLC brings teachers together in a community of inquiry. Sackney, Walker and Mitchell, (2005) promotes the view that to build a learning community is to build capacity for learning. This they posits is a break from the traditional deficit model where PD was an effort to plug the gaps that exists in teachers' subject knowledge.

2.4 Characteristics of effective PD

There are a number of features that may render CPTD effective. (Guskey, 1995; Avalos, 2011; Desimone & Birman, 2009; Opfer & Pedder, 2011). On the other hand, researchers have recorded instances where CPTD initiatives failed to deliver the desired outcomes and it is this observation that fuelled the research into the characteristics of CPTD activities that improve effectiveness (Guskey & Yoon, 2009; Borko, 2004; Guskey, 2014; Desimone & Birman, 2009).

Guskey (2003) expresses the view that many PD initiatives fail because they lack focussed planning and are unrelated to teachers' daily tasks. These types of interventions are usually top down initiatives with rigid programmes. Borko (2004) also highlights the failure of such fragmented and episodic approaches to teacher development.

This observation that CPTD initiatives may fail to deliver its intended outcomes dictates that research into the features that enhances the effectiveness of CPTD programmes be done. There are indeed a number of research reports that indicates that researchers have taken up this challenge; and in this regard I am especially cognisant of the work done in the South African context (Maistry, 2008; Joyce & Calhoun, 2010; Bertram, 2011; Luneta, 2013; Steyn, 2008).

Luneta (2013) makes interesting observations with regard to the design of CPTD programmes:

The design of these continuous professional development programmes must be informed by an effective needs analysis that culminates from the teachers' knowledge bases of curricula, instructional, content and pedagogical knowledge. The knowledge bases are conceptual frameworks upon which professional development should be based. Research shows that teachers perform better in professional development programmes whose design they are part of. This article is a literature review of professional development programmes for teachers in relation to teacher knowledge bases in South Africa. It articulates how high quality professional development programmes can be designed, implemented, as well as the causes of failure and dissatisfaction associated with these programmes (abstract).

Hawley and Valli (1999) in their review of the research on PD programmes, identified eight principles for effective PD. They posit that effective CPTD programmes are:

- driven by attention to goals and student performance,
- built upon teacher involvement in identifying learning needs and shaping the learning opportunities and processes,
- school-based emphasising job-embedded learning,
- collaborative and involve problem solving strategies,
- continuous and supported over time,
- information rich with multiple sources of information for evaluation of the outcomes,
- based in theoretical understanding and uses real data to develop, support and advance learning, and
- part of a comprehensive range of change processes connecting individual and collective learning to larger organisational issues and needs (p. 138).

Other examples where researchers responded to the challenge of finding enhancing factors for CPTD now come under scrutiny. Ingvarson, Meiers and Beavis (2005) reported on a study aimed at investigating the effects of the structural and process features of PD programmes, on teachers' knowledge, practice and efficacy. The findings of this literature survey indicated the following five features as key to effective CPTD:

- A strong content focus,
- Follow up,
- Active learning,
- Feedback, and
- Collaborative examination of student work.

(Avalos, 2011; Opfer & Pedder, 2011; Ingvarson, Meiers & Beavis, 2005; Borko, 2004; Hawley & Valli, 1999)

In a longitudinal study Desimone, Porter, Garet, Yoon, and Birman (2002) investigated the features of effective PD and its effects on changing classroom practice. They identified six key features that contribute to effectiveness and efficacy. They categorised these features into two categories namely structural features and core features. The structural features referred to

the enactment of professional activities and the core features pertains to the programme content. These features are listed in Table 5:

Table 5: Structural and core features of CPTD

Structural features	Core features
the form of the activity	a content focus
the duration of the activity	coherence
collective participation	active learning

Jeanpierre, et al (2005), on the other hand, identified three central features of effective science PD, namely,

- deep science content and process knowledge,
- teacher commitment and accountability to implement their learning, and
- expert providers of PD.

The research done by Jeanpierre et al (2005) found that a strong content focus must be accompanied by a well-defined role that the participants as well as the providers of the programmes should play, as key factors leading to effective CPTD.

In her later work, Desimone (2009) summarised the features of effective CPTD. These features are:

- a content focus based on the local curriculum,
- active learning by participants,
- coherence or alignment to improvement goals,
- the time-span of PD activities, and
- collective participation of the subject or grade team.

Table 6 below provides a summary of these features:

Table 6: Features of effective CPTD

Characteristic of PD	Focus in terms of learning opportunities
Content focussed	PD for teachers should address both specific content knowledge and pedagogical content knowledge related to the curriculum implemented in the classroom
Active learning	Teachers must be actively engaged in learning experiences which facilitates their professional growth. This include peer observation followed by interactive feedback and discussion
Coherence	Learning activities should be aligned to both the curriculum as well as the school and/or district goals for improvement.
Duration	Learning activities should last for a period of time (20 hours or more is suggested) and should include cycles of training, implementation and evaluation.
Collective participation	Teachers should actively be involved in group activities and discussions, particularly in grade level context

(Desimone, 2009)

An interesting observation that emanates from Table 6 is that it does not make reference to the roles of the providers or recipients of the CPTD programmes. My interpretation is that the role of CPTD providers are encapsulated in the fact that they are the agents through which the other features are implemented. Besides describing the recipients as active participants, Desimone's (2009) summary does not consider the dispositions of teachers towards CPTD as a factor that contributes to the effectiveness of CPTD programmes.

2.4.1 Design of effective professional development.

In addition to the features of effective PD discussed in section 2.3.5, a number of researchers have suggested that certain design principles should inform CPTD programmes (Ingvarson, 2005). These principles require that effective PD programmes should be related to:

- (i) student learning goals,
- (ii) PD that is school-based and aligned to teachers' daily teaching responsibilities, and

(iii) PD that is on-going and involve follow-up and evaluation.

Researchers in different content areas have also identified a series of common features for what they refer to as “high-quality” PD programmes. (Borko, 2004; Desimone, 2009; Higgins & Parsons, 2009; Garet et al., 2001; Goldsmith, Doerr, & Lewis, 2014; Kazemi & Hubbard, 2008). These researchers proposed that high -quality PD programmes are programmes which provide teachers with: -

- A deeper understanding of the subject matter they teach and of how students think and learn the subject matter;
- Multiple opportunities to engage in exploration, reflection, and discussion;
- Activities that involve attending and responding to student thinking;
- Constructive and non-prescriptive feedback on tasks teachers perceive as relevant;
- Contexts for collegial sharing and collaboration; and
- Follow-up support during extended periods of time.

Louks-Horsley, Styles, Mundry, Love and Hewson (2010) suggested that contextual factors such as (1) students and their learning needs, (2) teachers and their learning needs, (3) the learning environment, (4) leadership and organisational culture, and (5) curriculum needs and classroom practice should receive due attention for any CPTD programme to be effective. Louks Horsley et al (2010) further alluded to the fact that CPTD providers need to take cognisance of (1) the nature of the subject, (2) the process of change and (3) the way in which adults learn in the design of CPTD activities

The discussions in this section logically suggest that CPTD should meet certain agreed upon standards. This aspect comes under the spotlight in the next section.

2.4.2 Standards for CPTD

The first example this study considers regarding CPTD standards emanates from the work done at the Center for Research on Education, Diversity and Excellence (CREDE) (Rueda, 1998). CREDE has synthesized five standards for effective CPTD:

1. Facilitate learning and development through joint productive activity among leaders and participants.

Learning takes place when novices and experts work together to solve a common problem or produce a common product. When thinking about PD in terms of joint productive activity, *joint* refers to who is allowed to participate and how, while *productive* refers to what counts as a legitimate collaboration.

2. Promote teachers' expertise in professionally relevant discourse

Language and discourse are critical aspects of the PD process. PD should not involve jargon or theoretical constructs if it does not contribute to meaningful problem-solving, or if it has no connection to practice. Rather, PD should work to create a common language of discourse for all participants.

3. Situate teaching, learning, and joint productive activity in the contexts of the participants

Discourses about teaching and learning activities and joint problem-solving tasks should focus on authentic issues and problems encountered in participants' daily practice.

PD should be flexible in order to allow for local differences and diversity; and concrete in order to avoid the one-size fits all approach. Innovations and school reform initiatives which rely upon rigid replication of a model or set of practices fail to account for the individual circumstances found in specific schools.

4. Challenge participants toward more complex solutions in addressing problems

There are many examples of teachers collaboratively addressing complex problems in innovative and successful ways. Conversely, some school reform mandates have become more restrictive, constraining the ability of educational practitioners to develop locally meaningful solutions. Yet, the same high standards and meaningful feedback on efforts that are critical to students' success should be accorded to teachers. PD activities are better conceptualized as sustained problem-solving opportunities rather than short-term interventions seeking immediate resolutions or designed to address superficial issues.

5. Engage participants through dialogue, especially the instructional conversation² (IC)

In instructional conversation (IC) the discussions are characterized by multiple, interactive, connected turns; succeeding utterances build upon and extend previous ones; in other words it is a connected discourse. ICs are useful for creating responsive learning environments and should be utilized in PD activities. This type of conversation is a blend of deliberate, planned teaching with more interactive, responsive conversation. The instructional aspects of the IC are related to the opportunities for responsive assistance in the ongoing interactions among participants. The conversational aspects of the IC provide the hook that facilitates the connection of theoretical knowledge to practical knowledge, including that which comes from teaching and being immersed in a community of teachers.

Secondly, the work of Broad and Evans (2006) illuminates the issue of standards for CPTD. In a research report they produced for the Ontario Ministry of Education, they formulated 12 standards for PD, as illuminated in Table 7 below:

² Instructional Conversations (IC) refers to discourses in CPTD contexts or classroom interactions that promote analysis, reflection and critical thinking. Participants in this discourse are generally responsive to what others say and hence each statement build upon, challenges or extends the previous one.

Table 7: Standards for Staff Development (NSDC)

The standard :	Description
1. Learning Communities	Staff development that improves the learning of all students organizes adults into teach communities whose goals are aligned with those of the school and district.
2. Leadership	Staff development that improves the learning of all students requires skilful school and district leaders who guide continuous instructional improvement.
3. Resources	Staff development that improves the learning of all students requires resources to support adult learning and collaboration.
4. Data-driven	Staff development that improves the learning of all students uses disaggregated student data to determine adult learning priorities, monitor progress, and help sustain continuous improvement.
5. Evaluation	Staff development that improves the learning of all students uses multiple sources of information to guide improvement and demonstrate its impact.
6. Research-based	Staff development that improves the learning of all students prepares educators to apply research to decision making
7. Designs and strategies	Staff development that improves the learning of all students uses learning strategies appropriate to the intended goal
8. Learning	Staff development that improves the learning of all students applies knowledge about human learning and change.
9. Collaboration skills	Staff development that improves the learning of all students provides educators with the knowledge and skills to collaborate
10 Equity	Staff development that improves the learning of all students prepares educators to understand and appreciate all students, create safe, orderly, and supportive learning environments, and hold high expectations for their academic achievement.
11. Quality teaching	Staff development that improves the learning of all students deepens educators' content knowledge, provides them with research-based instructional strategies to assist students in meeting rigorous academic standards, and prepares them to use various types of classroom assessments appropriately
12. Family involvement	Staff development that improves the learning of all students provides educators with knowledge and skills to involve families and other stakeholders appropriately

(<http://www.nsd.org/standards/index.cfm>).

Having considered these standards as an example of how CPTD could be designed and implemented, it raises the question of evaluation criteria to assess the impact and efficacy of any CPTD programme. In this regard the work of Guskey (2002) is quite informative.

2.5 Evaluation of the impact of CPTD programmes

Desimone (2009) decries the superficial nature of efforts to evaluate the impact of CPTD initiatives and asserts: “For decades, studies of PD consisted mainly of documenting teacher satisfaction, attitude change, or commitment to innovation rather than its results or the processes by which it worked” (p.181). She argues that given the plethora of experiences that count as teacher learning, this is a challenging task. However, she proposes that any instrument that is applied to measure the impact of CPTD must take cognisance of the core features of teachers’ learning experiences (p.181). Desimone (2009) thus suggests the following framework (Figure 6) that could guide the construction of a CPTD measuring instrument:

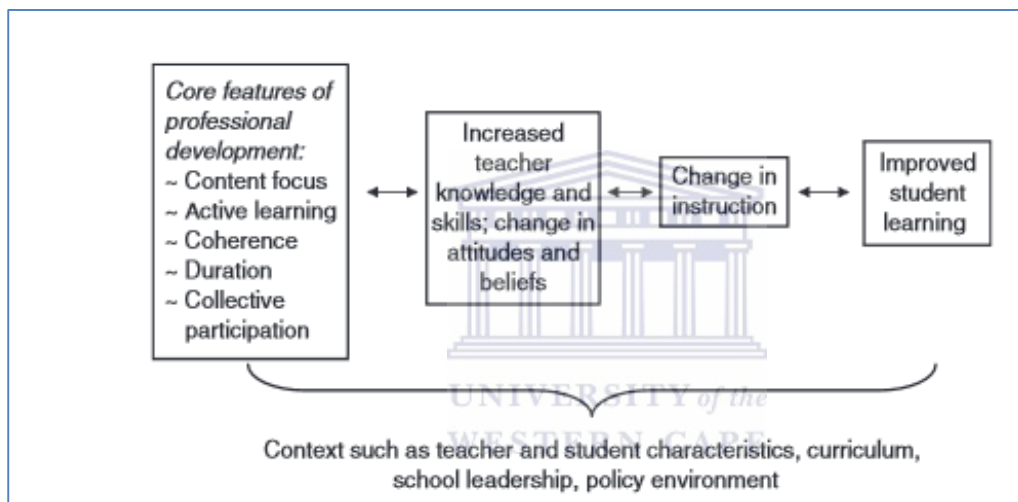


Figure 6: A conceptual framework for evaluating CPTD (Desimone 2009, p. 185)

Guskey (2002) provides us with a rubric that enables us to evaluate the teachers’ experiences in CPTD programmes as well as the impact thereof in their classrooms. (See Appendix B)

2.6 Teacher development and life-long learning (LLL)

Van Horn (2006) establishes a link between CPTD and LLL by noting that to be effective as teachers, a lifelong need exists to engage in CPTD that will enhance the teaching-learning process. Goodson et al, (2001) makes a similar connection between LLL and CPTD by contending that CPTD is a component of LLL for teachers. Benken and Brown (2010)

support this argument by indicating that CPTD should be viewed as professional learning that is sustained over time.

LLL may be understood as the pursuit of knowledge on an ongoing bases for either personal or professional reasons. LLL promotes personal development, active citizenship and employability. This implies that PD linked to LLL involves professional learning that leads to a critical stance towards current thinking and practices and thus enabling teachers to engage in the process of collaboratively seeking novel solutions to educational problems. Hence CPTD linked to LLL emphasises a concept of professional learning that is continuous, is situated and socially mediated, and encompasses formal as well as informal learning experiences. Table 8 below further expands on the benefits that may be derived from committing to LLL in general. These benefits are consequential in three related but distinct areas of a teacher's life. Shrestha, Wilson and Singh (2008) posits that LLL in general, have three dimensions, namely, personal education and empowerment, employability and community participation and engagement. In particular the implications for CPTD may be illustrated as in Table 8.

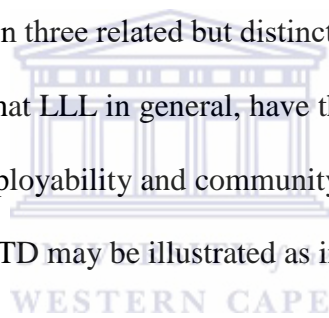


Table 8: The three dimensions of Lifelong Learning

Dimension	Purpose	Examples of learning experiences	Motivating factor
Personal education and empowerment	Develop identity as a teacher Subject expertise	Continual development of skills and expertise	Economic advancement
Employability	Career-pathing	Improving competence in areas of school administration, curriculum and subject related expertise	
Community participation and engagement	Educational leadership Active citizenship	Developing an active stance towards community involvement and educational policies	Active participation in community and leadership structures

(Adapted from Shrestha et al, 2008)

Akiba (2012: 12) identifies the following subset of LLL programmes that typically fall in the domain of PD activities for teachers:

- PD programmes,
- Teacher collaboration,
- University courses,
- Professional conferences,
- Mentoring/coaching,
- Informal communications, and
- Individual learning activities.

Postholm (2012) likewise suggests the following ways in which life-long learning for teachers may be enacted:

- attending and participating in workshops as well as long and/or short university courses,

- job-embedded by continually reflecting on their own practice and the learning of their students,
- observing colleagues in practice and giving feedback in an interactive way, and
- informal conversations with colleagues (p. 406).

The pursuit of such programmes may lead teachers to develop a reflexive disposition that enhances their capacity to participate meaningfully in educational discourses. It may further enhance their capacity to engage in the processes of analysing data on practice and performance for the purpose of identifying areas for improvement and further learning. Some of the programmes may even result in improved qualifications. Finally, these programmes may also lead to developing the teacher's leadership and managerial competences and develop them eventually into curriculum leaders (McGrane and Lofthouse, 2010).

McKinney, Carroll, Christie, et al, (2005) illustrate the processes of teacher learning as manifesting in four quadrants known in literature as Reid's quadrants for teacher learning. (See Figure 7 below). Reid's quadrants for teacher learning places teacher learning on a continuum in two dimensions, one dimension representing activities ranging from informal to formal and a set of contexts ranging from incidental learning opportunities to planned learning opportunities.

The two dimensions represented on the vertical axis describes a continuum ranging from formal to informal learning experiences. On the horizontal axis Reid represents learning experiences ranging from planned learning opportunities to incidental learning opportunities. Formal learning opportunities such as courses at a training institution or a university, as are those learning opportunities explicitly provided by an agent. In contrast informal learning opportunities are enacted through networking with other colleagues or peers or learning opportunities based on classroom experiences.

On the vertical axis the diagram conveys the idea that planned learning opportunities may be either formal or informal, but such learning opportunities are characteristically pre-arranged whereas incidental learning opportunities are spontaneous and unpredictable, for example, they may take place during break times where teachers exchange ideas over coffee.

These descriptions represent a continuum in four quadrants that encompass the range of learning opportunities that are afforded to teachers.

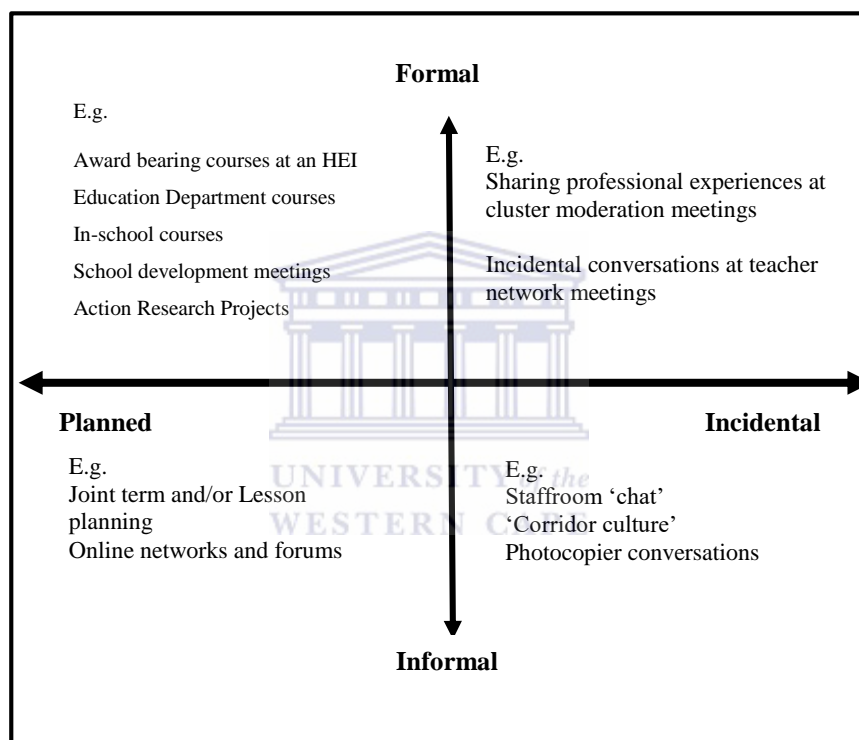


Figure 7: Reid's quadrants for teacher learning

(McKinney et al, 2005)

2.7 Professional learning (PL)

PL is widely considered to be an essential component of improving schools and especially of classroom teaching (Darling Hammond 1999; Elmore 2002). Professional learning involves a number of areas of improvement of teachers' knowledge and skills. Examples of areas where improvement may be effected include aspects as deepening subject content knowledge and pedagogical content knowledge. Areas where skills may be improved

may relate for example to the acquisition of new classroom practices that enhances teaching and learning. Professional learning may also involve reading about the latest research outputs in education (Bjuland and Jaworski, 2009). Cochran-Smith and Lyttle (2009) offer the following typology for PL as a process of building new knowledge structures for teachers:

- *Knowledge for practice*: This refers to subject content knowledge needed for teaching;
- *Knowledge-in-practice*: This corresponds to Shulman's pedagogical content knowledge (Shulman, 1986); and
- *Knowledge-of-practice*: this is knowledge gained as teachers reflect on their teaching in order to enhance the effectiveness thereof.

2.7.1 The professional learning of teachers

PL is facilitated as teachers engage in activities where they describe, discuss, and reflect on their practices with others. This sharing and reflecting on classroom experiences represent a key strategy in the quest to improve instructional practice. Akiba (2012: 3) adds to this perspective by stating that “professional learning activities” are intentional activities designed for teachers in order to gain new knowledge about teaching and student learning. Akiba (2012) argues strongly that such intentional activities can potentially lead to cognitive changes in teachers' knowledge and beliefs if PL activities involve practice-related and job-embedded learning experiences. This corresponds to the view expressed by Tan and Nashon (2013): “Improving instructional practice as a result of PL involves shifts in beliefs and pedagogy” (p. 860). The role of beliefs in teachers' classroom actions are highlighted by Opfer and Pedder (2011) by noting that teacher beliefs about learning determines their orientation to teaching and the way their pedagogical stances are enacted in their classroom practice. Thus PL has to do with knowledge construction as well as interacting with teachers' belief systems which frames their teaching actions.

Other aspects which have a bearing on PL, relates to the settings in which it occurs as well as the types of activities in which teachers are engaged.

Liebermann (1996, 187) identifies three settings in which PL occurs:

1. direct teaching (conferences, courses, workshops, consultations),
2. learning in school (peer coaching, critical friends, action research, portfolio assessment), and
3. learning out of school (reform networks, partnerships, subject networks, informal groups, PD centres, and informal groups).

Furthermore, Akiba (2012: 12) identifies seven types of PL activities:

1. PD programmes,
2. Teacher collaboration,
3. University courses,
4. Professional conferences,
5. Mentoring/coaching,
6. Informal communications, and
7. Individual learning activities.

Adding to the deliberation about the settings and activities in which teacher learning occurs, Mc Grave and Lofthouse (2010) illuminate eight aspects of PL. These areas encompass aspects of teacher orientations such as developing a reflexive disposition, participating in professional discourse, analysing data on practice and performance, improving qualifications, classroom management, learner attributes, and engaging with issues of policy, research and theory

PL must also have cognitive outcomes related to specific content knowledge. Consequently it must also be recognised that in the contexts of shifting a teacher's pedagogical disposition, a teacher's content knowledge is critical and must be placed as priority (Benken et

al, 2008). For example, Hill, Rowan and Ball (2005) found that “teachers’ mathematical knowledge was significantly related to student achievement gains” in elementary classrooms (p. 371).

Professional learning is widely believed to be more effective when it is based on self-development and work-based learning. This perspective is by specific theories such as experiential learning (Kolb, 1984), reflective practice (Schön, 1984), process knowledge (Eraut, 1994), cognitive and problem-based professional learning (Grady, Macpherson & Mulford, 1995) and professional socialisation (Hart & Weindling, 1996). In addition, Wallace (1991) points out that learning of skilful managerial performance and support to staff and learners also falls within the ambit of professional learning.

Professional learning is enhanced when teachers are involved in activities that: 1) are sustained and continuous, 2) are coherent with teachers’ learning goals as well as with school missions and reform goals, 3) focus on teaching practices and student learning in the context of actual classrooms, and 4) provide opportunities for teacher collaboration (Desimone, 2009; Elmore, 2002; Hawley & Valli, 1999; Loucks-Horsley, Hewson, Love, & Stiles, 1998; Wilson & Berne, 1999).

2.7.2 Factors influencing the quality of professional learning (PL)

The processes involved in facilitating the PL of teachers, must also address how teachers learn. In particular teachers should be engaged in active learning opportunities which will allow them to transform their teaching and not simply layer new strategies on top of the old (Snow-Renner & Lauer, 2005). Effective PL opportunities also involve modelling the new strategies and constructing opportunities for teachers to practice and reflect on them (Darling-Hammond & Richardson, 2009).

Literature provides us with a perspective of the factors that influence teachers' PL at a qualitative level. These factors are intrinsic, extrinsic as well as systemic and structural.

According to Day (1999) these factors relate to:

- the PL history of the teacher,
- the career phase of the teacher,
- the learning disposition of the teacher,
- the quality of learning opportunities afforded to the teacher, and
- support from various agencies who are involved with teacher development.

Figure 8 below illustrates these factors, showing the causal articulation between the various factors. The Figure indicates how the teacher's own history, disposition and values as well as external agencies and structural as well as systemic orientations influence the quality of PD. The important role all these agentic factors play in the quality of CPTD is therefore of import in understanding the issues that renders teacher learning effective.

Day (1999) represents the above mentioned factors in a flow diagram (see Figure 8), starting with the intrinsic factors, flowing into the extrinsic factors and finally the systemic and structural factors.

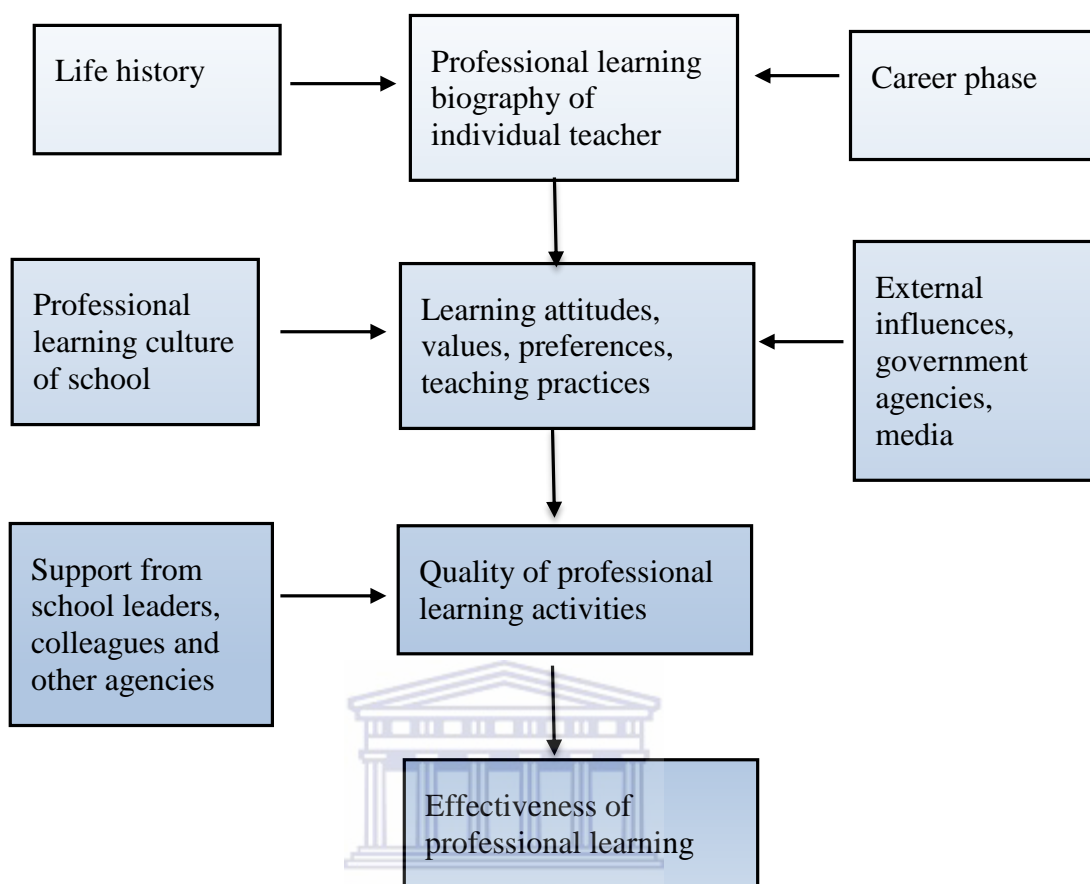


Figure 8: Factors influencing the quality of teacher learning

Darling-Hammond et al, (2009) further propose that providing intensive, content-rich, and collegial learning opportunities for teachers can improve their PL. This approach not only deepens teachers' knowledge of content but enables them to acquire new knowledge, apply it in the classroom, and reflect on the outcomes with colleagues.

2.7.3 Barriers to PL

The processes of improving teacher learning is fraught with many impediments. O'Donovan, (2008) advances the argument that even if teachers display the willingness to engage in PL activities they may not even be aware of some of these obstacles that may reside in their own practices such as the reluctance to share private practice and engage in self-reflection with peers (p. 385). Feiman-Nemser (2001) further highlights some of the system-

related impediments by arguing that some teachers are ill prepared for this journey as life-long learners by virtue of their initial training as teachers and the “sporadic and disconnected” PD opportunities provided by the education authorities.

2.7.4 Enablers to PL

Feiman-Nemser (2001) suggests that new approaches for encouraging and enhancing teacher learning are needed. In this regard one of the main proposals by Feiman-Nemser (2001) relates to PL communities as a possible way to promote this suggested improvement in teacher learning. She notes: “Teachers would form professional communities to share, encourage, critique and support each other and could form partnerships with universities to draw on their resources.” (p. 1014). Another ubiquitous approach to improving teacher learning is inherent in the Japanese Lesson Study³ methodology which encourages teachers to collaboratively plan, enact and evaluate student learning activities (Lewis, Perry & Hurd, 2009). Postholm (2012) reviewed a number of articles on PL and produced the following list of factors that enhance PL:

- (i) Peer observation encourages experimentation by teachers,
- (ii) Teacher learning thrives in a trusting environment,
- (iii) Reflection is a powerful contributor to teacher learning,
- (iv) Paired cooperation between two or three teachers enhances PL,
- (v) School culture is a contributing factor in teacher learning,
- (vi) High expectations of improvement is a strong driver of PL,

³ Lesson Study is a CPD model that offers situated professional learning for teachers through collaborative lesson planning, teaching, observing, and debriefing where teachers to reflect individually and collectively. Lesson Study originated in Japan and has been embraced by teacher educators globally because it empowers teachers and provides a collaborative structure that promotes reflection and critical dialogue about pedagogical content knowledge among teachers.

- (vii) Quality teacher learning experiences is a function of the environment in which it takes place,
- (viii) Extended opportunities to learn and using time effectively leads to efficacy,
- (ix) Engaging external expertise can enrich and deepen PL, and
- (x) Challenging and problematic discourses encourages PL.

In addition to the suggestions by the researcher mentioned in the previous paragraph, literature points to the importance of taking cognisance of learner types amongst adult learners as either a barrier or enhancer of adult learning. Honey and Mumford (1992) describes various learner types among adult learners (see Table 9 below). Understanding these learner types amongst adult learners may be of assistance in designing PL activities or at least to ensure that PD programmes encompasses a variety of learning activities in order to be effective.

Table 9: Adult learner types

Type of learner	Explanation
Activists	These are people who learn best when they can use trial and error to discover something.
Reflectors	These are people who learn best when they are given adequate time to digest, consider and prepare.
Theorists	These are people who learn best when there is a sound structure or pattern or purpose – they respond well to complex ideas and concepts and/or they question current thinking.
Pragmatists	These are people who learn best when they are given real life practical issues to discuss and are supplied with practical tips and suggestions.

(From Honey and Mumford, 1992)

2.7.5 Attributes of adult learning which may enhance PL

In addition to an understanding of various types of adult learners, providers of PL opportunities for teachers may benefit from an understanding of the attributes of adult learning. Knowles (1990) provides the following attributes of adult learning which may be effectively employed in teacher learning:

- The need to know is strong in adult learners.
- Adult learners have an independent self-concept which facilitates self-directed learning.
- Readiness to learn is inherent in adult learners.
- Experiential learning built on learners' past experiences is essential.
- Group discussion, problem-solving activities emphasising peer collaboration are effective ways of facilitating adult learning, and
- Relevance to real life situations motivate adult learners.

2.7.6 Sites for PL

Liebermann (1996) identifies three settings in which PL occurs:

1. Direct teaching (conferences, courses, workshops, consultations),
2. Learning in school (peer coaching, critical friends, action research, portfolio assessment), and
3. Learning out of school (reform networks, partnerships, subject networks, informal groups, PD centres).

The significance of this taxonomy introduced by Lieberman (1996), is that it directs our focus to the significance of a holistic view of teacher learning and that the importance of job-embedded learning should not be undervalued. The importance of job-embedded learning is that it links teacher learning to student learning in a direct way. This supports the supposition that continuous PD derives its purpose and direction from the goals of the teacher's work.

2.8 Professional Learning Communities (PLC)

From the study of the literature regarding CPD it is becoming increasingly evident that professional learning communities (PLCs) are seen as an avenue to build organic structures that could engage teachers in focused PD activities (Nelson, 2006). Linder and Calabrese

(2012) suggest that PLCs are gaining recognition as an effective strategy for promoting long term PD of teachers.

Other researchers share this view and notes that the literature on PD emphasises the efficacy of Professional Learning Communities in the quest for educational improvement. (Dufour, 2001).

2.8.1 What are Professional Learning Communities (PLCs)?

According to Leclerc, Moreau, Dumouchel, and Sallafranque-St-Louis (2012), the concept of “professional community” first appeared in the literature in the early 1990s. Riveros, Newton and Burgess (2012), however, claim that the idea of PLCs has its historical roots in education reform literature. They give examples of where the root concepts of PLCs may originate, such as the ideas of teacher reflection espoused by Dewey, peer collaboration promoted by Vygotsky, social learning as proposed by Wieck and action research by Stenhouse. This suggests that PLCs represent a collation of best practices accumulated over years, regarding school improvement and teacher development.

Literature on PLCs, however, does not provide a singular definition of PLCs. Servage (2008) notes that typically a PLC is a grouping of teachers who meet regularly with the purpose to engage in collaborative curriculum planning and development. She, however, makes the point that a PLC is more than just group work. So how do we conceptualise a PLC?

Lieberman and Miller (2008) define a PLC in general terms as a clustering of teachers who meet regularly for the purpose of deepening their content and pedagogical content knowledge with the purpose of improving student learning. Hord and Hirsch (2008) provide a more descriptive definition of a PLC:

A professional learning community consists of a group of professionals sharing common goals and purposes, constantly gaining new knowledge through interaction with one another, and aiming to improve practices. It is a cycle where learning is normally embedded into the daily work; teachers gain new knowledge, try it

out in practice, and, from the experience, gain yet more knowledge. They do this in interaction with each other, by working collaboratively (p. 3).

Burke, (2013) describes the defining characteristic of a PLC in the following way: “Teachers in professional learning communities collaborate inside and outside of one another’s classrooms and continually engage in dialogue to improve teaching and learning” (p. 250). Reichstetter (2006) produced a summarising definition from her literature review on PLCs and states: “A professional learning community is made up of team members who regularly collaborate toward continued improvement in meeting learner needs through a shared curricular-focused vision.” (p.1). Newmann (1996) identified five central elements in order to define a professional learning community: A learning community is a group of professionals who possess a common vision for student learning and agreements that involve collaborating, sharing, and reflecting on their practice and who inquire into the teaching and learning process.

Harris and Jones (2010) conceptualise PLCs in accordance with the school effectiveness and school improvement movements. These movements view the professional learning community as a powerful staff development approach and a potent strategy for school and system improvement. This means that the conception of a PLC as an intervention in schools was a means to an end. This conception is rooted in the belief that high quality PD leads to high quality teaching and that high quality teaching leads to high quality learning outcomes (Stewart, 2014).

According to Stoll and Louis (2007:2) the term ‘professional learning communities’ usually refers to teachers ‘critically interrogating their practice in ongoing, reflective and collaborative ways’ in order to promote and enhance student learning.

Professional learning communities (PLCs) hold the potential to meet the complex needs of school transformation. (DuFour & Eaker, 1998; Hord, 2004) The fundamental

underpinnings of the PLC concept are, according to Eaker and Keating (2008), to change institutional norms in teaching and governance by moving the focus from:

- teaching to learning,
- isolation to collaboration, and
- intentions to results

Hord and Hirsch (2008) advocated the following important principles according that direct the agenda of a professional learning community:

- Changing focus from teaching to learning,
- Building a culture of collaboration,
- School improvement, and
- A focus on results.

2.8.2 Factors that support the establishment of a PLC

In a study by Harris and Jones (2010) they found that the critical success factors for the optimal functioning of a PLC are:

- Respect and trust among colleagues at the school and network level;
- Possession of an appropriate cognitive and skill base that enables effective pedagogy and leads to effective learning;
- Supportive leadership from those in key roles and shared leadership practices;
- The norms of continuous critical inquiry and continuous improvement;
- A widely shared vision or sense of purpose;
- A norm of involvement in decision-making;
- Collegial relationships among teachers; and
- A focus upon impact and outcomes for learners.

It is important to note that the PLC is not just about teachers meeting together as a cluster; it involves collaborating to learn together about a topic the community deems important. As they collaborate, staff members build shared knowledge bases which contribute to enhanced possibilities for the community's vision.

Most studies documented the development of Professional Learning Communities within an individual school or schools within a single Education District. There has been very little research conducted on how this process can be implemented in a unique bounded system of schools. (Nelson, 2006)

Some of the factors that support the formation of PLCs include: (1) Creating a culture of trust and collegiality, (2) provision of time and resources for PD activities, (3) flexible programmes, (4) planning and learning together with expertise inside and outside the school, (5) accessibility of good quality resource materials, and (6) teachers as reflective practitioners (Dufour and Eaker, 1998; Dufour, 2004; McLaughlin and Talbert, 2006). Thus a PLC brings teachers together in a partnership or community that is informed by democratic practices and a transformative agenda. Democratic practices imply distributed leadership (Lambert 2003), shared decision making (Gordon, 2004) and dialogue (Dufour & Eaker, 1998; Cranston, 2011). Members of a PLC get together regularly for discussions and inquiry about curriculum issues and schooling in general. Here they engage around teaching, learning and assessment as well as contextual issues that impact on student learning outcomes (Servage, 2008). Sergiovanni (2000) posits that a strong purposeful community may be the one single most important way to improve schools. It is a way to change teaching and learning.

According to Hord (2005) there are two types of supportive conditions necessary for PLCs to function productively: (1) logistical conditions such as physical and structural factors and resources, and (2) the capacities and relationships developed among staff members so they may work well and productively together.

2.8.2.1 Physical and Structural Factors

Scheduling time to meet is considered to be one of the most important factors in creating a PLC. Boyd (1992) enumerated a list of physical factors needed in a context conducive to change and improvement: availability of needed resources; schedules and structures that reduce isolation; and policies that provide greater autonomy, foster collaboration, provide effective communication, and provide for staff development. Louis and Kruse (1995) offer a similar list: time to meet and talk; physical proximity of the staff to one another; teaching roles that are interdependent; communication structures; school autonomy; and teacher empowerment.

Related to the challenges of time and space, it may be necessary for large school staffs (those that exceed 30–35 members) to form smaller groups.

2.8.2.2 Relational Factors and Human Capacities

Bringing together individuals who do not respect or trust each other is problematic. In an article in *Educational Leadership*, Barth (2006) wrote: "The nature of relationships among the adults within a school has a greater influence on the character and quality of that school and on student accomplishment than anything else. . . . The relationships among the educators in a school define all relationships within the school's culture" (p. 8).

A PLC requires not just congenial relationships among the adults in a school, but collegial relationships and trust. Barth (2006) makes a distinction between congenial and collegial relationships. Barth's indicators of collegiality include the following: educators talking to one another about practice, sharing their craft knowledge, observing one another while they are engaged in practice, and rooting for one another's success. Whilst congenial relationships are important in a group setting, it is the collegial relationships that are essential to a PLC and collegial relationships are more difficult to establish.

Trust provides the basis for giving and accepting feedback in order to work toward improvement. Building trust requires substantial time and appropriate activities that enable the

individual to experience the trustworthiness of colleagues and to extend or become trustworthy to complete the cycle.

2.8.3 Processes in forming a PLC

The processes whereby a PLC is established are well documented in the literature, for example, Grossman, Wineburg, and Woolworth (2001) identified four stages PLC formation:

- 1) Formation of group identity and norms of interaction;
- 2) Navigating fault lines;
- 3) Negotiating essential tensions; and
- 4) Developing communal responsibility for individual growth.

These four stages identified by Grossman, et al (2001) are consistent with the stages of group formation namely forming, norming, storming and performing. Tuckman's model⁴ states that the ideal group decision-making process should occur in four stages:

- *Forming* (pretending to get on or get along with others)
- *Storming* (letting down the politeness barrier and trying to get down to the issues even if tempers flare up)
- *Norming* (getting used to each other and developing trust and productivity)
- *Performing* (working in a group to a common goal on a highly efficient and cooperative basis)

LeClerc et al (2012) highlights the importance of vision, a collaborative school culture, leadership and resources as indispensable building blocks for PLC formation. They also identifies four major factors that support the process:

- Time: forming a PLC must be regarded as a process and not an event,

⁴ Bruce Tuckman (1965) proposed the four-stage model called Tuckman's Stages for a group

- Support and follow-up: PLC leadership should walk the road alongside teachers and provide positive feedback regarding progress or deal with challenges along the way, ,
- Encouragement: Leadership at various levels should provide encouragement, and
- Involvement of teachers in decision-making.

Talbert (2010) provides us with some lessons learnt from research concerning the implementation of PLCs. Among others it is suggested that establishing PLCs firstly brings to the fore the dynamic tensions between the bureaucratic (top-down) and professional (bottom – up) approaches. The Table below exemplifies this dynamic tension:



Table 10: Bureaucratic vs. Professional approaches to the formation of PLCs

Principles for change toward PLCs	Bureaucratic approach	Professional approach
Establishing expectations and norm of approach	Mandate PLCs and their composition Require and record attendance at scheduled PLC meetings Tie compliance to teacher contract	Communicate PLC priority and model collaboration Build PLCs of principals and departmental officials Develop principals' skills in nurturing PLCs
Focusing on improving all students' achievement	Establish targets for gains in high stakes test scores for all student groups Sanction schools and teachers if they do not meet targets	Develop student tracking systems with multiple measures of individual students' academic skills Develop protocols for looking at students' work.
Creating learning resources	Use coercion for teacher participation Provide training to meet national and provincial requirements	Invest PD resources in PLC time and customised support Procure and develop skilled facilitators Build a strong support system of content specialists Use exemplars to show how PLCs achieve success Promote teacher participation in professional networks
Engendering mutual accountability for success	Require PLCs to develop plans for meeting benchmarks Require PLCs to document their implementation plans and site administrators to review them Use threat of PI status to improve student outcomes	Create an environment of trust and risk-taking Shift focus from external accountability systems to internal assessments and interventions Establish incentives for innovation Reward PLC outcomes Create a culture of sharing success and strategies.
Patterns of teacher response	Compliance: ritual enactment of PLC principles Resistance: refusal to invest time Anxiety: Fear of failing to lead or achieve change	Enthusiasm: take leadership Cooperation: engagement in designed work Wait and see: peripheral participation

(Adapted from Talbert, 2010)

Secondly Talbert (2010) suggests that we must start by developing a deep understanding of the core principles of PLCs. Establishing a PLC requires a change in culture and in this regard Talbert (2010) cautions that changing professional culture is a developmental process. This process requires coherent professional strategies, policies, and practices at all levels of the system over time. System leaders must manage context pressures and politics in ways that sustain and mobilise support for long term professional strategies for developing PLCs

2.8.4 The PLC signifier

The phrase “Professional Learning Community” consists of three words, each encompassing an important meaning (Stoll & Louis, 2007). These meanings are understood as indicating the importance, and the power of a PLC as a supportive mechanism for continuous professional teacher development (Brodie, 2013). *Professional* implies that the community’s work is underpinned by a specialised knowledge base which is discipline specific. Furthermore, the term “professional” indicates that the work of teachers requires specialist education and training in order to practice, is service oriented and governed by a strong identity of professional commitment. *Learning* connotes an emphasis on improvement.

Professional learning is focused on improving knowledge and skills which will enhance the quality of teaching, and as a consequence the learning that takes place in classrooms. *Community* emphasises the collaborative, supportive and sharing engagement between members. It points towards a relational trust between members which allows them to share personal practice. Hefner (2011) eloquently sums up this meaning as follows:

By using the term professional learning community we signify our interest not only in discrete acts of teacher sharing, but in the establishment of a school-wide culture that makes collaboration expected, inclusive, genuine, ongoing, and focused on critically examining practice to improve student outcomes (p. 14).

2.8.5 Attributes of effectively functioning PLCs

Professional Learning Communities are premised on the assumption that they provide the social interaction that deepens professional learning. They create a platform where interactive engagement toward solving educational problems is enacted (Dufour, 2004). According to Stoll and Louis (2007) the activities within a PLC include sharing and critically interrogating teachers' practices in an "on-going reflective, collaborative, and learning-oriented and growth stimulating way" (p. 2).

Sigurdardottir (2010) lists a number of attributes of effectively functioning PLCs:

1. Shared values and vision that focus on students' learning,
2. High expectations of students' learning,
3. Shared leadership that values teachers' participation in making decisions,
4. A perception of mutual support among participants,
5. Collaborative learning among participants that addresses students' learning needs,
6. Organisational arrangement that support teachers' collaboration,
7. Habits of work that encourage collaborative inquiry,
8. A social climate that supports collaborative learning, and
9. Job satisfaction and commitment (p. 394).

Collaboration between teachers is a sine qua non for PLCs to function effectively. However, collaboration is not a skill that is innate in teachers. Fullan, Hill and Crévola (2006) in their research found that there is a deep-rooted culture of individuality in teaching practices. In this regard, DuFour and Eaker (1998: 212 - 128) provide some guidelines for developing the skill in teachers to collaborate effectively:

- Time for collaboration must be built into the school day,

- The purpose of collaboration must be made explicit,
- School personnel need training and support to be effective collaborators, and
- Educators must accept responsibility to work together as true professional colleagues.

2.8.6 What are the factors that may promote sustainability of a PLC?

All indications from research suggest that for CPTD to be effective, it must be ongoing and sustained over time (Ingvarson, 2005; Hargreaves, 2007; Crowther, 2011; Teaque & Anfara, 2012; Askel-Williams & Murray-Harvey, 2015). This requires that we seriously consider the factors that promote sustainability of a PLC.

Mathews, Holt and Arrambide (2014) identified five factors that have the most influence on the establishment and sustainability of PLCs. These factors are (a) trust, (b) communication, (c) proximity, (d) team structure and (e) on-site leadership. Considering these factors it becomes clear that they are all relational factors and they have the potential to exert a powerful influence on the way a PLC operates.

According to Bickmore et al (2011), long-term engagement is a crucial underpinning for any sustained interaction between human beings. Hence the lens of long-term engagement provides a useful analytical tool in exploring the issue of sustainability.

The five factors identified by Mathews et al (2014) are the building blocks for long term inter-active engagement by participants and together, this provides the architecture on which the sustainability of any PLC is realised.

Talbert (2010) provides us with some lessons learnt from research concerning long term engagements in PLCs:

1. System change entails dynamic tensions between bureaucratic and professional approaches,

2. Deep understanding of the core principles of PLCs ground effective change strategies,
3. Changing professional culture is a developmental process,
4. Changing a system towards PLCs requires coherent professional strategies, policies, and practices at all levels of the system over time,
5. System leadership for PLCs should mobilise bureaucratic resources to implement professional strategies, and
6. System leaders must manage context pressures and politics in ways that sustain and mobilise support for long term professional strategies for developing PLCs.

Talbert (2010) highlights the dynamical nature of human interactions and suggest that these interactions requires skilful management and a profound understanding of change processes. This is an important observation since there are typical challenges that accompanies the implementation of any given educational innovation. These challenges are rejection, token implementation, mistaken implementation, replication, tinkering and crafting. Table 11 below explains these challenges.

Over and above the challenges provided in Table 11, PLCs may also be stifled by:

- A lack of focus during PLC meetings
- A lack of good ideas to be shared
- Too many abstract/theoretical inputs may be perplexing
- Getting side-tracked by administrative issues, and
- Take-over by the bureaucracy.

These negative conditions, if they manifest in a PLC may cause teachers to experience PD in the PLC context as artificial and at worst, exasperating.

Table 11: Implementation challenges

Implementation Scenario	Explication
Rejection	No implementation due to resistance resulting from conflicting beliefs; doubting own abilities to deliver; work overload; time constraints and/or family and other after school commitments.
Token implementation	This is the scenario where teachers articulate the principles and philosophy of a PLC but their actions are not aligned with their words
Mistaken implementation	Mistaken implementation is the result of a fusion between the conventional approach to CPTD and the PLC approach. The result is that the hybrid model lacks the efficacy of both the conventional or the PLC approach
Replication	This is an attempt at direct importation of the theoretical model and experiences of the orientation processes. Whilst it is a good starting point because of its scaffolding structure, it lacks contextual relevance and remains a theoretical model of a PLC.
Tinkering (level 1 adaptation)	Teachers realise that they have to adapt the model to local situations, but the adaptations is superficial
Crafting (Level 2 adaptation)	This is the desired implementation scenario for it points to internalisation of the model and its underpinning philosophy. It is also grounded in the principles of effective CPTD. The PLC model is adapted to suit the context and the needs of participants. It is customised and aligned to school and district improvement goals.

(Talbert, 2010)

On the other hand, Lieberman and Miller (2008) share some of their experiences in establishing PLCs and making sure that they are sustainable:

Because each learning community develops in its own way and within its own particular context, it is difficult to isolate a set of generic practices. What follows is a list of ways that we have seen successful communities go about their work:

- They meet regularly and take the time to build collegial relationships based on trust and openness.
- They work hard to develop a clear purpose and a collective focus on problems of practice.
- They create routines and rituals that support honest talk and disclosure.

- They engage in observation, problem solving, mutual support, advice giving, and peer teaching and learning.
- They purposefully organize and focus on activities that will enhance learning for both the adults and students in the school.
- They use collaborative inquiry to stimulate evidence-informed conversations.
- They develop a theory of action.
- They develop a core set of strategies for connecting their learning to student learning (p. 19).

It is thus important to be aware of the opportunities for professional learning that may support growth and development of teachers in a PLC supported environment. Zhussupova (2012) enumerates a number of useful mechanisms of professional learning that may be promoted in a PLC:

Table 12: Configuration of PLC learning activities

Learning partnerships with expert and experienced educators	On –line networking with colleagues	Informal conversations with colleagues
Formal studies	Reading groups	Study groups
Programmatic action research	Personal action research	workshops
Keeping reflective diaries	Writing for journals	Presentations at workshops and/ or conferences.

(Zhussupova, 2012)

2.9 Towards a conceptual framework: Essential Characteristics of PLCs

Newman and Wehlage (1995) were among the first to postulate the five essential characteristics of PLCs: (1) shared values and norms, (2) a clear and consistent focus on student learning, (3) reflective dialogue, (4) make teaching practices public, and (5) focusing on collaboration. Katz, Earl, and Jaafar (2009) on the other hand, identifies the following four key characteristics of successful PLCs (see table 13 below). According to Katz et al (2009), such PLCs have a have a challenging focus, supported by productive relationships based on trust.

They derive mutual benefits for participants through collaboration and tolerate 'moderate professional conflict, although not personal conflict. They engage in professional learning through the vehicle of rigorous enquiry into real classroom issues. These characteristics are very similar to the five dimensions of a PLC published by Hord (1997):

- (1) Supportive and shared leadership,
- (2) Collective creativity,
- (3) Shared values and vision,
- (4) Supportive conditions, and
- (5) Shared personal practice.

DuFour et al. (1998) highlights similar characteristics but choose to be more pragmatic in that he adds a results orientation based on commitments that leads to concrete actions. For the purpose of this study, I compared the dimensions of a PLC as formulated by the researchers mentioned above. This assisted me to construct my own theoretical framework. This comparison is provided in Table 13 below. A cursory glance at Table 13 shows great correspondence in the way the researchers above understood and interpreted the salient features of a PLC.

Table 13: The features of a PLC: a comparison

Newman and Wehlage (1995)	Hord (1997):	DuFour et al. (1998)	Katz, Earl, & Jaafar, (2009)
Shared values and norms	Shared values and vision	Shared purpose and vision,	
A clear and consistent focus on student learning,	Supportive and shared leadership	A collaborative culture with a focus on learning	A challenging focus on teaching and learning
Reflective dialogue	Supportive conditions	Collective inquiry on best practices about teaching and learning,	Productive relationships through trust;
Focusing on collaboration	Collective creativity	Action orientation	Collaboration for joint benefit, which requires ‘moderate professional conflict’, although not personal conflict; and
Make teaching practices public	Shared personal practice.	A commitment to continuous improvement,	Participants engage in rigorous enquiry.
		Results orientation.	

Table 13 above provides a summary of the essential features of a PLC by various researchers. The summary provides a starting point in the construction of my conceptual framework for this study. It is quite obvious that a shared vision, norms and values is primary to any PLC. The Table also shows that there should be a particular culture that informs PLC activities, the nature of these activities and the supportive structures that undergirds membership of a PLC.

Based on the context of this study a selection of the most practical features from Table 13 was included in my conceptual framework. These are also the features that I interpret as

most critical for professional learning in a PLC. The features included in the construction of my conceptual framework are the following:

1. Shared vision, norms and values,
2. Reflective dialogue,
3. Collaborative inquiry,
4. Supportive and shared leadership, and
5. Deprivatised practice

2.10 Conceptual framework

In constructing the conceptual framework that undergirds this study, the PLC features that emanated from section 2.9 are now briefly discussed. This is done in order to illustrate how they would manifest and be recognized along the growth path of establishing a PLC. This becomes important later on when I do the analysis of the data in this study.

2.10.1 Shared vision, norms and values

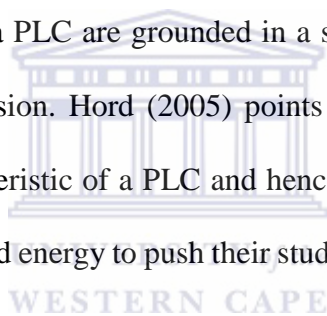
A PLC is guided by the vision that all students are capable of learning and the construction of learning environments supportive of students realising their potential. This vision serves a guiding light for participants in a PLC, since it reflects “the unwavering commitment to students’ learning that is constantly articulated and referenced in the staff’s work” (Hord, 2004, p.7).

Members of the PLC collaboratively establish the norms of engagement. For teachers in a PLC to learn collaboratively it is important that shared norms and values are established in order to facilitate collaboration and communication. Bjuland and Jaworski (2009: 24) refer to this activity as community building and indicates that this is the first phase in which participants learn to work together.

Developing norms and protocols for engagement, clarifying expectations, roles and responsibilities, setting parameters that guide relationships among members, are all steps along the way. Shared norms and values form the basis of a social contract for participants. Potari, Sakonidis, Chatzigoula, and Manaridis (2010) use the concept of mutual learning agreement to describe the collaboration among participants which includes teachers, education specialists and academics. In the context of this agreement teachers and researchers are seen as partners in an inquiry process of learning and teaching Mathematics.

This mutual learning agreement is thus based on shared norms and values and provides a basis for a PD perspective where both teachers and academics experience transformative learning⁵ by engaging in a reflective dialogue.

The values embedded in a PLC are grounded in a sense of purpose and this provides focus and commitment to the vision. Hord (2005) points out that an undeviating focus on student learning is a core characteristic of a PLC and hence provides a sense of purpose that guides their investment in time and energy to push their students towards high quality learning.



2.10.2 Reflective dialogue

Louis et al (1995) views reflective dialogue as teacher discourses or conversations about significant educational issues or problems involving the application of new knowledge. Research on teacher reflection has shown that developing a reflective stance can help teachers to systematically improve their practice. (Buzza, Kotsopoulos, Mueller & Johnston, 2013).

The idea of the reflective practitioner was articulated by Schön in 1983 and he indicated that an understanding of alternative perspectives about one's teaching lie at the heart of PD.

⁵ The concept of transformative learning stems from the work of Jack Mezirow (1975) in adult education. Transformative learning is a powerful form of learning, which not only impacts a teacher's knowledge structures, but also beliefs and world perspectives. Transformative learning involves empowering teachers to acquire new knowledge and skills that enables them to explore new ways of acting.

Fullan (2009) posits that it is only through reflection that teachers begin to question and think differently about their teaching practices. Thus one may infer that reflection on practice is an important aspect of teacher discourse. This discourse naturally revolves around student learning but is only effective if it also involve reflection on real-time classroom practice. Assessment, especially common assessments become another pillar that supports teacher reflection. Analysing the results of learner assessments is therefore one of the important processes of CPD.

Reflection involves the teaching and learning dialogic as well as assessment for and of learning. In a PLC this focus on student learning becomes a collaborative focus and the subject of reflective dialogue between participants. It is part of an ongoing process of support and feedback to all participants. Daniel, Auhl & Hastings (2013) elucidate this process as follows: “Critical reflection enacted by teachers typically includes daily personal reflection by individual practitioners on their teaching and student learning and collaborative reflection with colleagues on policy and practice” (p. 159).

Reflection and feedback is interactive and non-evaluative. However, reflection and feedback must go beyond superficial comments about what the colleague did well and what the challenges during the lesson were. Dufour (2004) expresses this shift in focus as follows: “Collaborative teacher conversations must quickly move beyond “what are we expected to teach?” to “How will we know when each student has learnt?” (p.2). This implies that the content of this reflective discourse must centre on student learning and student learning needs, and how these needs can be effectively addressed.

2.10.3 Collaborative inquiry

The purpose of collaborative inquiry amongst others, is to of identify problematic issues of practice and the collective solution seeking discourse amongst participants which it engenders. David (2008) characterises collaborative inquiry as follows:

In collaborative inquiry, teachers work together to identify common challenges, analyse relevant data, and test out instructional approaches. The idea behind this approach is that such systematic, collaborative work will increase student learning (p. 78).

Although collaborative inquiry is not an easy activity, researchers maintain that it is among the most promising strategies for strengthening teaching and learning (David, 2008). It requires guidance and support from experts to induct teachers into research skills as well as the development of collaboration skills (Nelson, Slavit, Perkins & Hathorn, 2008).

2.10.4 Supportive and shared leadership

Shared leadership refers to a team property whereby leadership is distributed among team members rather than focused on a single designated leader. (Carson, Tesluk & Marrone, 2007). They further describe this form of leadership as a relational feature in a team, involving mutual influence between team members as they pursue common objectives. These influences generally come through providing information and guidance based on expertise and experience.

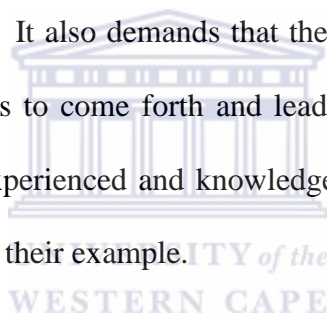
Shared leadership encompasses both formal and informal modalities of leadership. It also implies that any one of the participants may initiate or take action. Supportive leadership encourages others to take a leadership initiative and provide opportunities for recognition and celebration of accomplishment. (Sackney et al, 2005). In general the idea of leadership should be transformed from the “all-wise and all-competent” to the notion of participative leadership. As Kleine-Kracht (1993) notes: “...there should no longer be a hierarchy of one who knows more than someone else, but rather the need to contribute” (p. 393). The implication of such a statement is that school or educational leaders must walk alongside teachers and become co-learners, seeking solutions to educational problems.

Prestine (1993) identified three supporting factors in this regard:

- (1) the ability to share authority,

- (2) the ability to facilitate the work of others, and
- (3) the ability to participate without dominating.

I would argue that shared leadership also encompasses the concept of “the leader in the moment”. This concept of the “leader in the moment” pertains to the person with the expertise and experience to guide a particular activity and support the discourse in real time. This idea is supported by Sergiovanni (1994) who indicates that the source of authority for leadership in a particular situation is embedded in an individual’s ability to initiate and lead. The concept of the “leader-in-the-moment” requires a predisposition on all participants to recognise, accept as well as celebrate the courage and willingness of individuals to step out of their comfort zones and take initiative, knowing that they can count on the support of other colleagues should the need arise. It also demands that the so-called experts or academics at times step back allowing teachers to come forth and lead the dialogue. We may start this process by firstly encouraging experienced and knowledgeable teachers to lead and as time goes on, to invite others to follow their example.



2.10.5 Deprivatised practice

Participating in professional learning demands that teachers open their classrooms to their colleagues and other members of the PLC such as university lecturers and other subject specialists. Peery (2004) states that:

Professional development is meaningful and encourages positive growth only if it has an inside-out nature where teachers look inside their classrooms and determine what needs improvement. For Peery, the inside-out model emphasizes process over product, allows for participants to feel safe and engaged, and promotes reflection and collaboration with peers and outside consultants (p. 21).

Despite all indications that deprivitising practice is an effective way of improving their classroom performance, teachers are sometimes reluctant to break out of isolation. In fact few

are comfortable with inviting a colleague into their classrooms to observe their practice. (Talbert & McLaughlin, 2002). Hord (1997) posits that sharing private practice through peer observations, where teachers regularly visit each other's classrooms, is a powerful professional learning experience for both teachers involved in this activity. Thus peer visitation and providing non-evaluative interactive feedback to each other is an important stimulus for professional learning that is expected to take place in a PLC. Appendix I provides a summary of my conceptual framework in a Table.

2.11 Conclusion

In this chapter we have established the rationale for CPTD and considered the various CPTD models presented in literature. We also explored the literature that is relevant to professional learning and situated teacher learning which is embedded in the process of lifelong learning. In the final instance the literature relevant to PLCs and related issues was reviewed. This chapter ends with the presentation of my conceptual framework.

In the next chapter I now turn my attention to the research design for this thesis and explain the ontological and epistemological stances I take in my investigation.

Chapter 3: RESEARCH DESIGN

Teachers must be seen and see themselves as occupying key roles in classrooms not simply as technicians who know how to run good discussions or teach encoding skills to beginner readers but as persons whose view of life, which includes all that goes on in classrooms, promises to be as influential in the long run as any of their technical skills. It is this extended view of a teacher's responsibility that makes it appropriate to speak of teaching as a moral enterprise (Jackson et al., 1993, p. 277).

3.1 Introduction

In the previous chapter I have considered the extant literature in the field of the PD of teachers and in particular focused on PLCs as the preferred model of CPTD under investigation. Currently this model of CPTD is receiving much attention of researchers world-wide (Hunter & Black, 2011; Fullan, et al, 2006; Avalos, 2011; Desimone, 2009; Brodie, 2013). My research, though, is aimed at contributing to the literature by providing a South African perspective with respect to PLCs.

This chapter presents the research methods and research design that guided my research. At the beginning of the chapter I broadly discuss the major research designs found in the literature before introducing the research design employed in this study.

3.2 Research Methods and Research Design

This study adhered to the following distinctions: a research method refers to the techniques that the researcher uses to gather information and research design refers to the blueprint that you prepare using the research method chosen (Bryman 2004). Research design delineates the steps that you need to take to conduct and report on the research. According to Blaikie (2009) this means taking into account all the aspects that are needed to conduct the research in a meaningful way such as:

- Formulating operational questions,
- Deciding appropriate methodologies,
- Deciding which instruments to use for data collection,
- Deciding on the sample for the investigation,
- Addressing reliability and validity in the investigation and instrumentation,
- Addressing ethical issues in conducting the investigation,
- Deciding on data analysis techniques, and
- Deciding on reporting and interpreting results.

3.2.1 Research design

In this study I have adopted a qualitative research design. According to Mc Millan and Schumacher (2006:315) a qualitative research design is especially appropriate to the investigation of social phenomena. Hewit-Taylor (2001) describes the aim of qualitative research as an endeavour to interpret the actuality of the phenomenon under investigation and to enhance understanding of the experiences of the actors in the space of action as well as the meanings and values attributed to these experiences by individuals.

In the research tradition, there are of course other research designs as well. The two dominant research designs are the qualitative research design and the quantitative research design. Quantitative research involves data that may be quantified and analysed using statistical techniques. Qualitative research on the other hand involves qualitative or non-numerical data.

Having indicated the two dominant research traditions, combining qualitative and quantitative methods in a single study is widely practiced and accepted in many areas for example, in health care research (Sale, Lohfeld & Brazil, 2002). This method of combining qualitative as well as quantitative research methods in one study is referred to as a mixed-methods approach (Bryman 2004).

Table 14 illustrates the fundamental differences between the two dominant research designs:

Table 14: Differences between qualitative and quantitative research

Research orientation	Qualitative	Quantitative
Principle orientation to the role of theory in relation to research	Inductive; generation of theory	Deductive; testing of theory
Epistemological orientation	Interpretivism	Positivism
Ontological orientation	Subjectivism; constructivism	Objectivism

(Adapted from Creswell, 2013)

In order to fully comprehend the distinctions, I provide the following interpretations as supported by Sale, et al (2002) and Jonassen (1991), of the epistemological and ontological dispositions induced by the two dominant research traditions in Table 14 above.

Interpretivism: This is an epistemological stance that dictates that there are multiple realities or multiple truths, based on the researcher's construction of reality.

Positivism: This is an epistemological stance that dictates that there is only one truth and that reality exists independently of human perception.

Subjectivism: This ontological stance views reality and truth as dependent on the researcher's views and experience.

Objectivism: This ontological stance views reality and truth as independent from the researcher.

Constructivism: This ontological stance directs the researcher to accept that reality is socially constructed and therefore constantly changing.

3.2.2 Ontological and epistemological assumptions⁶

Ontology is the study of beliefs about the nature of reality and epistemology is the study of beliefs about the origin and acquisition of knowledge. This research is based on the ontological assumptions that view social reality as the social construction of social actors (Blaikie, 2009). Based on the deliberations on qualitative versus quantitative research designs in section 3.2, my research certainly subscribes to the ontological and epistemological stances informed by interpretivism, constructivism and subjectivity. This implies that this study is predicated on the suppositions that:

- (i) There are multiple realities or multiple truths, based on the researcher's construction of reality.
- (ii) The ontological stance I will adopt is one which views reality and truth as dependent on the researcher's views and experience.
- (iii) This ontological stance directs the researcher to accept that reality is socially constructed and therefore constantly changing.

The epistemological underpinning of this study is based on interpretivism: This is an epistemological stance that dictates that there are multiple realities or multiple truths, based on the researcher's construction of reality.

3.2.3 The distinction between qualitative and quantitative research methodologies

Regarding the distinction between qualitative and quantitative research methodologies, VanderStoep and Johnson (2010) expand further contrasts between the qualitative and quantitative research traditions. Table 15 below presents the main differences between qualitative and quantitative research methods as suggested by VanderStoep et al (2010):

-
- ⁶ **Ontology** = *ontos* + *logia*, which means 'being' and 'study of' the nature of reality and truth.
 - **Epistemology** = originates from Greek *epistēmē* which means knowledge, from *epistanai* to understand, know, from *epi-* + *histanai* to cause to stand.

Table 15: Contrasting the features of quantitative and qualitative research.

Characteristic	Quantitative research	Qualitative research
<i>Type of data</i>	Phenomena are described numerically	Phenomena are described in a narrative fashion
<i>Analysis</i>	Descriptive and inferential statistics	Identification of major schemes
<i>Scope of inquiry</i>	Specific questions or hypotheses	Broad, thematic concerns
<i>Primary advantage</i>	Large sample, statistical validity, accurately reflects the population	Rich, in-depth, narrative description of sample
<i>Primary disadvantage</i>	Superficial understanding of participants' thoughts and feelings	Small sample, not generalisable to the population at large

VanderStoep and Johnson (2010, p.15)

Given the deliberations on qualitative versus quantitative research designs above, my research subscribes to the ontological and epistemological stances informed by interpretivism, constructivism and subjectivity. Furthermore my research may be characterised by the features of qualitative research espoused by VanderStoep and Johnson (2010), namely:

- Phenomena are described in a narrative fashion,
- Identification of major schemes,
- Broad, thematic concerns,
- Rich, in-depth, narrative description of sample, and
- Small sample, not generalisable to the population at large

3.3 Research Approach

In order to implement the qualitative research design for this study, I have chosen to follow the phenomenological approach. Phenomenologists according to Lewis (2009) works

from the premise that human experiences makes sense to the social participants who are in fact able to express these experiences consciously.

3.3.1 Phenomenology

Phenomenology is a research approach which seeks to investigate the lived experiences of human beings in their natural environment. Through a phenomenological study the aim is to investigate phenomena and make meaning through qualitative descriptions of lived experiences. The phenomenological approach thus focusses on human experiences by researching at the individual level. Bahari (2008) states that:

The concept of phenomenology concerns how researchers view social phenomena as socially constructed and is mainly related to creating meanings and obtaining insights into those phenomena. Phenomenology also relates to the interpretive study of human experience in order to examine and clarify human situations, events, meanings and experiences (p.22).

Embree (1997) proposes a number of perspectives regarding the phenomenological approach. These approaches are listed in Table 16 below.

Table 16: Perspectives on the Phenomenological Approach.

	Phenomenological Perspective	Concerned with
1	Descriptive	How objects are situated in pure consciousness
2	Naturalistic	How consciousness constitute things in the natural world
3	Existential	Concrete human existence
4	Generative historicist	How meaning is generated in the historical context of collective human experience over a period of time
5	Genetic	Genetic meaning of things in the context of individual experience
6	Hermeneutic (Interpretive)	Interpretation of structures of experience and how things are understood by the people who lives through them and the observer who studies them
7	Realistic	The structures of consciousness and intentionality

Embree (1997)

The descriptive phenomenological approach is associated with Husserl who in general is regarded as the father of the phenomenological approach. The interpretive approach is associated with Heidegger (Hopkins 2002; Finlay, 2008).

Husserl was a mathematician and Heidegger a theologian. They both taught at Freiberg University. Husserl became interested in the study of philosophy and especially focussed on the concept of phenomenology as a methodological approach that allowed a deeper exploration of reality (Lavery, 2003).

One of the main contentions between the two was that for Husserl context was peripheral and for Heidegger context was central (Lavery, 2003). A comparison between Husserl and Heidegger's perspectives is provided in Table 17 below.

Table 17: A comparison between Husserl and Heidegger’s perspectives

	Descriptive Phenomenology (Husserl)	Interpretive Phenomenology (Heidegger)
1	Emphasis is on describing universal essences	Emphasis is on understanding the phenomenon in context
2	Viewing the person as one representative of the world in which he or she lives	Viewing the person as a self-interpretive being
3	A belief that consciousness is what human beings share	A belief that the contexts of culture, practice and language are what humans share.
4	Self-reflection and “stripping” of previous knowledge help to present an investigator free description of the phenomenon	As pre-reflexive beings, researchers actively co-create interpretations of phenomena
5	Adherence to scientific rigour ensures description of universal essences or eidetic structures	One needs to establish contextual criteria for the trustworthiness of co-created interpretations
6	Bracketing ensures that interpretation is free from bias	Understanding and co-creation by the researcher and the participant are what makes interpretations meaningful

Adapted from Reiners (2012)

3.3.2 Hermeneutic Phenomenology

In the process of exploring the research problem, this study adhered to a hermeneutic phenomenological approach and its prescripts. Plager (1994) contends that the hermeneutic approach to phenomenology is predicated on the following suppositions:

- Human beings are social dialogical beings;
- Understanding is always before us in the shared background practices;
- We are always already in a hermeneutic circle of understanding;
- Interpretation presupposes a shared understanding; and

- Interpretation involves the interpreter and the interpreted in a dialogic relationship.

These suppositions imply that we must pay due attention to the connotations of the participants' existing perceptions of their world and their relations with their given realities as they perceive them. This is the lived reality of participants and its understanding is based on a shared background and practices as well as familiarity with everyday contexts. Hermeneutic phenomenology implies that the researcher may view the experiences of the participants through the lens of his or her own prior knowledge as well as their views about beliefs about education. Hence there is no need for bracketing on the part of researchers. Bracketing is explained by Le Vasseur (2003) as an attempt by the researcher to "hold prior knowledge or belief about the phenomena under study in suspense in order to perceive it more clearly" (p. 409).

In employing a hermeneutic phenomenological approach this study makes the following distinction: phenomenology has do with description of experience and hermeneutics with the interpretation of experience. Hence this study combines these approaches by not only describing, but also interpreting the experiences of the participants in the LEDIMTALI PLC.

3.4 Research Method

As already stated in section 3.2, a research method refers to the techniques that the researcher uses to gather information. Interviews and surveys are some of the most commonly used methods in the social sciences. Hence qualitative research methods emphasise the value of individual experiences and views, as encountered in real-life situations.

3.4.1 Data gathering methods

The main methods for collecting qualitative data are individual interviews, focus groups and observations. For this study I employed an approach that is based on gathering data through

various data gathering instruments. The data gathering methods for this study consisted of in-depth semi-structured interviews with individual teachers as well as focus group interviews with selected groups of teachers across schools in order to cross check the data gathered during the individual interviews. This according to Ritchie and Lewis (2003), ensures depth and richness to the data. The following qualities of the different interview methods framed my approach to this study.⁷

Unstructured interviews with the following characteristics:

- It can be referred to as 'depth' or 'in depth' interviews;
- They have very little structure at all;
- The interviewer may just go with the aim of discussing a limited number of topics, sometimes as few as just one or two;
- The interviewer may frame the interview questions based on the interviewee and his/her previous response;
- This allows the discussion to cover areas in great detail; and
- They involve the researcher wanting to know or find out more about a specific topic without there being a structure or a preconceived plan or expectation as to how they will deal with the topic.

1. Semi structured interviews with the following characteristics:

- Semi structured interviews are sometimes also called focused interviews;
- Comprises a series of open ended questions based on the topic areas the researcher wants to cover;

⁷ These guidelines were gleaned from the following source:
[http://libweb.surrey.ac.uk/library/skills/Introduction to Research and Managing Information, Leicester/page_32.htm](http://libweb.surrey.ac.uk/library/skills/Introduction%20to%20Research%20and%20Managing%20Information,%20Leicester/page_32.htm)

- Comprises a series of broad questions to ask and may have some prompts to help the interviewee;
- The open ended nature of the question defines the topic under investigation but provides opportunities for both interviewer and interviewee to discuss some topics in more detail;
- Semi structured interviews allow the researcher to prompt or encourage the interviewee if they are looking for more information or find what they are saying interesting;
- This method gives the researcher the freedom to probe the interviewee to elaborate or to follow a new line of inquiry introduced by what the interviewee is saying; and
- It works best when the interviewed has a number of areas he/she wants to be sure to be addressing.



2. Structured interviews:

- The interviewer asks the respondents the same questions in the same way;
- A tightly structured schedule is used;
- The questions may be phrased in order that a limited range of responses may be given, e.g. 'Do you rate our services as very good, good or poor';
- The researcher needs to consider whether a questionnaire or structured interview is more appropriate; and
- If the interview schedule is too tightly structured this may not enable the phenomena under investigation to be explored in terms of either breadth or depth.

The interview processes for this study was purposefully arranged in such a way that it would engage interviewees in a deep discussion about PLCs and their understanding of the components of a PLC as indicated in my conceptual framework.

4.3.1.1 Individual Interviews

In-depth interviewing is one of the most appropriate methods of gathering data on phenomena that is not readily observable (Kvale, 2008). In this study interview questions were structured in such a way to elicit data from the perspective of the participating teachers that would relate to the processes and issues in the establishment of a PLC (See Appendix F).

The conceptual framework (see Appendix I) guided the interview process, in order to ensure that relevant data is gathered. The interview questions were purposefully crafted to generate responses that would probe teachers' understanding and experiences as well as their perceptions of a PLC and how it could function in their contexts. They were also invited to share their views on the sustainability of the project and what may be the way forward when funding for LEDIMTALI ends in order to ensure that their learning gains are sustained and that further PLC activities may be continued.

Open ended questions were posed in order to give participating teachers the opportunity to express their ideas in their own words. Interviews were audio recorded with the participants' permission. The recorded interviews were transcribed verbatim and were given back to the participants for member checking prior to analysis. Hence participants were afforded the opportunity to amend responses they deemed inappropriate or sensitive.

3.4.1.2 Focus-group interviews

A focus group interview is a technique involving the use of in-depth interviews with a number of participants at the same time. One of the distinct features of focus-group interviews is its group dynamics, hence the type and range of data generated through the social interaction

of the group are often deeper and richer than those obtained from one-on-one interviews (Kvale, 2008). For the study, two focus group interviews were conducted. The instrumentation is described in Appendix G. The sampling method for these interviews will be explained in a later section.

3.4.1.3 Self-administered surveys

This was done to gain insight into teachers' perception of the maturity of the group's understanding of a PLC. A survey instrument labelled PLC Development Profile (see Appendix B) was developed in this regard. This instrument measured teachers' understanding on a Likert type scale consisting of four (4) levels namely:

1. None,
2. Emergent,
3. Developing, and
4. Fully developed.



The levels are defined as follows:

Level 1 - Non-existent: The participant does not attach any particular meaning or implication to the feature in the context of the project.

Level 2 - Emerging: The participant attaches meaning in a semantic sense, to the feature but is not able to reflect on its implication for participating in the project.

Level 3 – Developing: The participant attaches meaning to the feature and is able to link them to the project in a limited way.

Level 4 - Fully developed: the participant understands both the syntactic and semantic meanings of the feature and can reflect on them as the underpinning reasons for engaging in the project.

McLafferty (2003) describe questionnaire surveys as a research method for gathering information about the characteristics, behaviours and/or attitudes of a population by

administering a standardised set of questions or questionnaire. In this research I found it a useful instrument to explore participants' perceptions about professional learning communities. The convenience of this method is that the data collection process is systematic and well defined and it generates group level summary statistics. A self-administered questionnaire was handed to all participants at a teacher institute and collected for analysis at the end of the day. The response rate was 65 %. Forty questionnaires were handed out and 26 were returned.

3.4.2 Sampling

The sampling approach for this study may be classified as purposeful sampling, which makes results more credible (Patton (2002)). Purposeful sampling does not necessarily produce a representative sampling, but it ensures rich data. The sampling for this investigation was purposeful in the sense that it gave the researcher access to key informants in the project. This according to Patton (2002) enhances the depth of the study since information-rich data are those data inputs from which one can learn a great deal about issues of central importance to the purpose of the inquiry.

The LEDIMTALI PLC consists of 10 schools and about 45 teachers participate in its regular activities. During the course of the 3rd year of the project, twenty-one teachers were purposively selected to participate in the study. The only criteria was that they should be active participants and at most represent two teachers from one school.

All of the participants in the study were currently and actively involved in the PLC for at least three years. Of the teachers participating in the focus groups and individual interviews, nine were identified to participate in the individual interviews and the rest participated in the focus group interviews. See Appendix C for the profile of the teachers who participated in the individual interviews.

Appointments were made to interview these teachers at their schools. The purpose of the research was explained and the consent form presented to the teachers to be interviewed.

They were also informed that participation in the interview process was voluntary and that all possible precautions will be taken to ensure anonymity and confidentiality. All the teachers invited to participate in the interview process then signed the consent forms (see Appendix E) and agreed to be interviewed.

The settings for both the focus groups and individual interviews were determined through negotiation between myself and the participants. The individual interviews took place at the teachers' schools. For this purpose, a private room was allocated to the researcher by the school principal. The interview was scheduled in such a way that it did not interfere with the teachers teaching duties.

The focus group discussions were held in a room allocated for this purpose at the venue where the last teacher institute for 2014 took place. Everyone was seated at a round Table which allowed good eye contact and a close proximity for the discussions.

3.4.3 Profile of interviewed teachers

The empirical context for this investigation consisted of 10 schools. Due to this small number of schools I chose to interview nine teachers in order to make it impossible to link an interviewee to a school. A further 15 participants were involved in the focus group interviews. This provided a broad spectrum of views from which a fairly accurate representation of experiences within the PLC could be investigated. The chosen pseudonyms are all English names to further enhance anonymity.

Teachers were sampled on the basis of a purposeful, random sampling strategy (Patton, 2002). In two of the schools, two teachers of the school agreed to participate in the individual interviews. For the rest only one teacher from a particular school was interviewed. The sample included three male and six female teachers. Three of the teachers interviewed held senior positions, namely that of Head of Department. Between them the interviewees hold 125 years of experience in the teaching of Mathematics from grades 9 to 12. This translates to about 18

years of experience each. The size of their subject departments was on average 5 teachers per school.

For the focus group interviews, I asked for volunteers during one of the focus group interviews and eliminated those who already participated in the individual interviews. The final sample included five male and ten female teachers. None of the teachers held senior positions at their respective schools. They were mostly younger teachers with an average of 12 years teaching experience.

3.4.4 Data analysis

The analysis of qualitative data is based on two important principles: transcribing the interviews and immersing oneself in the data in order to gain detailed insights into the phenomena explored (Smith & Frith, 2011). Once this has been achieved the task of analysing the data may commence. Smith and Frith (2011) indicates that there are predominantly three categories in which methods of analysing qualitative data may be classified:

1. Socio-linguistic methods that explore the use and meaning of language such as discourse and conversation analysis;
2. Methods that focus on developing theory, typified by grounded theory; and
3. Methods that describe and interpret participants' views such as content and thematic analysis (p. 13).

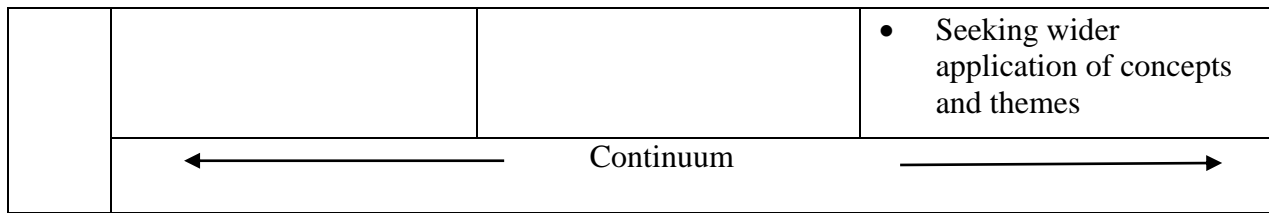
For this study I have adopted the third approach listed above. A thematic approach requires the use of analytical categories to analyse qualitative data. These categories may be derived inductively, that is, obtained gradually from the data or used deductively, either at the beginning or part way through the analysis as a way of approaching the data. Deductive analysis is less common in qualitative research, but is increasingly being used, for example, in the *framework approach* (Pope, et al, 2000).

The conceptual framework developed in Chapter 2, (see Appendix I) directed my data analysis towards the framework approach as described by Pope et al (2000). In the framework approach, the analytical categories are determined at the beginning of the data gathering process. These a priori categories in the case of my investigation relates the features of a PLC I explored, namely, Shared norms and values; Supportive and shared leadership; Reflective dialogue; Collaborative inquiry and Deprivitisation of practice.

The *framework approach* was developed in the 1980s by social policy researchers and is useful for the systematic analysis of qualitative data relating to the experiences of participants who share a common practice. See Table 18 below for an overview of all the processes involved. This feature of the *framework approach* ensures that it is analytically robust. The other distinctive aspect of the method of the *framework approach* is that although it uses a thematic analysis, it allows for flexibility between the themes since there may be links between these a priori categories or themes. Remaining true to the descriptions and the narratives of the interviewees is central to the *framework approach* (Smith & Frith, 2011, Ritchie & Lewis, 2003). Table 18 provides an overview of the *framework approach*

Table 18: Overview of the framework approach

Processes	Stages		
	Data management	Descriptive accounts	Explanatory accounts
	<ul style="list-style-type: none"> • Becoming familiar with that data • Identifying initial themes/categories • Developing a coding system • Assigning data to the themes and categories in the coding index 	<ul style="list-style-type: none"> • Summarising and synthesising the range and diversity of coded data by refining initial themes and categories • Identify associations between the themes until the whole picture emerges • Developing more abstract concepts 	<ul style="list-style-type: none"> • Developing associations/patterns within concepts and themes • Reflecting back on the original data and analytical stages in order to ensure participants accounts are accurately presented • Interpreting and explaining the concepts and themes



(Adapted from Ritchie and Lewis, 2003)

Data analysis does not take place in a linear form and one part of the process overlaps another. Nevertheless, I followed the guidelines provided by Ritchie and Spencer (1994). They posit that the process of analysis involves a number of distinct though interconnected stages. They outline six key stages in the process of analysing qualitative data: Familiarisation, Identifying of themes, Indexing, Charting, Mapping, and Interpretation

The process of data analysis begins during the data collection, by skilfully facilitating the discussion and generating rich data from the interviews. As Smith and Frith (2011) noted qualitative data is obtained mostly though participant interviews, this stage is not included in the categories identified by Ritchie and Spencer (1994) above.

The first stage of the data analysis process therefore involves the procedure of familiarising oneself with the data. This was achieved through listening to audio recordings, reading the transcripts in their entirety several times. The aim of this phase in the analysis process was to immerse oneself in the details of the interviewee narrative as a whole before breaking it into parts for further analysis. It is during this process that patterns begin to emerge and I noted these patterns as written comments made in the margin of the printed interview transcripts. This process then also involved stages 2 and 3 of the Ritchie and Spencer stages above, namely identifying common themes and indexing those themes.

I then organised interview data in a Table in such a manner that allows for the extraction of common elements or themes on the basis of the conceptual framework adopted for my study. This stage in the data reduction process also provided a mechanism to explore the links that

may emerge between the categories or themes based on the data. In this phase of that data analysis I employed stages 3 and 4, namely, charting and mapping.

Central themes and connecting concepts between them were explored using the conceptual framework adopted to the point of theoretical saturation. Saturation means that no matter how much more data is collected there would be no more concepts or themes emerging. Although I followed the *framework approach*, I also drew on the principles of the constant comparative method of analysing the data (Glaser & Strauss, 1965). The purpose of the constant comparative method of joint coding and analysis is to generate theory more systematically. Glaser and Strauss (1965) theorise that: “...the basic, defining rule for the constant comparative method is that while coding an incident for a category the researcher may compare it with previous incidents in the data, coded in the same category” (p.439). This coincided with the final step in the process of data analysis according to the scheme by Ritchie, et al (1994)

3.5 Validity

The importance of safeguarding the validity and reliability of qualitative research is well espoused in literature (Creswell & Miller, 2000; Denzin & Lincoln, 2009; Guba & Lincoln, 1998). Lewis (2009) argues that “As the qualitative researcher is often perceived as the research instrument, he or she must ensure that the information he or she reports/records is accurate, not oversimplified or misinterpreted” (p. 7).

Kvale (1996) suggests that in order to ensure that the researcher remains truthful the following aspects of data gathering and analysis must be taken into account:

- Analysis methods: are the interviews interpreted the same by different researchers?
- Answer reliability: did the researcher ask the same question in several ways?

- Coder reliability: is the interviewer asking the same thing in an unbiased manner?
- Critical checking: are all researchers asking critical questions to test the interviewee's story?
- Follow-up questions: Are all researchers using follow-up questions to ensure the collection of thick, rich data?
- Leading questions: are interviewers avoiding leading questions that may solicit a desired response, but not necessarily an accurate response
- Transcription: are interviews and observations being transcribed correctly and accurately?

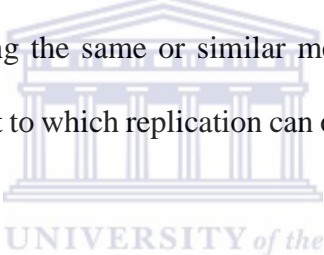
Maxwell (1992) argues that there are five types of validity that may be applicable in the qualitative research tradition, namely, descriptive validity, interpretive validity, theoretical validity, generalizability, and evaluative validity. For the purposes of this research, I particularly attended to the notion of descriptive validity which implies that the data is factually accurate, not distorted or made up. To ensure validity, I was guided by the criteria which is espoused by Merriam (2009). Verification of data validity according to Merriam (2009) involves the following actions:

- Multiple sources of data collection such as field notes drafted during the course of the engagement of participants during the various activities of the PLC,
- Member checking and focus group interviews to ensure that the data is captured accurately and represents the views of participants, and
- Triangulation by cross checking the data obtained through the various data collection methods (p.229).

To ensure validity, Merriam's criteria, was implemented. Data collection was done using various methods as described in section 3.3.3. This approach is also supported by Creswell and Miller (2000), who define validity in terms of the accuracy of representing the participants' reality of the phenomenon under investigation. This was achieved by member checking, in other words, providing participants with a copy of the transcripts of the interviews in which they were involved and asking them to check whether I had captured their views accurately.

3.6 Reliability

According to Ritchie and Lewis (2002) reliability is generally conceived as the degree to which the findings of any form of qualitative research are replicable and "whether or not they would be repeated if another study, using the same or similar methods, was undertaken."(p. 270). They go on and question the extent to which replication can occur in qualitative research. They then argue:



Because of such concerns, the idea of seeking reliability in qualitative research is often avoided. Instead, writers discuss similar issues using terms and concepts that are felt to have greater resonance with the goals and values of qualitative research. For example in discussing reliability (and also validity) a number of authors talk about the 'confirmability' of findings. There are also other terms suggested as equivalents for reliability, such as credibility, that are more closely related with validity. Others talk in similar vein about the 'trustworthiness'; the 'consistency' or the 'dependability' of the evidence. All of these features lie at the heart of reliability in its broadest sense and are key to appraising the soundness of a study (p. 270).

In the case of this study I was guided by the consistency and dependability as measures of reliability. Triangulating the data obtained from the different individual interviews as well as the data from the focus group interviews, ensured that this study met these requirements as the views expressed by the various participants do not contain any contradictions and in major areas confirm each other's views.

3.7 My role as the researcher

During the course of my research I held the position of Senior Curriculum Planner in the Western Cape Provincial Education Department. In this regard I am fairly well acquainted with the contexts of the different schools involved in the activities in the sample. This position rendered my role in the research which I have conducted, as that of a reflexive partner. Thus my role in this research project may be described as:

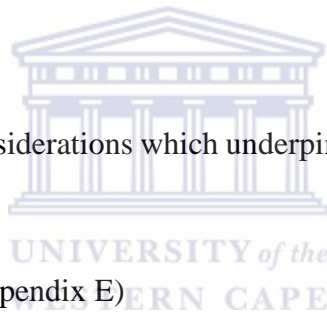
- A colleague in the PLC,
- An external facilitator attached to the department of education,
- A researcher and developer in the project, and
- A disseminator of information about the project to other audiences.

3.8 Ethical statement

In terms of the ethical considerations which underpinned my research, I attended to the issues of:

1. Informed consent (See Appendix E)
2. Anonymity and confidentiality
3. Protecting the participants from harm.

All the respondents were informed about the research and its purpose. Their participation was be voluntary. Permission was be sought and obtained from the interviewees to record the interviews. Permission was also sought and obtained from the Provincial Education Department (See Appendix H) as well as the principals of the schools where the interviews with teachers and observations of teachers were conducted. Ethical clearance was sought and obtained from the University of the Western Cape (UWC).



3.9 Conclusion

In Chapter 3 I have documented the research design, the research approach and methods I have followed to gather relevant data and to meaning fully analyse the research data. I described the qualitative research traditions with all that is implied in this design. The research data were analysed using the framework approach, giving due considerations to the criteria as I have observed them in the relevant literature in order to ensure the validity and the reliability of this research.

I now turn to Chapter 4 where I present the data. The data presentation is guided by the subsidiary research questions and follow the sequencing of these questions.



CHAPTER 4: RESEARCH FINDINGS

As a professional development model, PLCs vary widely depending on individual schools and school systems, but there are some characteristics and goals that most PLCs have in common. PLCs are based on the premise that teacher knowledge is embedded in the lived experiences of teachers and that as a result of actively engaging teachers in reflecting on their professional knowledge and practices, it is possible to alter instruction to better promote student learning (Jones, Gardner, Robertson & Robert, 2013).

4.1 Introduction

In the previous chapter I dealt with the research design for this study. I also described the methods of data gathering as well as the sampling process. In this chapter the spotlight will fall on the findings of my research.

4.2 Research findings regarding the label “Professional Learning Community”

4.2.1 Understanding and interpreting the construct of a PLC

In general the concept of a PLC has been embedded in the participants’ consciousness through their lived experiences. Teachers manifested a varied conceptualisation or understanding of the construct of a PLC as defined for this study in Chapter 1.

The first aspect of participants’ conceptualisation of a PLC refers to the way they construct meaning vis-à-vis the words that make up the phrase Professional Learning Community. In other words, I investigated the meanings that participants attached to the term, “professional”, the term “learning” and the term “community”. I also report on how they interpret the whole phrase when these words are put together.

Firstly the participating teachers interpreted the term professional in multifarious ways. For them the term “professional” has three meanings which denote three distinct dispositions, namely intellectual, behavioural and descriptive. Indicative of this perception are the comments by one teacher in focus group 1, who said that: “*Professional means we are all trained*

Mathematics teachers and we know how to teach the subject so that learners understand.” This interpretation of professional is further elucidated by the following observations illustrated in Table 19 below:

Table 19: Teacher interpretations of "professional"

<i>Teacher response</i>	Disposition implied
<i>We are all maths teachers in other words we are professional people (Erick)</i>	a descriptive disposition
<i>Professional, I would say, is a focus on your occupation as a teacher (Lee-Anne)</i>	a descriptive disposition.
<i>We relate to each other in particular way (William)</i>	a behavioural disposition
<i>We as professionals engage each other in a professional way. We observe particular norms and values in our engagement (Focus group 1)</i>	a behavioural disposition
<i>All activities are well structured (Erick)</i>	a behavioural disposition
<i>For me the word professional implies the way we engage with each other (Focus group 2)</i>	a behavioural disposition
<i>For me professional means to know my subject content (Elvira)</i>	an intellectual disposition

In this regard, there are a three meanings which were attached to the concept of “professional” as it is captured in the PLC label. These three meanings of the term “professional” may be summarised as follows: the word describes an intellectual disposition (as articulated by Elvira), a behavioural norm of engagement (as articulated by William and Erick) and description of who they are as participants in the PLC (as articulated by Erick and Lee-Anne).

Secondly, participants stated that learning as part of the PLC label, implies continual improvement in practice by updating their knowledge and understanding of both content and

curriculum issues. A typical description of this interpretation is given by a participant in focus group 2:

A PLC is a place where we learn from each other. We come together from different schools to discuss and share teaching strategies. I think it is important that we continue learning, because as teachers we must keep abreast of developments in education.

The following quotes from the interview data, are further indicators of this interpretation:

- *Learning means that we discuss Mathematics and share teaching strategies. Hence, in the PLC we are exposed to new ideas. (Focus group 2);*
- *In the project we get the opportunity to learn, not only from the university lecturers, but also from the subject advisors and other teachers (Miranda);*
- *Learning means that we should stay abreast of new developments and changes in the curriculum. (William); and*
- *For me to learn is very important. I want to be up to date with developments in education. I do not want to stagnate as a teacher. (Elvira).*

From these quotes we may conclude that the participating teachers interpreted a PLC as representing a shift from PD to professional learning.

In the third place, participants interpreted “community” as signifying psychologically safe spaces on the basis of personal and group relationships which lead to mutual support and caring. As a consequence, one teacher attached the following interpretation to the term community: *This leads to trust and openness.* Several participants highlighted other aspects of community: *Community means that:*

- *We are there for each other and when they need your assistance you do not say no. (Eleanor)*
- *We are a community in the sense that we collaborate and take decisions based on common consensus. (Erick)*
- *It is where we can relate to each other and we can talk more freely. (William)*
- *This community is based on trust and mutual respect. (Focus group 1)*
- *The outstanding feature ... is that we are all regarded as equals. (Elvira)*

Importantly, participants interpreted “community” as signifying egalitarianism⁸ and respect for each other as human beings: *We engage as equals and everybody is treated with respect.*

Another important feature which is noteworthy of the concept of “community” is that of relational agency⁹ and how it influences professional learning:

Community means you like the people who are around you. It is special because they help you to develop and make me see why learning is important. Members work together like let's say you are friends you develop each other even if you do not see things in the same way. Even here in the school they do support, like most of the time we work as a team. My experience is that we as teachers enjoy the interaction with each other. We understand each other (Arlene).

⁸ Egalitarianism refers to a social philosophy advocating the removal of inequalities among people.

⁹ In this context relational agency refers to the capacity of seeking and accepting assistance as well as reciprocating.

In summary what the participating teachers communicated regarding the way in which they interpret community, demonstrates the following understanding: Community connotes a strong relational character in a PLC where teachers mutually support and care for each other.

This coupled with the concept of relational agency based on friendships and collegial relationships, promotes social learning.

4.2.2 Teachers' perception of their levels of understanding the terms that makes up the phrase "Professional Learning Community".

In order to provide a snapshot of teachers' level of understanding after about three years of engaging in the LEDIMTALI PLC, they were asked to complete a questionnaire. Their responses were mapped on four levels, namely non-existent, emerging, developing, and fully developed. The meanings attached to these levels may be understood as follows:

Level 1 Non-existent: The participant does not attach any particular meaning or implication to the term in the context of the project

Level 2 Emerging: The participant attaches meaning in a semantic sense, to the term but is not able to reflect on its implication for participating in the project

Level 3 Developing: The participant attaches meaning to the term and is able to link them to the project in a limited way

Level 4 Fully developed: the participants understand both the syntactic and semantic meanings of the term and can reflect on them as the underpinning reasons for engaging in the project.

The findings of the survey revealed interesting trends and are represented in Figure 9, below.

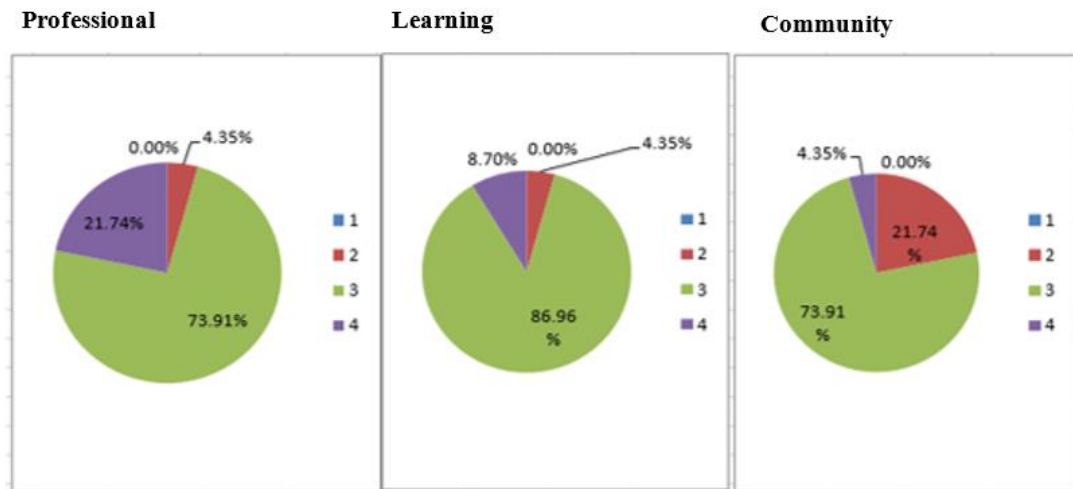


Figure 9: Participants understanding of the PLC signifier

Figure 9 conveys the follow findings:

- Most participants hold a developing understanding of the different words in the PLC signifier.
- Whilst the majority of teachers indicated that their understanding of the concept *learning*, is still developing 21,7% of participants claims that they fully understand the concept of *professional*.
- However, about 21.7% of participants indicated that their understanding of the term *community* was still emerging.

4.3 Research findings regarding the PLC Features

During one of the teacher institutes the entire group was surveyed regarding their level of understanding of the attributes of PLCs as captured in the conceptual framework used in this study. The findings of the survey on a pre-determined set of features, namely shared norms and values, reflective dialogue, collaborative inquiry, supportive, and shared leadership and sharing private practice was represented on four levels. These levels are defined as follows:

Level 1 - Non-existent: The participants did not attach any particular meaning or implication to the feature in the context of the project.

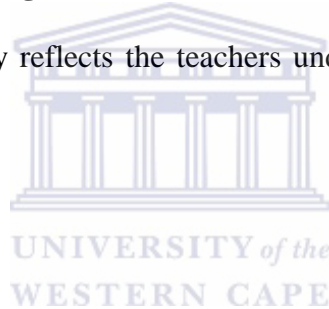
Level 2 - Emerging: The participants attached meaning in a semantic sense, to the feature but was not able to reflect on its implication for participating in the project.

Level 3 – Developing: The participants attached meaning to the feature and were able to link them to the project in a limited way.

Level 4 - Fully developed: the participants understood both the syntactic and semantic meanings of the feature and could reflect on them as the underpinning reasons for engaging in the project.

4.3.1 Participants understanding of the PLC features

The findings of this study reflects the teachers understanding as they reported on it themselves. .



The responses are summarised in Figure 10 below:

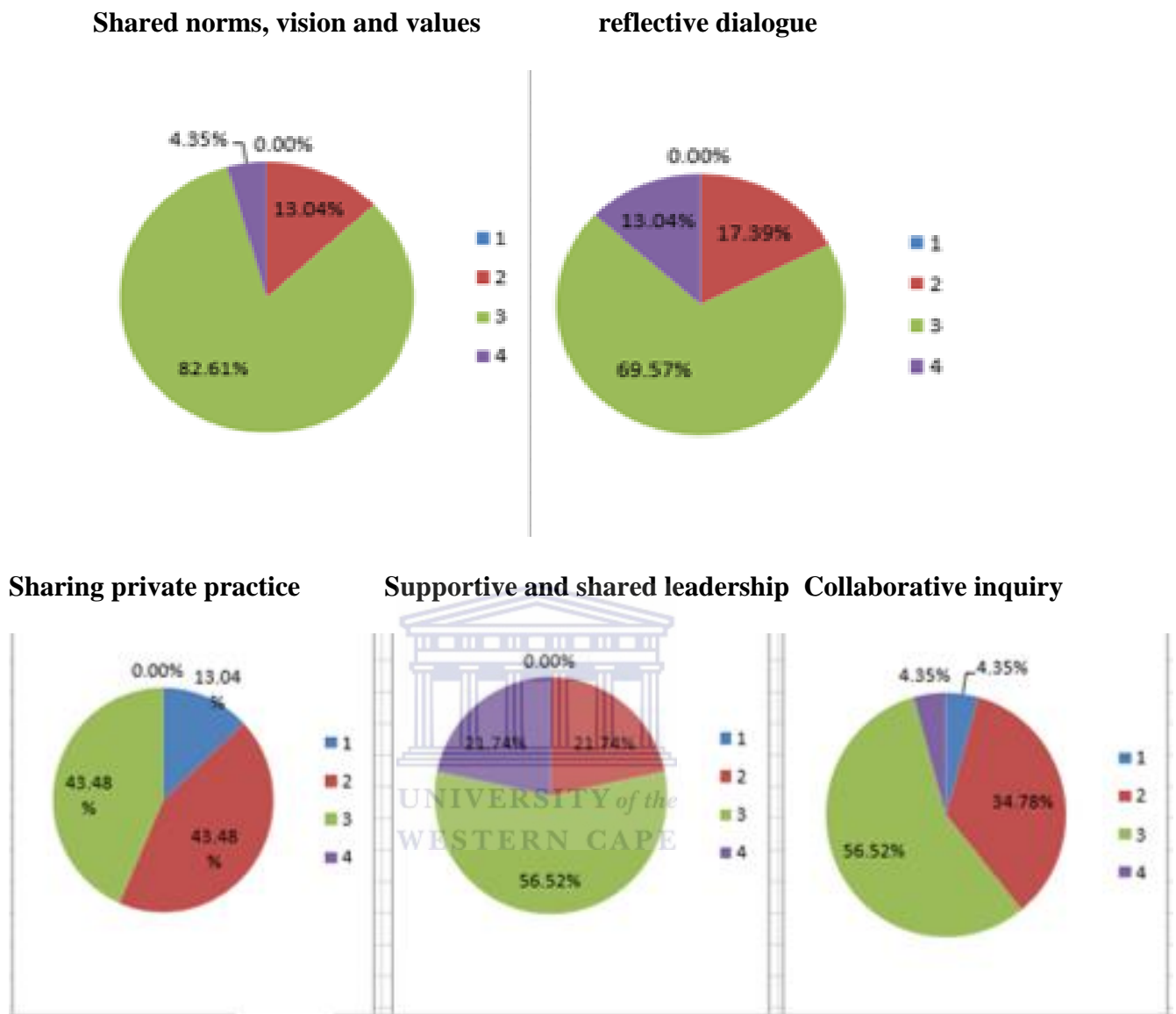


Figure 10: Participants understanding of the PLC identifiers

Figure 10 highlights the following findings:

- The two features that stood out for most participants are (1) *A common vision, norms and values* and (2) *reflective dialogue*.
- The second feature that enjoys prominence is *reflective dialogue*.
- The feature that is at the bottom of the rung in terms of its conceptualisation and manifestation in the LEDIMTALI PLC, is that of *deprivitising practice*.

In the next chapter these findings will be discussed, but for now it will suffice to note that this a snapshot of how teachers internalised and attached significance to the PLC features.

Responding to the question during the individual interviews as well as the focus group interviews: How do you recognise a PLC as opposed to just a group of teachers meeting to discuss teaching? The following responses are indicators of participating teachers' perceptions of the features of a PLC:

- Sharing best practices and resources,
- Collaboration amongst teachers,
- Being a reflective teacher,
- Relationships – feeling of belonging and acceptance as well as trust,
- Identifying with each other's problems,
- Common purpose,
- Taking responsibility in the learning of all learners,
- Opportunities for professional learning, and
- Equality among participants.

The following observation from a participant during the focus group interviews is quite pertinent in this respect:

For me a professional learning community implies that teachers from all walks of life coming together after obtaining their basic teaching qualification, to share their experiences and challenges. They learn together and learn from each other. They share resources. Working together with experts of the university is also a good thing because they bring new knowledge and research to us, but they are also teachers and so there is no difference between us, it is just that we teach at a different level (Focus group 1).

Another perspective of the teachers' experiences emerged when I mapped the participants' interpretations of the PLC features onto and the PLC features of my conceptual framework, as illustrated in Figure 12. This mapping uncovered interesting trends as shown in Figure 11 Note that the colour coding used in the diagram is simply an aid to recognise the associations easily and does not play any role in any attributes of the association.



Conceptual Framework	Teacher perceptions
Shared norms and values	sharing best practices and resources
Supportive and shared leadership	Collaboration amongst teachers
Reflective dialogue	Being a reflective teacher
Collaborative inquiry	Relationships – feeling of belonging and acceptance as well as trust
Deprivatized practice	Identifying with each other's problems
	Common purpose, interested in the learning of all learners
	Opportunities to learn

Figure 11: PLC identifiers versus teachers' perceptions

From Figure 11, it is clear that:

- Teachers emphasised *shared norms and values* more than the other characteristics.
- The Figure also indicates that *supportive and shared leadership* as well as *deprivitisation of practice* is the least emphasised features of the PLC.
- The next observable trend from the diagram is that teachers value *collaborative inquiry* and sharing between them as participants in this PLC.

4.3.2 Findings related to the features comprising the conceptual framework

In this section I report on the findings distilled from the interview data using the dimensions of a PLC according to my conceptual framework (See Table Appendix I).

4.3.2.1 Shared vision, values and norms

Most teachers interviewed, expressed the importance of having a common vision regarding the purpose of CPTD. More-over they alluded to the active promotion of this shared vision by the PLC leadership and other education administrators. This is evidenced by the quote from one of the participants: *I think that it is important for school management as well as district officials to set a vision for networking in order to improve the quality of teaching and learning for all schools (William)*

The important role that leadership plays in this regard was also expressed by other participants:

- *I think leaders at the various levels should show initiative and sell the idea to the teachers. (Elvira)*
- *Leadership must have a vision for this and promote this vision among staff members. But also they must create supportive conditions, put the necessary structures in place (Miranda)*

Participants hold the view that a shared purpose or vision introduces implicit values into the PLC. This is how Elvira expressed this notion: *We share a common purpose and this makes us to appreciate each other's ideas and contributions.*

Furthermore, teachers are of the opinion that being professional implicitly infuses particular norms of engagement and particular values that underpin collaboration: *As professionals we observe particular norms and values in our engagement (Andrew).*

In summary, regarding a common vision, norms and values, participating teachers experienced:

1. The role of leadership in providing guidance and support,
 2. The professionalism that is implicit in being teachers and teacher educators,
- and

3. A common purpose which drives the goal of continual improvement in educational practice and educational outcomes.

4.3.2.2 Supportive and shared leadership

The teachers interviewed are quite positive regarding leadership provided by the project leaders in this PLC. Andrew, for instance expressed himself as follows: *Leadership plays an important role in creating trusting relationships and instil confidence in the process. They must also ensure well organised structures and pay attention to the teachers' emotional well-being.*

Participants also fully endorsed the leadership in the PLC, especially the project leader: *I have never had the opportunity to question anything about the leadership. The organisation is good, the facilitation is good.* One of the other interviewees especially mentioned the fact that he equally accepted them and treated them all in the same way, even knowing everybody by name. In the words of Arlene: *I think the leadership makes everyone feel welcome, they treat them equally. You can see the prof, he knows all of us and then he speak to all of us equally.* When probed as to why they appreciate the way that the project leader treated them she responded: *Patience! Prof. understands that there are other people who do not quickly understand. He is very patient with us.*

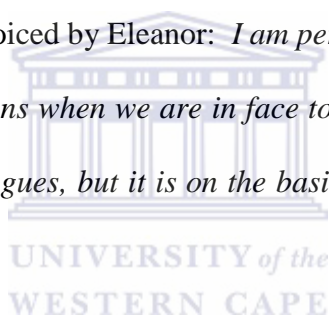
Furthermore, there was reference to the aspect of empathy or the lack thereof. There is a feeling that leadership must also attend to the personal and emotional issues that teachers grapple with. This sentiment was expressed by one of the participants during the focus-group interviews:

Maybe more of that is needed seeing that the levels of frustrations of teachers are relatively high. So they also need to discharge that as well. It comes across during the non-formal discussions between us. Maybe we should create a platform to discuss these frustrations.

4.3.2.3 Reflective dialogue

The interview data reveals that teachers in general accept the importance of being reflective practitioners. They do, nevertheless, indicate that opportunities to reflect with colleagues are limited as a consequence of organisational arrangements at their schools. Andrew remarked on this feature of the PLC as follows: *Usually when we meet, we discuss our progress as teachers. We discuss the results of our tests, and to intervene, working with those learners who failed in the tests.* Eleanor describes this discourse as: *We are looking for solutions in a collaborative way - we become like a support group for each other when we encounter problems in teaching.*

The fact that this reflective dialogue does not always take place outside of workshops and teacher institutes, is further voiced by Eleanor: *I am personally concerned that it does not really happen beyond the occasions when we are in face to face meetings. Ok I have started to make contact with other colleagues, but it is on the basis of friendship. I will phone them and ask for assistance.*



4.3.2.4 Collaborative inquiry

The data highlights the fact that the LEDIMTALI PLC participants are committed to seeking solutions to the educational problems they encounter, for example, Eleanor feels that: *We are looking for solutions in a collaborative way.* Elvira also articulates this commitment: *As teachers we also saw this as an opportunity to improve our own knowledge and teaching methods, since maybe our current teaching methods are outdated or does not work anymore.* She is supported by Erik who says: *We feel that it is important to continually improve ourselves in order to increase the learning of our children. Especially in a school like ours where the learners have a disadvantage and lags behind.*

Furthermore, for these teachers collaborative inquiry also means experimenting with new methods and giving feedback to each other as to how it

works in their classes, for example, one interviewee reports: *The spiral revision for me is one of the most outstanding features in LEDIMTALI. It works for me and helps to consolidate the learning of my learners.* Further examples in terms of experimenting with new ideas comes from the following interviewee: *The other thing is how we analyse our question papers, it has improved the quality of my test and exam papers. I also benefitted from certain methods I have learnt there and it has boosted my self-confidence tremendously.*

4.3.2.5 Deprivatised practice

The following statement is indicative of the fact that teachers find it challenging to open their classroom for visitors to observe them in action. *Safety, both psychologically and physically is important for our well-being and confidence to allow a colleague into your class. Even just showing the video clips of some teachers teaching, can be threatening, but if we trust each other we are not afraid to be observed and reflect on our practice.*

However, teachers did express the view that allowing the fieldworkers into their class may have positive consequences: *When the fieldworkers visit our classes they are there to support us and assist us.* The notion of class visits as “inspection” is typical of how some teachers responds to anybody observing their class: *Also we do not appreciate anybody checking up on whether we are doing our work.*

In the LEDIMTALI PLC there was a concerted effort to encourage peer observation and non-evaluative feedback. This strategy was not met with any resistance as teachers generally held the view that visiting and observing each other’s classes was not problematic. A typical response during the interview process conveyed the following stance:

There’s no problem, because we even discuss in our departmental meetings, that if you see someone else going into your class, he is not

there to judge or whatever. He is there to gain or to learn and anyway to assist in the way you are doing things. (Arlene).

From the interview data it was apparent that organizational arrangements at the school level remains a barrier because of their full teaching schedules and after-hours commitments. The one way in which peer visitation was facilitated in the LEDIMTALI PLC was to release a teacher by having the fieldworkers take over their classes for certain periods: *Yes, it was a lot easier when they were here because they would take one of your classes and you can visit your colleague. Otherwise you can only do that when you have a free period.* This perspective was confirmed by another interviewed teacher:

We actually only have time to do that if the fieldworker visits our school, because he then substitutes for us. We would normally not stay the entire period; say we only stay for half the time. Then when we meet we share our observations and give feedback to each other. We always try to give positive feedback and not criticize.

In some of the schools the interviewees reported that this peer visitation could actually not take place because of the time tabling arrangements. This was explained by Arlene:

No it was not possible to visit other colleague's classes. . We were trying to do that, but the problem is the time Table, time does not allow us to do that. We have many classes ourselves which we have to teach.

4.4 Findings in terms of other opinions expressed by teachers:

4.4.1 The lack of networking

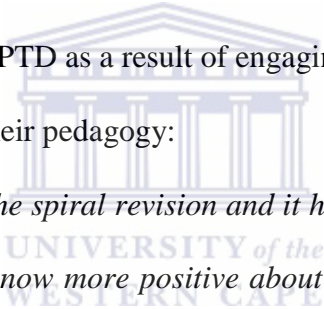
Networking among teachers from different schools according to William is not happening often enough. *I think there is only one teacher that I interact with from the group, so currently the networking is not happening.* This lack of contact with each other beyond the workshops and

teacher institutes is one of the drawbacks of having a PLC that spans the boundaries of different schools. The use of social media has been suggested as a possible solution. However research shows that extending PLCs to include teachers from different schools may have the effect of diluting the community dimension of such PLCs (Stoll et al 2007; Hargreaves 2007).

In the context of subject specialisation in high schools, crossing boundaries of schools is inevitable, hence ways need to be explored to make PLCs across different high schools viable and effective. Hargreaves (2007) suggest that the pedagogical diversity offered by such an arrangement is rich enough to justify the investments in time and resources in such PLCs that consists of teachers from neighbouring schools. This view is supported by Bolam (2005).

4.4.2 The impact of CPTD

Regarding the impact of CPTD as a result of engaging in a PLC some teachers already started to implement changes to their pedagogy:



Yes, we have started the spiral revision and it helps our children a lot. Also the teachers are now more positive about teaching Mathematics and we now share a common concern about the learning of our children, especially in Grades 8 and 9 since their performance is not so good. Now we find, even if a colleague is not involved with teaching Grades 8 and 9, they are prepared to help by giving extra classes.

Eric voices the opinion that:

The spiral revision is one of the most outstanding features of LEDIMTALI. It works for me and helps me to consolidate the learning of my learners. The other thing is how we analysed our question papers, it has improved the quality of my tests and examinations. I also benefitted from suggested methods. I have learnt there (the PLC) and it has boosted my self-confidence tremendously.

We may thus draw the conclusion that there were positive improvements with respect to classroom practice due to teachers' participation in the LEDIMTALI PLC. Teachers reported improvements, either in practice or in learner performance or in the way that they began to function as a Mathematics department at school. Besides improving their knowledge and skills as teachers, they were affected personally in terms of their self-efficacy and self-confidence as teachers of Mathematics.

4.4.3 Dealing with diversity

With respect to dealing with diverse views or opinions amongst participants, Andrew is of the opinion that *LEDIMTALI is welcoming and accommodative. When there is a divergence of opinion or a disagreement the leader let us discuss in order to reach a common understanding.* In this he is supported by the views of many other participants. This is what was said during the focus group interviews: *A PLC is where teachers from different schools get together to share ideas. We work as a team. In the PLC we are treated as equals and this leads to openness and trust. Even if we differ, we see that as an opportunity to learn.* The last comment indicates that the culture that developed in the PLC was robust enough to mediate issues relating to diversity in its various manifestations. Another indicator of accepting diversity in terms of language, race and culture is captured in Erick's statement: *I have never had problems with diversity because South Africa is a diverse country. It is part of everyday living. This actually contributes to enriching ourselves.*

4.4.4 The quality of facilitation

Regarding their expectation of facilitation within the PLC one teacher felt that they had high expectations of the facilitators: *I expect the facilitators to be knowledgeable on their topic and to be able to answer the teachers' questions. Humility and patience are important characteristics of a good facilitator.*

4.4.5 The role of leadership

Evans (2014:179) makes the following statement: “It is consensually accepted that educational leaders should promote and facilitate professional learning and development in their schools.” recognising that “...the effective leader creates an environment in which others can grow professionally” (p.180). This view as espoused by Evans (2014) is echoed by the response accredited to: *Leadership plays an important role to create a safe and conducive atmosphere which is necessary to develop openness and trust.* Teachers had high regard for the PLC leadership. Furthermore leadership should also come from school administrators as Lee-Anne proposed when asked how school management and district subject advisors can promote collaborative learning: *To my mind it is about showing leadership. Leadership must have a vision for this and promote this vision among staff members. But they must also create supportive conditions and put the necessary structures in place.*

4.5 Barriers to PLC formation.

In seeking an answer to the third subsidiary research question: What are the factors that promote or hinder the establishment of a PLC amongst Mathematics teachers across different schools in the LEDIMTALI project? A question was set during both the individual and as well as the focus groups interviews. The next section present the findings. Eight possible barriers were identified, and these are listed below.

4.5.1 Time as a barrier

This is how Arlene described this challenge:

Teachers spend long hours at school. This is one of the contributing factors for poor attendance at cluster meetings. Even calling a meeting on a Saturday is problematic because they have to attend to their personal affairs over the week-end since they do not find time, for

example, to go to a bank on weekdays. The second aspect is support that we need from the principal and the district officials. We need acknowledgement from administrators. I do not think that finances are necessarily a barrier. A factor that may motivate us to engage in such a PLC is the concern about our results in Mathematics. If teachers realise that such collaboration will be beneficial to their pupils' performance they will make time to attend the activities of such a PLC. I believe that if the department gives us an entire day for professional development, it will be a good idea.

This was confirmed during the focus- group interviews by one participant who stated:

I think time is a huge constraint. At our schools we are all very busy and we work long hours. So we do not really have time to get together as often as we wish. I think we should network on the social media such a WhatsApp. I have noticed that this medium allow us to communicate as a group where we all can see and respond to what a colleague posts there.

During the other focus group interview this was confirmed as:

Time is the greatest barrier. It becomes difficult to collaborate outside the workshops and teacher institutes. However, this problem can be overcome through creating a website with a chat forum or even set up a face book page for the whole group.

4.5.2 Diverse personalities as a barrier

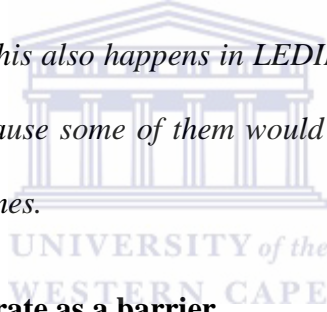
It is inevitable that personality clashes will occur in a PLC. The indication that this was also the case in the LEDIMTALI PLC comes from one of the participants who remarked: *Some*

teachers have strong personalities and are difficult to convince. This is sometimes a stumbling block.

4.5.3 Unwillingness to engage as a barrier

This for example was verbalised as follows:

- *Teachers are sometimes not open or willing to admit that they do not know something, for example If I have to teach say exponents and I am not sure how to approach my lessons, I would rather ask my colleague who I trust how she teachers exponents.*
- *One of the stumbling blocks is that some people are hiding in the group and do not engage. They just go along but never make any contribution. This also happens in LEDIMTALI. Yet they have good ideas because some of them would talk to you afterwards during break times.*



4.5.4 Unwillingness to collaborate as a barrier

It is surprising to note that there are teachers, even though they have been part of the project since its inception who are not open to collaboration. Indicative of this state of affairs is the comment by William:

A second stumbling block is that schools for various reasons, are not keen to work together. In my case, I tried to arrange with our neighbouring school to write a common paper for grade 12. They did not want to come to the party and I do not know why. Another finding is that schools are not collaborating with each other outside of the face to face interactions at workshops or teacher institutes.

This is, however, not true for all schools. This observation was conveyed by William during my interview with him: *Very little networking and collaboration is taking place outside the workshops and teacher institutes. Where it actually happens it happens on the basis of friendships already established.*

4.5.5 Resources as a barrier

It is generally recognised that effective PD needs the deployment of resources, including financial, material and human resources. In the South African context, schools do not as a rule receive funding for implementing PD activities. William indicated that: *Basically there is also a need for resources or funding to ensure that we can engage in the activities of LEDIMTALI in a space which is conducive to learning and collaboration.* Andrew concurred that: *Transport and finances can also be a barrier to attending the workshops and teacher institutes.*

4.5.6 Workload and personal commitments as a barrier

Findings in this study indicated that workload at school and family or other after school commitment such as involvement with extramural activities at school level are barriers to PD and engagement in PLC activities. Indicative of this is the statement by Elvira:

Our workload as teachers also works against the desire to engage in professional development activities. Time constraints because of work and family commitments also are a challenge. This is supported by the teachers in the focus group interview: Yes we have other commitments besides teaching. This makes our workload very heavy and thus we do not have the time to attend workshops. So workload and time is a barrier.

4.5.7 Leadership as a barrier

Leadership plays an important role in creating the conditions for teachers to become involved in a PLC. So it is no surprise that participating teachers identified an autocratic leadership style as a barrier. *Some of our superiors still have a very autocratic leadership style. They are very authoritarian in their management style.*

4.5.8 Conflict as a barrier

In the LEDIMTALI PLC, participants were quite aware of the potential of conflict when groups of teachers meet. Whilst they did not directly refer to potential conflict situations, from their responses it is easily inferred that they had potential conflict in mind when they made certain utterances. For example: *Some teachers have strong personalities and are difficult to convince. This is sometimes a stumbling block.*

Teachers who were interviewed also referred to issues such as competitiveness among participants as well as the two levels at which conflict may arise. The focus group interviews also highlighted this aspect of potential conflict in the learning community by noting that:

A PLC is a group of people from different backgrounds working together. However, working around a common purpose should ensure that here is no competition amongst us and we are treated as professionals who also can make a contribution to the discussions. No one pulls rank and forces their ideas on us. The venues where we meet is nice and relaxing so that we are at ease and build good rapport with each other. In fact we enjoy each other's company without feeling the pressure of work.

4.6 Enablers to PLC formation

In seeking an answer to the third subsidiary research question: *What are the factors that promote or hinder the establishment of a Professional Learning Community amongst Mathematics teachers across different schools in the LEDIMTALI project?* A question was set both during the individual as well as the focus groups interviews. The next section considers the findings. Six possible enablers were identified, and these are presented in the numbered list that follows.

4.6.1 Recognition

Recognition by SMTs and other educational administrators: William expressed the view that SMTs at school can make a PLC work effectively if they recognise and even formalise participation: *School management and even district officials have a role to play. They should set the vision and release the resources for us to engage in the PLC.*

4.6.2 Relational agency

Relational agency refers to the capacity of the participants to seek assistance as well as to offer assistance on the basis of the relationship that was established in the PLC. Eleanor uses the concept of a support group to describe relational agency and she articulates it in the following way: *We are looking for solutions in a collaborative way – we become like a support group where we can phone each other when we encounter problems in teaching. A support group means like you are there for each other and when they need you for assistance you do not say no.*

4.6.3 Structure

Teachers prefer to participate in events that are well organised and structured and they view this as part of the professional way in which CPTD is organised in the PLC: *“We do not engage in anything unplanned and unstructured”* is how Erick expressed this sentiment.

Structures do not only refer to the way CPTD activities are designed and enacted, but it also links to some of the other enablers below, such as leadership structures, norms of engagement and physical resources which are made available for this purpose.

4.6.4 Leadership

The role of leadership is highlighted by Lee-Anne when she says that *Leadership must create supportive conditions and put the necessary structures in place*. This view was confirmed in the focus group interviews. One of the participants had this to say: *I think that the organisers play a big role in the effectiveness of the PLC. In this sense leadership is also one of the enabling factors because they must create a safe environment for us*.

Literature supports these views: For instance, Protheroe (2005) emphasised that the leader's role in a PLC is vital to its successful implementation and sustainability. Hord and Sommers (2008) likewise pointed to the key role that school principals play in creating the conditions for teachers to establish a PLC. This view is supported by Balyer, Karatas and Alci (2015): "By creating a PLC, principals create an environment encouraging mutual cooperation, emotional support, personal growth, which cannot be accomplished alone" (p. 1342).

4.6.5 Resources

William expressed a similar view that SMTs at school can make a PLC work effectively if they recognise and even formalise participation: *School management and even district officials have a role to play. They should set the vision and release the resources for us to engage in the PLC*. These resources include time, money, and interest in the PLC work.

4.6.6 Dealing with conflict

There are various factors which may mitigate potential conflictual situations in a PLC. These factors as they emerged in this study, relate to: (a) a common purpose, (b) non-competitive working relations, (c) absence of hierarchies and, (d) conducive and relaxed

working environments. The quotes below indicate that participating teachers tacitly accepted certain norms of behaviours. This led them to infer that the quality of interaction which they referred to a professional behaviour, minimised the potential of conflict and enhanced working relationships:

- *The way we engage with each other is also indicative of this professionalism.*
- *We help each other and not criticize or insult.*
- *No one pulls rank and forces their ideas on us.*
- *...it is good to be open and listen to other people's input.*
- *I think people should have the courage to speak their mind. This conflict does not mean disunity, but by considering different opinions, that is how the group will grow.*
- *A PLC is where teachers from different schools get together to share ideas. We work as a team In the PLC we are treated as equals and this leads to openness and trust. Even if we differ, we see that as an opportunity to learn.*
- *There must be discipline or commitment.*

4.7 Impact on subject department culture and classroom practice

The teachers reported that they are now starting to experience certain changes in the way their subject departments operate:

- Teachers now meet in Grade groups to plan and moderate each other's assessments.
- Teachers now reflect on own practice and identify areas for improvement.
- We share teaching strategies more than what we did in the past.
- Also we have learnt how to analyse our test results and structure interventions.

- LEDIMTALI definitely impacted on the culture in the subject department at school.

4.8 Sustainability

When I posed the question: What about sustainability for the future, Elvira responded by saying: *I am of the opinion that if we form such a PLC with schools in our immediate environment, where we as teachers can share and present, I think it would be sustainable.* To this Eleanor added: *I also feel that the departmental officials should play a greater role to facilitate this networking.* This view was supported by William who said: *I think it is important that school management as well as district officials should sell the idea to teachers.* However, Lee-Anne felt that teachers should also take responsibility for their own PD. In focus group 1, the sentiment that participants need to start something in their immediate locality was put forward: *I think that we as participants must go back and start clusters with our neighbouring and feeder schools.* Gloria on the other hand feels strongly that smaller groups are the way forward:

I think that from LEDIMTALI we should form smaller groups in our area so that it is easy to get together and stay in touch. In this way we can also reach out to our feeder schools and involve them in the same type of professional development activities. This will actually help to bridge the gap between the high schools and the primary schools and stop playing the blame game.

She goes further to point out that even the teacher unions have a role to play in this regard: *Maybe the teacher unions can also play a role, because they also focus on developing teachers. They can enhance networking as their members will easily buy in.* Other participants, however, expressed the view that teachers are most likely to engage if there is no prescription

from administrators. Administrators should ideally support the initiatives by teachers themselves to start networking.

What these teachers are alluding to is, firstly, that with departmental support, a PLC could be sustainable provided that it is localised. Other respondents included the support and encouragement of school management as well as the teacher unions. They go further and emphasise teachers' own commitment to CPD. Other issues emerging from the responses of participants involves incorporating the feeder primary schools as this will mediate the finger pointing across the high and primary schools in terms of the quality of Mathematics teaching at these institutions.

4.9 Conclusion

In general the most important finding is that the concept of a PLC has been embedded in the participants' consciousness through their lived experiences. Their understanding of what the phrase "professional learning community" implies was on a developing trajectory with most participants being able to explain the significance of each term sufficiently well. Teachers experienced the five core dimensions of a PLC positively and could give an account of their experiences. The interview data confirms that leadership plays an important role in establishing the vision for a PLC and directing its activities. Time, resources and organizational arrangements at the school level remains barrier to the effective functioning of the PLC.

Sustainability is possible if the following stakeholders are on board: the officials from the department, school management, teacher unions and most importantly the teachers themselves.

In Chapter 5 I engage in a discussion of the findings as reported in this chapter.

CHAPTER 5: Discussion of findings

Teacher professional learning is a complex process involving the interconnectedness and interdependency of teacher agency, the initiative itself and the pivotal role of support. (King, 2014:103)

5.1 Introduction

The purpose of this study was to investigate a model for the sustainable CPD for Mathematics teachers in the Western Cape through an alliance between teachers, didacticians and education officials. The main research question that guided the study was: What are teachers' lived experiences of the endeavours of establishing a PLC. In order to investigate the main research question, subsidiary questions were formulated:

- How do teachers in the LEDIMTALI project make meaning of the concept of a PLC?
- How do teachers experience the salient features of a PLC?
- What are the factors that promote or hinder the establishment of a PLC amongst Mathematics teachers across different schools in the LEDIMTALI project?
- What are the factors that may promote sustainability of a PLC as perceived in the LEDIMTALI project?

5.2 Discussion of Research findings

In chapter 4, I presented the findings of this study. Summarising these findings, the study concludes that teachers embraced the construct of a PLC. However, their understanding of the significance of the PLC label was varied. Teachers also attached more importance to the terms *professional* and *learning* than was the case regarding their interpretation of the construct of *community*.

In terms of the features of a PLC as captured in my conceptual framework, they emphasised that they experienced some of these features more than the others. For example,

deprivitisation of practice was very low on the profile of teachers understanding of the five features of a PLC. Similarly teachers emphasised the supportive dimension of leadership more than the dimension of shared leadership. Teachers embraced an extended meaning of the term professional and linked it to the PLC features of a shared vision, norms and values. This clearly represents an advancement over the view in literature that limits professional to a collective identity and an intellectual disposition. In this regard this study made significant contributions to the current conceptualisation of PLCs.

The most significant finding of this study was that the participating teachers interpreted a PLC as representing a shift from PD to professional learning. This is important for two reasons:

1. Teachers are now aware of their own responsibility for their professional growth and development.
2. CPTD no longer puts the emphasis solely on learner performance, but on lifelong learning for the sake of personal growth and development.

The study also revealed that teachers in the project are keen to continue with the PLC structure although more confined and localised to a network of schools closely clustered in terms of geographical location. The finding of this study demonstrates the vital importance of teacher commitment, support by the organised teacher formations as well as recognition and deployment of resources by education leaders and administrators for the sustainability of such PLCs.

The discussions will be framed by the subsidiary research questions.

5.2.1 Teachers' conceptions of a PLC

In this section I discuss the findings related to the first subsidiary question:

How do teachers in the LEDIMTALI project make meaning of the concept of a Professional Learning Community?

I refer to the label attached to the PLC model as the PLC signifier. This study is predicated on the supposition that the PLC signifier needs to convey meaning to the participants. Morrissey (2000) suggests that the term professional learning community defines itself. Hence the first subsidiary guided this study to explore how the participants in the PLC that served as the testbed for this study made meaning of the *phrase professional learning community* and if indeed the term professional learning community is self-explanatory. In taking this stance I am guided by the fact that retrospective reflection on their experiences by the participating teachers and considering the PLC signifier as the object of this reflection allows us to gain insight into the teachers' experiences.

Stoll and Louis (2007) indicate that the phrase “Professional Learning Community” consists of three words, each encompassing an important meaning. These meanings may be interpreted as indicating the importance, and the power of a PLC as a supportive mechanism for continuous professional teacher development (Brodie, 2013). According to Brodie (2013) the power of PLCs resides in a deliberation about, and a conceptual understanding of the PLC construct as a mechanism for CPTD: “Without proper thinking, planning and commitment, professional learning communities will not live up to their promise. With proper thinking, planning and commitment, they can provide safe and challenging spaces for profound and powerful teacher learning and growth” (p 15).

Decoding the meanings of the three words in the PLC signifier is then one way of relating the teachers' lived experiences in the PLC to myself as the researcher. This argument is based on the fact that the discourse about PLCs as CPTD structures must necessarily also involve an interpretation of the PLC terminology and how it relates to the activities enacted in the course of CPTD programmes. This then would be the value of exploring the teachers' interpretation of the three terms that make up the signifier, professional learning community.

5.2.1.1 Teachers' interpretation of the term "professional"

This study found that the participating teachers indeed attached meaning to the label Professional Learning Community. In the first instance, the term professional was interpreted in different ways. For them the term "professional" has three meanings which denote three distinct dispositions, namely intellectual, behavioural and descriptive. These different but complementary meanings attached to the term professional may be explained as follows:

- The *descriptive connotation*: we are all teachers of Mathematics and therefore we are professionals.
- The *behavioural connotation*: namely as teachers we behave and act in a certain way with our colleagues.
- The *intellectual connotation*: we are trained Mathematics teachers and so we are specialists in the subject.

The extant literature supports these findings, for example, Day (1999) observed that teachers in England also differentiated between "*being a professional*" and "*acting as a professional*". This resonates with the descriptive and behavioural connotations that teachers attached to the concept professional. In fact Evans (2014) goes further and identifies three dimensions of professionalism, namely, behavioural, attitudinal and intellectual. She explains that the behavioural dimension relates to what the practitioner physically does at work; the attitudinal dimension relates to attitudes held and the intellectual dimension relates to practitioners' knowledge and understanding and their knowledge structures. (p. 189).

An important findings of this study in this regard is that it confirms the views of Stoll and Louis (2007):

The word professional suggests that the community's work is underpinned by a specialized and technical knowledge base; a service ethic, orienting members to meet client needs; strong collective identity through professional commitment; and professional autonomy through collegial control over practice and professional standard (p. 3).

These researchers highlight characteristics which are congruent to the findings of this study. The nature of the congruence is illustrated in the Table below:

Table 20: Ways of interpreting the term “professional”

Interview data: teachers’ depiction of the term professional	Stoll and Louis’s (2007) depiction of the term professional
The descriptive connotation: Mathematics teachers	Collective identity
The behavioural connotation: as teachers we behave and act in a certain way with our colleagues;	Service ethic
The intellectual connotation: we are trained Mathematics teachers and we know the subject	A technical knowledge base

Stoll and Louis (2007), on the other hand, also characterises professionalism by relating the construct to the autonomy that professionals enjoy as a consequence of being a professional. In this regard the experience of the PLC participants in this study is at variance with literature. The reason for this divergence is located in the nature of education administration in South Africa. What we currently experience in the South African context is one of a high degree of centralisation driven by a culture of performativity and accountability (Spaul, 2013). This culture in education governance in South Africa does not allow teachers to exercise a measure of professional autonomy.

The teachers in this study attached an interpretation that also links the term professionalism to particular norms and values. My argument around this finding is that it is an important extension to the meaning of professional, since it goes beyond the notion of collective identity because it also specifies how teachers relate to each other in this collective.

It immediately provides a link with one of the important features of a PLC, namely,

shared vision, norms and values. Hence it brings about an important awareness of the values and norms that underpin the relational nature of a PLC.

5.2.1.2 Teachers' interpretation of the term "learning"

With regard to *learning*, Stoll and Louis (2007) explain that professional learning is focussed on improving knowledge and skills which will enhance the quality of teaching and as a consequence the learning that takes place in classrooms. Probing the participating teachers' interpretation of this part of the name "professional learning community" revealed that they regard *learning* as important for personal growth and development and improving practice for its own sake. Considering the views expressed by teachers, it is clear that they understood the critical importance of continual improvement in practice and that they appreciate the opportunity to be engaging in professional learning for this reason. For example one teacher says: *I think it is important that we continue learning, because as teachers we must keep abreast of developments in education.*

Another important finding is that teachers realised the social component of learning, which is, learning with and from each other. Furthermore they realised that they cannot become entirely dependent on internal inputs but that it is equally important to learn with and from outside experts such as university academics and subject advisors. This is consistent with what Jaworski (2003) terms co-learning. In this context she posits that "working together, each might learn something about the world of the other. Of equal importance, however, each may learn something more about his or her own world and its connections to institutions and schooling" (p.250). Jaworski (2003) further indicates that this co-learning approach between academics and practitioners shifts the emphasis "...from one of primarily informing the practitioner to one of jointly constructing knowledge through shared activity" (p.251)

Teachers further interpreted the *learning component* of the term professional learning community to signify keeping up to date with developments in educational practice as well as

exposure to new knowledge structures in Mathematics and the concomitant adaptation or change in classroom methodologies.

The finding of this study indicate that teachers regard PLC engagement as representing a shift from PD towards professional learning (PL). Teachers indicated that they value the learning opportunities provided in the project and that they are motivated to increase their own mathematical knowledge and be informed by the latest developments in education.

The shift from PD to PL is congruent with the notion espoused by Stoll and Louis (2007): “It is not insignificant that the word ‘learning’ now appears between ‘professional’ and ‘communities’, because it connotes a shift in the emphasis away from a focus on process towards the objective of improvement” (p. 2). This shift in perspective from PD to PL brings topics such as Lifelong learning (LLL) as well as *adult learning principles* to the fore.

Benken, et al (2010) argue PL which should be sustained over time and in fact should become LLL. This implies that teachers should seek opportunities that would afford them rich learning experiences in their quest for professional learning. Such professional learning opportunities involves result in adopting a critical stance towards current thinking and practices in the process of collaboratively seeking novel solutions to educational problems.

Postholm (2012) suggests various ways in which LLL for teachers may be enacted:

- attending and participating in workshops as well as long and/or short university courses,
- job-embedded learning by continually reflecting on their own practice and the learning of their students,
- observing colleagues in practice and giving feedback in an interactive way, and
- informal conversations with colleagues (p. 406).

Postholm's suggestions are typical of an epistemic agentic perspective. Engel (2013) describes epistemic agency as the capacity that teachers have to exercise their learning capacity. Epistemic agency thus involves the acquisition and transmission of information relevant to the acquisition of knowledge in the act of professional learning. The concept of epistemic agency therefore appropriately portrays the teachers' experiences in the LEDIMTALI PLC.

Literature also indicates that there are a number of settings in which teachers may then exercise their epistemic agency. Examples of such settings are identified by Liebermann (1996, 187) as:

- exposure to direct instruction at conferences, short courses and seminars,
- job-embedded learning in school, and
- learning out of school via partnerships with HEIs, subject networks, and networking with colleagues at PD centres.

Exercising epistemic agency may be further enhanced by taking cognisance of adult learning principles. Knowles (1990) provides the following attributes of adult learning which may be effectively employed in the way teachers exercise their epistemic agency:

- The need to know is strong in adult learners.
- Adult learners has an independent self-concept which facilitates self-directed learning.
- Readiness to learn is inherent in adult learners.
- Experiential learning built on learners' past experiences is essential.
- Group discussion, problem-solving activities emphasising peer collaboration are effective ways of facilitating adult learning.
- Relevance to real life situations motivate adult learner.

This study concludes that teachers' interpretation of the term "*learning*" in the phrase represented by the PLC signifier, may be explained by teachers exercising epistemic agency. This interpretation also alludes to the way teachers' epistemic commitments will be manifested in the PLC. Epistemic commitments relates to the manner in which teachers themselves feel committed to the following epistemic principles:

- Learning implies improving knowledge and skills.
- Learning implies keeping up to date with educational developments.
- Learning is best mediated socially.

5.2.1.3 Teachers' interpretation of the term "community"

The term community may be used in two unrelated contexts. The first context is a geographical one and the second context is a relational one without any reference to location. In this study we were interested in the relational context in which the term community is applied. In the first place, participants interpreted "community" as signifying psychologically safe spaces on the basis of personal and group relationships which lead to mutual support and caring. In this discussion two important constructs arise: that of relational agency and a "micro-climate" of commonality. A microclimate is best understood by considering the following Table:

Table 21: A microclimate of commonality

Elements that make up a microclimate of commonality	Explanation: teacher experiences or affordances related to community.
Membership	A feeling of belonging and personal relatedness to other colleagues.
Influence	Opportunities to make a contribution or a difference in the lives of other teachers.
Integration and the fulfilment of personal needs	Accessibility to support structures and resources.
Shared emotional connection	A commitment to the community and a belief that members need each other and will be there for each other.

(Adapted from the work of McMillan and Chavis, 1986 and Rovai, 2000)

Professional Learning Communities represent a micro-climate of commonality (Rovai, 2003) and as a consequence they provide the social interaction that deepens professional learning. They create a platform where interactive engagement toward solving educational problems is enacted (Dufour, 2004). This platform for interactive engagement presupposes a community of learners in which participants in a PLC experience facets of caring, mutual support, acceptance, social relationships and engagement, friendship, respect and psychological safety.

Community membership implies belonging and reciprocity. This means that members of the said community are mutually inter-dependent and take co-responsibility for each other and the tasks that need to be completed. This allows members to have particular expectations of each other, for instance, making demands for assistance or sharing with other members and expecting them to respond.

The feeling of interdependence and mutual support creates a sense that they are not facing challenges alone. They are needed and valued within the bounds of their community.

Secondly participants also interpreted “*community*” as signifying egalitarianism¹⁰ and respect for each other as human beings. Teachers indicated that this is indeed happening in the PLC. Besides being treated as equals this also signifies that rank and qualifications, as well as the institutions to which participants are attached, is of no consequence. This is similar to the statement by Rovai (2003) that when qualifications and rank are not seen as barriers in relationship building, a microclimate of commonality with each other develops (Rovai, 2003).

McMillan and Chavis (1986) pointed out that the community concept is made up of four elements, namely, membership; influence; integration and fulfilment of needs; and shared emotional connection. These elements are associated with a feeling of belonging and personal relatedness, opportunities to make a difference, accessibility of resources and the commitment and belief that members need each other and will be there for each other. The first aspect to note is that of membership. Implicit in that data, teachers experienced this and its concomitant benefits. This statement underscores the significance of membership to the PLC. Membership of a PLC connotes three attributes which make a PLC a special structure: a common identity, emotional safety, and a common language to discuss teaching and learning. The findings of this study confirms these three attributes.

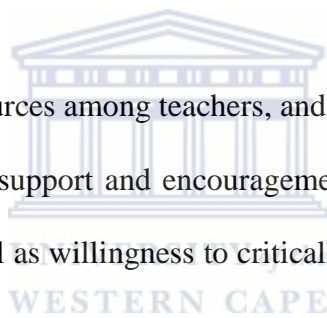
In relation to the notion of “a micro-climate of commonality” as espoused by Rovai (2003) the other attributes noted by McMillan and Chavis (1986) become relevant to the experiences of the participating teachers. The attributes I refer to are: influence; integration and fulfilment of needs; and shared emotional connection. The data supports that the experience of egalitarianism is indeed indicative of such a micro-climate of commonality and that it was manifested in the way teachers experienced the attributes of influence; integration

¹⁰ Egalitarianism refers to a social philosophy advocating the removal of inequalities among people

and fulfilment of needs; and shared emotional connection in the PLC. In summary, what is stated in this paragraph is indicative of the relational agency teachers experienced in the PLC.

Furthermore this study found that teachers' perception of community is coloured by a sense of interdependence and mutual obligation. Smith (2014: 14), however, cautions that the behaviours and dispositions associated with community do not come about incidentally. They must be intentionally cultivated. Adapting the suggestions forwarded by Palloff and Pratt (1999) the following could be the outcomes of an intentional intervention to develop community amongst teachers:

- Socially constructed meaning evidenced by agreement or questioning, with the intent to achieve agreement on issues of meaning,
- Sharing of resources among teachers, and
- Expressions of support and encouragement exchanged between teachers, as well as willingness to critically evaluate the ideas of others.



Once again this is consistent with the concept of a micro-climate of commonality.

A noteworthy finding of the study is that the concept of relational agency is central to the construct of community. Participants alluded to the opportunity the PLC affords community members to seek and obtain assistance from other participants on the basis of friendships that developed in the PLC. Relational agency also obliges community members to provide assistance when called upon to do so. This is exactly what relational agency implies. In the words of one of the participants, this community consists of people who are willing to share their expertise. In this regard Rovai (2003) comments in the following way: "...community members develop a sense that they are not facing challenges alone, and that

they are needed and valued within the bounds of their community” (p.287). Once again the dimensions of interdependence and obligation are emphasised.

A sense of community enables teachers to embrace their differences and develop mechanisms to deal with multiplicity, divergence and conflict. This does not mean that such a teacher community will be without conflict, neither is conflict necessarily a bad thing. In the process of becoming a community conflict is a process in which diverging viewpoints are manifested. This is very much part of the process of social interaction. It is during conflictual processes that shared values and norms of engagement become the cornerstone of the community’s conflict-stance. A community’s conflict-stance involves a broad repertoire of mechanisms to resolve issues through critically reflecting on divergent viewpoints, beliefs and practices.

Conflict is an unavoidable by-product of group formation. However, conflict can be channelled in a positive direction. Achinstein (2002) suggests that initiators of PLCs should understand conflict within community and ensure that they are conversant with how to deal with conflict when it manifests in the PLC: “Understanding conflict is essential to building a fuller conception of teacher professional communities” (p. 425). Jehn (1995) identified two levels of conflict amongst group members. The first level of conflict is referred to as relationship conflict. Relationship conflict is ascribed to interpersonal differences between members. The second level is identified as task conflict. Task conflict arises from the content of the task in which members of the group are engaged. Teachers alluded to these levels of conflict, but also indicated that the project leader was always able to resolve these conflicts and ensured that the PLC remained productive.

Linked to participants’ interpretation of the name *professional learning community*, I also investigated how participants viewed their understanding of the construct of a PLC as a social structure. For this purpose I used a self-administered survey instrument and will now be

discussing the findings. It is important to note that the findings that will follow in section 5.3, represent a snapshot of teachers' understanding after about three years of engagement in the PLC.

5.3 Teachers' perception of their understanding of where they are as a PLC

Morrissey (2000) makes the observation that each dimension of a PLC develops at its own pace, many times overlapping with other dimensions. I surveyed the teachers' perceptions of where they see themselves in terms of the dimension or features of a PLC. The findings tell a particular story which will be the focus of this section.

Clearly participants view their understanding of the different terms in the phrase Professional Learning Community as still developing. The majority of teachers (87% or 20 out of the 23 teachers who returned the survey instrument) indicated that their understanding of the concept learning, is on level 3, meaning it is past the emerging stage, but still developing. This supports a previous finding where I have indicated that teachers made the shift from PD to professional learning. The fact that they indicate that the concept of learning is still developing also confirms the fact that teachers do not view deprivitising their practice as opening their classrooms as sites for collaborative inquiry, and hence the value of job-embedded learning emanating from peer observation and non-evaluative feedback.. At this stage of the project I will argue that teachers are still on an upward developmental trajectory in terms of sense making of professional learning.

There were five teachers from the group surveyed or 21,7% of participants who claimed that they fully understood the concept of professional. The majority rated their understanding at level 3. Clearly the term professional is an important part of the PLC label and conveys significant meaning as we have already indicated in section 5.2.1.1. This is in contrast to the fact that again about 21.7% of participants indicated that their understanding of the term *community* was still emerging. This is clearly an indication that the *relational aspects or soft*

skills underpinning social learning is not an aspect that receives great prominence in the teaching fraternity, whilst the *hard* skills like professionalism and learning are always emphasised in the formal system of education administration.

I will now turn the focus to the second subsidiary research question and discuss the findings in relation to this question:

How do teachers experience the salient features of a Professional Learning community?

5.4 PLC Features

In exploring teachers' experiences regarding the features of a PLC, research question number 2 comes into focus. This discussion is done with reference to findings related to two data sets, which may assist in bringing greater clarity. The first data set stemmed from the survey that was administered and the second data set arose from the interviews that were conducted, both individual and focus group interviews.

When the entire group was surveyed regarding the growth in their understanding of the attributes of PLCs, two features that stood out for most participants were (1) a common vision, norms and values, and (2) reflective dialogue. This could be explained by the fact that they are all motivated by a quest for improving practice and learner performance. The second feature that enjoys prominence is reflective dialogue. This finding may be interpreted as stemming from the way in which participants generally engage in workshops and teacher institutes.

The feature that is at the bottom of the rung in terms of its development and manifestation in the LEDIMTALI PLC, is that of deprivitising practice. This is in accordance with most other research findings (Fullan et al. 2006; Timperley et al, 2007). Despite all indications that deprivitising of practice is an effective way of improving their classroom performance, teachers are sometimes reluctant to break out of isolation of their own classrooms due to reasons such as existing norms of privacy and managing their professional image

relating to confidence and competence as a teacher. In fact few are comfortable inviting a colleague into their classrooms to observe their practice. (Talbert and McLaughlin, 2002).

The fact that teachers mentioned the following aspects as characteristic of the PLC they were involved in, indicates that they could identify the features of a PLC as a consequence of their lived experiences:

- Sharing best practices and resources,
 - Collaboration amongst teachers,
 - Being a reflective teacher,
 - Feeling of belonging and acceptance,
 - Trusting relationships,
 - Identifying with each other's problems
 - A common purpose,
 - Taking responsibility for the learning of all learners.
 - Opportunities for professional learning, and
 - Equality among participants.

These aspects bear close resemblance to the five features of a PLC as conceptualised in my conceptual framework. This is illustrated in Table 22 below:

Table 22: PLC features as experienced by teachers

Features of a PLC	Characteristics experienced by teachers
Shared vision, norms and values	<ul style="list-style-type: none"> • Taking responsibility for the learning of all learners • Common purpose • Equality among participants • Feeling of belonging and acceptance
Supportive and shared leadership	<ul style="list-style-type: none"> • Trusting relationships
Reflective dialogue	<ul style="list-style-type: none"> • Being a reflective teacher • Collaboration among teachers
Collaborative inquiry	<ul style="list-style-type: none"> • Identifying with each other's problems • Opportunities for professional learning • Sharing best practices and resources
Deprivatised practise	<ul style="list-style-type: none"> • Trusting relationships

The picture emerging from Table 22 confirms the trends observed in Figure 12 in the previous chapter. It clearly shows that teachers experienced the manifestation of shared norms and values more than other characteristics. The dimensions of supportive and shared leadership as well as deprivatisation of practice is the least emphasised features of the PLC. It appears as if there is some ambiguity in terms of how the participants view the importance of leadership in this PLC and the related feature of the PLC, namely, supportive and shared leadership. This is not necessarily so because the fact is that there are two aspects of leadership combined in this feature namely supportive leadership and shared leadership. It is my argument that supportive leadership is highly emphasised and sought after in the PLC, but that shared leadership is still a developing paradigm.

In an endeavour to interpret the fact that little evidence of shared leadership was found, the argument by Askel-Williams and Murray-Harvey (2015) provides some valuable insight. Askel-Williams and Murray-Harvey (2015) argue that professional learning communities show

an evolutionary development in terms of leadership ranging from “outside-in” to “inside-out”. Participants are initially heavily reliant on outside facilitation and leadership and progressively evolve to a state where participants take responsibility to direct their own PD activities. Hence, I would argue that over a period of time we may observe a greater degree of shared leadership emerging within the PLC.

Borko, Koellner and Jacobs (2014) highlight the leadership challenge from within by noting that novice PD facilitators find it hard to support critical discourses aimed at developing deep subject matter knowledge and pedagogical content knowledge. The implications of this challenge for Borko et al (2014) is contained in their declaration: “In order to promote powerful and lasting change in the teaching profession, there is an urgent need to prepare novice PD facilitators to successfully facilitate newly developed models that offer high-quality learning opportunities for teachers.” (p. 149)

The next trend observable from the diagram is that teachers value collaborative learning and sharing between them as participants in this PLC. The fact that deprivitisation or sharing personal practice (Hord, 1996) receives the least emphasis from teachers is consistent with other research findings. (Cosh, 1999; Russel, 2013; Bryan, 2014)

5.5 Participants’ experiences of the dimensions of a PLC

Further to the discussion of the findings with a focus on research question 2, I now consider teachers’ experiences to the features of a PLC as summarised in Appendix I.

5.5.1 Shared vision, values and norms

For teachers in a PLC to learn collaboratively, it is important that shared norms and values are established in order to facilitate collaboration and communication. Bjuland and Jaworski (2009: 24) refer to this aspect as community building and indicate that this is the first phase in which participants learn to work together. Developing norms and protocols for

engagement, clarifying expectations, roles and responsibilities, setting parameters that guide relationships among members, are all steps along the way. Shared norms and values form the basis of a “social contract” for participants. Potari et al (2010: 475) use the concept of “mutual learning agreement” to describe the collaboration between participants (which include teachers, education specialists and academics). In the context of this agreement teachers and researchers are seen as partners in an inquiry process of learning and teaching Mathematics.

This mutual learning agreement is thus based on shared norms and values and provides a basis for a PD perspective where both teachers and academics experience transformative learning by engaging in a reflective dialogue. The values embedded in a PLC are grounded in a sense of purpose and this provides focus and commitment to the vision. Hord (2005) points out that an undeviating focus on student learning is a core characteristic of a PLC and hence provides a sense of purpose that guides their investment in time and energy to push their students towards high quality learning.

Most teachers interviewed, expressed the importance of having a common vision regarding the purpose of CPTD. More-over they alluded to the active promotion of this shared vision by the PLC leadership and other education administrators. The important role that leadership plays in this regard was also expressed by other participants and they alluded to the following foundational inputs that leadership must provide: vision, initiative, moral support and structure. Literature supports this view expressed by the teachers. Bolam et al (2005) notes that:

Creating, developing and sustaining a professional learning community is a major leadership and management task. The key associated issues and examples are presented under four headings: leadership values; developing and ‘spreading’ a learning vision and focus; building trust; and distributed leadership (p. 117).

The interviewed teachers also indicated that their engagement with each other is guided by the view of themselves as professionals. They, in fact interpreted the term

professional in the PLC label as a significant agentive constructor of the desired norms of engagement that would facilitate efficient and effective collaboration in the PLC.

Thus we may note that in terms of this feature of a PLC, the following findings emerged:

- The role of leadership in providing guidance and support,
- The professionalism that is implicit in being teachers and teacher educators, and
- A common purpose which drives the goal of continual improvement in educational practice and educational outcomes.

Allen (2013) argues that it is the facilitators and administrators who generally establish the parameters for teacher development “requiring them to focus on how to adjust teaching, re-teach and following up on failing students” (p.193). The argument here is that the vision and purpose for improving learner performance through CPTD based on a PLC, must ideally be initiated and actively promoted by leadership. If the vision of a PLC is that all students are capable of learning provided that teachers create learning environments supportive of students realising their potential, it is expected that leadership should be guided by this vision in terms of managing PLCs. Bolam et al (2005) further posit that the literature on leadership highlights the importance of vision building and support for learning.

It thus seems that the explanation for the teachers’ dependence on the support and guidance on school leadership regarding the vision as well as the norms of engagement undergirding a PLC is linked to what Allen (2013) describes as the mandate emanating from SMTs regarding the improvement of learner performance. In the words of Hargreaves and Fullan (2012: xv): “...looking for leaders to point the way” seems to be the prevailing sentiment among teachers.

5.5.2 Supportive and shared leadership

Firstly, the teachers interviewed were quite positive regarding leadership issues in this PLC. They are of the opinion that leadership plays an important role in creating trusting relationships and instilling confidence in the process. They must also ensure well organised structures and pay attention to the teachers' emotional well-being.

Secondly, participants fully endorsed the leadership in the PLC, especially the leadership provided by the project leader. The overwhelming sentiment was that they had no reason or occasion to question anything about the leadership. Another sentiment about the organisers and co-facilitators was one of positive endorsement.

Thirdly, there was reference to the aspect of empathy shown by the project leader in that he was sensitive to the personal circumstances and emotional well-being of all participating teachers.

Regarding the dimension of shared leadership, the ideas of Carson et al (2007) informed my analysis. Carson et al (2007) suggested that shared leadership may be conceptualised as an attribute of teams. So, on occasion leadership in team activities may alternate as is required by the topic at hand. It may happen that another group member is more informed than the designated group leader and this person may then take the lead. In this way leadership is distributed among team members rather than focussed on a single designated leader.

As I have indicated in section 4.3.4, teachers mostly emphasised the aspect of supportive leadership. The dimension of shared leadership does not feature as prominently. This finding may be explained by the fact that initially the PLC was entirely dependent on externally provided leadership. It could thus be expected that as the PLC matures in its standing, teachers will more and more assume leadership roles and so the dimension of shared leadership may manifest.

It is my view that teacher leadership must be intentionally nurtured and developed. Literature supports this view. In their research, Pearce and Sims (2002) reported that "... a conscious strategy of distributing leadership to team members is likely to enhance team effectiveness" (p. 178). Here one may regard the phrase, "*a conscious strategy*" as the operational phrase.

Ellemer, de Gilder and Haslam, (2004) confirm that leadership from within the group manifested mainly in the context of grade level groups. This context is more amenable for leadership being provided by the most suitable participant, that is, for the lead being taken by the most experienced or knowledgeable teacher in that grade. According to Ellemer et al (2004) it is this relational attribution within a group context that affords the required condition for the development of shared leadership. Furthermore, they maintain that if the group leader shares a particular identity with the group, the leader is able to energise, direct and sustain the activities of the group.

According to these researchers "the application of insights from the social identity approach allows us to see leadership as a group phenomenon and to consider the situational features that may enable leaders to draw on their followers' sense of shared identity" (p.467-468).

Table 23 below provides some examples of how this team leadership approach may be implemented in a PLC in order to induct teachers into leadership positions within the PLC:

Table 23: Example of a team-based leadership development

Team	Assignment
The coordinating team	<ul style="list-style-type: none"> • Facilitates and directs PLC activities • Models leadership • Develop structures and communication systems
The academic team (study group)	<ul style="list-style-type: none"> • Investigates identified topics and presents to PLC • Peer observation to improve practice • Identifies and shares best practices
Grade level teams	<ul style="list-style-type: none"> • Maps the curriculum for their grade • Look at student work • Develop common assessments

This example is of how shared leadership may be initiated and nurtured in the context of team leadership is predicated on the theory that leadership in team context is viewed as an input to team processes and performance. It is conceptualized mainly in terms of individual leadership skills, abilities, and behaviours and/or other leadership attributes such as expertise, knowledge and experience (Day, Gronn & Salas, 2004).

The findings of this study illuminated the following observations in terms of participants' expectations in terms of leadership in a PLC:

- Supportive leadership is preferred over shared leadership.
- Empathy viewed as an important leadership attribute since it is vital for the well-being of participants.

Clearly, participants did not see themselves as taking leadership, or sharing leadership in the PL. In order to cultivate teacher leadership, PLC initiators must have a vision for developing teacher leaders. Here are some suggestions in this regard:

- Shared leadership needs to be nurtured within group work contexts.

- Group leaders should come from the group and hence be seen as in-group members.
- Group leadership should be regarded as part of group processes.
- Administrators should be consciously look out for leadership attributes and potential of teachers, and
- Offer leadership training to identified teachers.

5.5.3 Reflective dialogue

Reflective dialogue has a diagnostic as well as a generative function. This dual role of reflective dialogue is illustrated in the Figure 12 below. The Figure also provides a link with the dimension of collaborative inquiry.

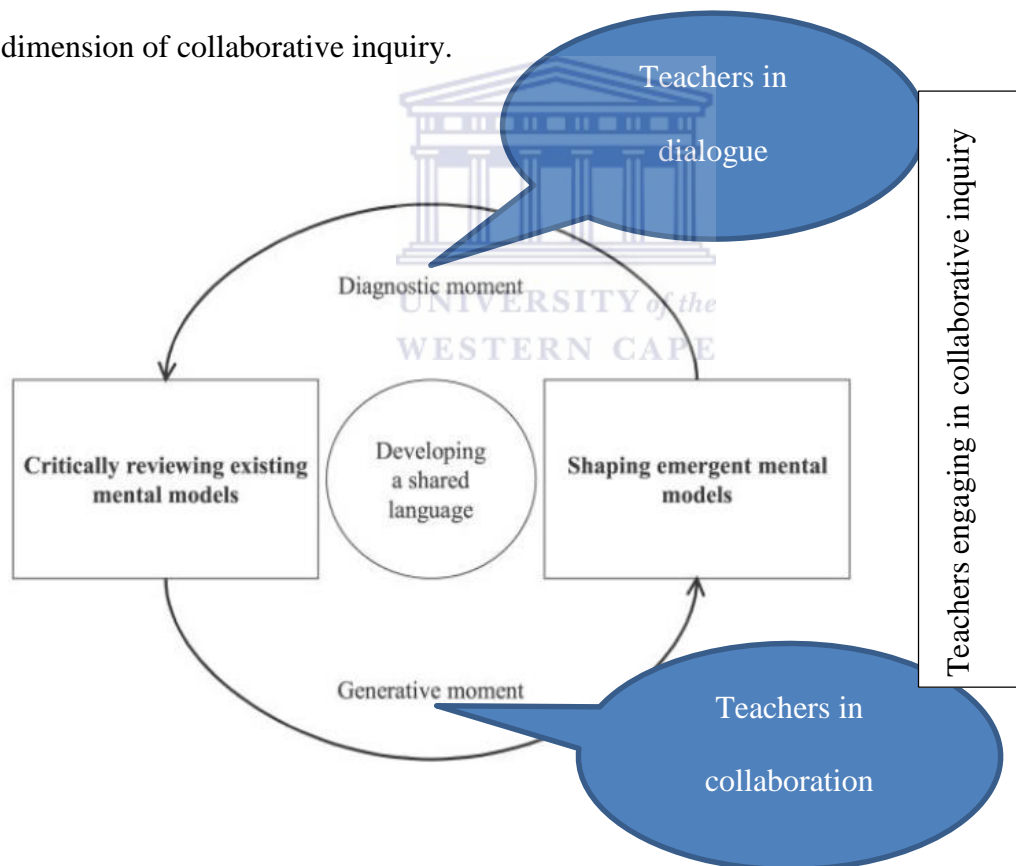


Figure 12: The power of reflective dialogue
(Adapted from Jacobs & Heracleous, 2005)

Jacobs and Heracleous (2005) explains the power of reflective dialogue by stating that dialogue as a form of reflective conversation enables teachers to change their mental models

through conscious and critical exploration. With respect to teachers' mental models, Jacobs and Heracleous (2005) remind us that mental models are highly localised and arise from social and cultural practices. However, mental models are powerful structures in that they shape the way that teachers argue about and interpret educational issues and consequently engage in teaching practice. Hence this links mental models intrinsically to the way in which teachers also engage in collaborative inquiry. In both the dimensions of reflective dialogue and collaborative inquiry, the development of a shared language is central to the processes involved.

Louis et al (1995) views reflective dialogue as teacher discourses or conversations about educational issues or problems. Research on teacher reflection has shown that developing a reflective stance can help teachers to systematically improve their practice (Buzza, Kotsopoulos, Mueller & Johnstone, 2013).

Mann, Gordon and MacLeod (2009) argue that “The importance of reflection and reflective practice are frequently noted in literature; indeed, reflective capacity is regarded by many as an essential characteristic for professional competence.” (p. 595). This view expressed by Mann, et al (2009) is based on the assumption that to learn effectively from one's experience is critical in developing competence during the lifespan in which one is engaged in educational practice.

Most models of reflection include critical reflection on experience and practice that would enable identification of learning need (Mann et al, 2009). This statement highlights the fact that in order to improve one's practice, it is important to be aware of the areas in which improvement is needed. This perspective is supported by the interview data and hence teachers generally accept the importance of being reflective practitioners. They do, however, indicate that opportunities to reflect with colleagues on site are limited as a consequence of organisational arrangements at their schools.

5.5.4 Collaborative inquiry

Nelson et al, (2009) observes that an increasing number of teacher professional developers are structuring experiences around collaboration and inquiry. Collaborative inquiry provides access to cognitive support between different participants, as well as evaluative support in order to make meaning of emergent solutions. This support structures is facilitated by the fact that different participants bring different knowledge structures and perspectives to bear upon the issue at hand. According to Nelson et al (2009): “PD focused on collaborative inquiry can be supported and facilitated through specific means, usually by a university professor and/or district specialist, or by one or all of the teachers themselves” (p. 1270).

Goddard, Goddard and Tschannen-Moran (2007) posit: “The more teachers collaborate, the more they are able to converse intelligently about theories, methods, and processes of teaching and learning, and thus improve their instruction” (p.879). The fact that teachers collaborate is a necessary, but not a sufficient condition for effective PD.

According to Harris and Jones (2010) literature abound with “well-funded teacher networks that fail to produce the gains expected simply because they are shallow or empty networks devoid of any real focus on improving learner outcomes” (p. 174). Improvement through professional learning communities is only possible if teachers collaborate and dedicate time to discuss and seek solutions to the hard questions about classroom practice. This collaborative solution seeking is in fact to purposefully and actively look for ways to impact teachers’ practice in the direction of improved learning outcomes for all learners (Fullan 2009).

This study established the link between collaborative inquiry and reflective dialogue and found that participants are committed to seeking solutions to the educational problems they encounter, in a collaborative way. This is enacted by experimenting with new methods and giving feedback to each other as to how it works in their classes. This process firstly employs the techniques of reflective dialogue based on the developed common language in order to talk

about teaching practices. Examples of such common language constructions in the LEDIMTALI PLC, includes concepts such as intentional teaching, spiral revision, the use of feedback and question types.

The next important finding regarding this feature of PLCs is that teachers engaging in collaborative inquiry do so out of a deep desire to learn and improve their practice. It happens as they collaboratively engage in solution seeking, but also as they experiment and try out new ideas and give feedback to others.

5.5.5 Deprivatised practice

Deprivatised practice refers to opening the door to your classroom and providing access to colleagues to observe your practice. This involves a measure of risk taking, but the benefits outweighs this risk of being evaluated as such. Elmore (2000) states that schools and school systems that are improving, directly and explicitly confront the issue of isolation by creating multiple avenues of interaction among educators and promote inquiry-oriented practices such as peer observation and feedback.

Another manifestation of a microclimate of commonality is observed in that some of the teachers who participated in the focus group interviews had this to say: Safety, both psychologically and physically is important for our well-being and confidence to allow a colleague into your class. Even just showing the video clips of some teachers teaching, can be threatening, but if we trust each other we are not afraid to be observed and reflect on our practice.

Regarding the non-evaluative review of teachers' practice and behaviours the focus groups felt that it is a good thing for teachers to be taken out of their comfort zones provided that they are not embarrassed or made to look stupid (Timperley, Wilson, Barry & Fung, 2007).

Teachers generally held the view that visiting and observing each other's, classes was not problematic. However, from the interview data it was apparent that

organizational arrangements at the school level remains proved to be a barrier, because of their full teaching schedules and after-hours commitments. Hence this professional learning intervention required a particular shift in the organizational configuration of scheduled lessons.

Levine (2008), in his research demonstrates the fact that teachers' relationships are being "governed by norms promoting autonomy, privacy, and non-interference among colleagues" (p. 115). Fullan (2007) similarly indicates the difficulty in deprivitising teaching due to "the misguided regimes of accountability" (p.36). Timperley et al (2007) highlights the emotional factors constraining deprivitisation of practice:

Teaching and learning are also about emotional practices. Expectations to change practice may touch raw nerves, because they are likely to impinge on teachers' sense of professional identity and competence, causing teachers to close up or behave defensively to protect themselves from situations that they might feel expose their inadequacies (p. 234).

5.6 Other opinions expressed by teachers

Besides responding to the questions that were aimed at soliciting answers to the research questions, teachers commented on other issues that may not have a direct bearing on the research questions. These issues, however, emanated from their experiences and may indeed impact on deepening our understanding of the way PLCs may operate in their contexts.

There are five issues that are vitally important according to the participating teachers:

- (1) the lack of networking in between workshops,
- (2) changes in their schools as a result of participation in the PLC,
- (3) dealing with diversity amongst the participants,
- (4) the quality of facilitation in the PLC, and
- (5) the role of leadership.

The issues mentioned above are integrally linked to operational issues of a PLC and warrant explication. However, the aspect of leadership will be reserved for later discussion when I deal with the barriers and enablers to PLC formation.

The lack of networking between face to face engagements indicates that in the contexts in which the participating teachers work, schools still lack the infrastructure to give teachers access to online discourses. A second reason that may have contributed to this observation is that the use of social media generally operates on the basis of friendship and has not transcended to include professional relationships. If PLCs are to operate across the boundaries of schools, then structures are needed to facilitate networking between teachers at different schools.

Changes in practice and cultures at school level as a consequence of participation in PLC activities bodes well for future programmes related to the implementation of PLCs as envisaged by the ISPFET. From the opinions expressed by participating teachers it also emerged that on both a professional as well as a personal level teachers experienced a growing confidence as a result of their participation as well as their collaboration with their colleagues and the academics from the university. This also communicates a positive outcome of the project and indicates that the PLC model may indeed have the potential to affect school improvement in general.

The teachers reported that they were now starting to experience certain changes in the way their subject departments operated:

- Teachers now meet in grade groups to plan and moderate each other's assessments.
- They are now also reflecting on own practice and identify areas for improvement.
- They share teaching strategies more than what they did in the past.

- They are instituting ways to analyse their test results and structure interventions according to the learning needs identified in this way.

LEDIMTALI definitely impacted on the culture of the subject department at school and what this study concludes is that teachers are now beginning to function as a local PLC in their schools.

Dealing with diversity at various levels is a given for the South African context. This study indicates that teachers are committed to transformation in terms of addressing issues of the past, but also developed an awareness of diversity that they may face in the classroom with respect to the students' backgrounds, home language and pace of learning.

This study also found that teachers expect that facilitators of PLCs and other CPTD initiatives need to be experts in their fields and well versed in the practices of facilitation. In this study, all the participating teachers responded positively in this regard.

5.7 The factors that promote or hinder the formation of a PLC

In this section I am focussing on the third subsidiary research question: *What are the factors that promote or hinder the establishment of a Professional Learning Community amongst Mathematics teachers across different schools in the LEDIMTALI project?*

5.7.1: Barriers

Establishing a PLC is a complex exercise that requires time, resources and resilience on the part of teachers who wish to engage in such a CPTD structure. As Dufour (2010) cautions: "Becoming a PLC is much more than going through a certain, prescribed number of steps since there is no recipe for reculturing schools. *How* things are done is often as important as *what* is being done" (p. 1).

Caffarella and Zinn (1999) provide an analytical schema to discuss the factors that hinder or support the formation of a PLC. This schema consists of four major categories, namely:

1. People and interpersonal relationships,
2. Institutional structures,
3. Personal considerations and commitments, and
4. Intellectual and psychosocial characteristics.

To provide an overview of the study related to the inhibiting factors, Table 24 below provides a summary in terms of the above schema:

Table 24: Barriers to PLC formation

Analytical Schema	Findings in the study
People and interpersonal relationships	<ul style="list-style-type: none"> • Diverse personalities as a barrier • Conflict as a barrier
Institutional structures	<ul style="list-style-type: none"> • Resources as a barrier • Leadership as a barrier
Personal considerations and commitments	<ul style="list-style-type: none"> • Time as a barrier • Workload and family commitments as a barrier
Intellectual and psychosocial characteristics	<ul style="list-style-type: none"> • Unwillingness to engage as a barrier • Unwillingness to collaborate as a barrier

I now consider each barrier in turn.

5.7.1.1 Time

Literature identifies time as a major constraint to PLC participation (Feiman-Nemser, 2000; Hord, 2005; Gillespie, 2010). In his study, Stamper (2015) confirms this and further found that scheduling time for collaboration and joint planning enhances the effectiveness of a PLC.

5.7.1.2 Diverse personalities

It is inevitable that personality clashes will occur in a PLC. Some teachers have strong personalities and are difficult to convince. This is sometimes a stumbling block. Since human personalities, backgrounds and psychological conditions are, by definition, unique to the individual, there is no “one-size-fits-all” technique that works for every situation. Major personality clashes must be dealt with to encourage productive and efficient collaboration between participants. Minor conflicts still need to be solved, but do not typically create the urgency of serious personality clashes.

5.7.1.3 Unwillingness to engage

Both Goleman, Boyatzis & McKree (2002) as well as Lencioni (2005) contend that establishing norms of engagement is a critical factor and strategy that can help determine whether a group will function as a real PLC or just a loose collection of individuals.

One of the stumbling blocks identified in this study is that some teachers are hiding in the group and do not engage. They just go along but never make any contribution.

5.7.1.4 Unwillingness to collaborate

Fullan (2001) posits that collaborative cultures, which by definition is founded on professional relationships, are indeed the strong foundations of a PLC. In this regard this study points to a lack of such a collaborative culture as a stumbling block in starting up a PLC.

5.7.1.5 Resources

It is generally recognised that effective PD needs the deployment of resources, including financial, material and human resources. Transport and finances are also examples of barriers to attending workshops and courses.

5.7.1.6 Workload and personal commitments

Literature indicates that personal considerations and commitments may act as barriers to PD (Caffarella & Zinn, 1999). Findings in this study indicated that workload at school and family or other after school commitment such as involvement with extramural activities at school level are barriers to PD and engagement in PLC activities. Teachers shared the view that their workload as teachers constrains the opportunities to engage in PD activities, especially if it is arranged after school hours. On week-ends family commitments also are a challenge to attend PLC activities.

5.7.1.7 Leadership

Leadership plays an important role in creating the conditions for teachers to become involved in a PLC. So it is no surprise that participating teachers identified an autocratic leadership style as a barrier. An autocratic leadership and authoritarian management style definitely constrains the formation and effectiveness of a PLC. An important feature of a PLC is that of supportive and shared leadership. Another important consideration in this regard is the intentional and conscious development of teacher leaders to guide PLC activities.

5.7.1.8 Conflict

It is unrealistic to think that every teacher will be enthusiastic about the various practices found in PLCs. There are bound to be those who resist certain practices and initiatives. Sometimes this resistance stems from a lack of commitment, lack of knowledge and skills, or a lack of confidence and self-efficacy (Achinstein, 2005).

5.7.2 Enablers to PLC formation

The literature on PLCs provides quite a number of supporting factors for the launch of a PLC. Starting with the analytical scheme (Caffarella and Zinn, 1999), the factors identified in this study fits the scheme as indicated in Table 25:

Table 25: Enablers to PLC formation

Analytical Schema	Findings in the study
People and interpersonal relationships	<ul style="list-style-type: none">• Relational agency
Institutional structures	<ul style="list-style-type: none">• Recognition by SMTs and other educational administrators:• Structure:• Resources
Personal considerations and commitments	<ul style="list-style-type: none">• developing a collective identity• Developing communal responsibilities and obligations
Intellectual and psychosocial characteristics	<ul style="list-style-type: none">• Dealing with conflict

The literature review in Chapter 2 also provided the following support factors for the launch of a PLC:

- (1) Creating a culture of trust and collegiality,
- (2) Provision of time and resources for PD activities,
- (3) Flexible programmes
- (4) Planning and learning together with expertise inside and outside the school,
- (5) Accessibility of good quality resource materials, and
- (6) Teachers as reflective practitioners (Dufour and Eaker, 1998; Dufour, 2004; McLaughlin and Talbert, 2006).

According to Hord (2005) there are two types of supportive conditions necessary for PLCs to function productively:

- (1) Logistical conditions such as physical and structural factors and resources, and
- (2) The capacities and relationships to be developed among staff members so they may work well and productively together.

All these factors dovetail very well with the schema in Table 5.4. I will now turn my attention to the factors identified in this study.

5.7.2.1 Recognition by SMTs and other educational administrators:

The PLC participants generally held the view that that SMTs at school could make a PLC work effectively if they recognise and even formalise participation. School management and even district officials have a role to play in this regard. They should be involved in setting the vision for the PLC and release the resources for teachers to engage in PLC activities. However, they should also heed the caution expressed by Jita and Mokhele (2012):

This article argues that, while the intentions of the policymakers to provide support and recognition for the work of teacher clusters were noble and progressive, the consequences of this intervention were somewhat negative and tended to bureaucratise and alienate teachers from these traditionally bottom-up structures of professional development. In exploring the dilemmas and challenges of the institutionalisation of teacher clusters, we have identified the need for officials to be measured and cautious when seeking to recognise these grassroots structures of teacher development (p. 10).

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5.7.2.2 Relational agency:

Relational agency refers to the capacity of the participants to seek assistance as well as to offer assistance on the basis of relationships that were established in the PLC. This would go a long way to enable teachers to work collaboratively in seeking *solutions* for problems and challenges encountered in practice, in a collaborative way. Relational agency is akin to the PLC becoming like a support group where we can phone each other when we encounter problems in teaching.

5.7.2.3 Structure:

Teachers prefer to participate in events that are well organised and structured and they view this as part of the professional way in which CPTD is organised in the PLC. Structures

do not only refer to the way CPTD activities are designed and enacted, but it also to some of the other enablers below, such as leadership structures, norms of engagement and physical resources which are made available for the purpose of facilitating CPTD in a sustainable way.

5.7.2.4 Leadership:

The role of leadership is highlighted by the view that leadership must create supportive conditions and put the necessary structures in place. Literature supports these views: For instance Protheroe (2005) emphasised that the leader's role in a PLC is vital to its successful implementation and sustainability. Posner (2006) likewise pointed to the key role that school principals play in creating the conditions for teachers to establish a PLC. A further endorsement of the role of leadership comes from Harris and Jones (2010) who says that "strong, supportive leadership is necessary to build and sustain professional learning communities" (p. 179).

5.7.2.5 Resources

Gillespie (2010) contends that there are three overarching structures needed for PLCs to operate effectively, namely, community, leadership, and resources. These three structures create the overarching foundation for a number of support systems that must work together to have successful delivery of PD. Hence, the finding that school leadership should play an important role in setting the vision for the school-based PLC and release the resources for teachers to engage in the PLC resonates well with the literature on PLCs. This was also confirmed by Stamper (2015) in his doctoral studies: "The second aspect of supportive conditions refers to physical structures, such as time, buildings, grounds, and materials" (p. 103).

5.7.2.6 Dealing with conflict

In any group setting the issue of conflict is unavoidable. In the LEDIMTALI PLC conflict rarely surfaced. When the facilitators became aware of conflict situations, they strived

to channel this divergence of opinions into a learning situation for participants. This is in concert with the views on intergroup conflict espoused by Achinstein (2002) who suggests that: “Understanding conflict is essential to building a fuller conception of teacher professional communities” (p. 425).

Initiators of PLCs should understand conflict within community. This understanding will lead to a meaningful resolution of conflict situations since facilitators will ensure that they are conversant with how to deal with conflict when it manifests in the PLC.

Garmston and Wellman (1999) encourages teachers to embrace the importance of conflict on collaborative teams when they suggested that “successful groups know how to fight gracefully—they embrace the positive aspects of conflict and actively minimize the negative aspects. Successful teams recognize conflict as an important resource for forging better practices. Experiences of teachers in the LEDIMTALI PLC certainly confirms the views of Garmston and Wellman (1999). This may certainly be ascribed in the way that the project leader modelled the approach to divergence of opinion in word and deed.

Jehn (1995) identified two levels of conflict amongst group members. The first level of conflict is referred to as relationship conflict. Relationship conflict is ascribed to interpersonal differences between members. The second level is identified as task conflict. Task conflict arises from the content of the task in which members of the group are engaged.

In the LEDIMTALI PLC, participants were quite aware of the two levels at which conflict may arise. What emerges from the finding of this study is that there are various factors which may mitigate situations of conflict. These factors relate to:

- a common purpose,
- non-competitive working relations,
- absence of hierarchies, and
- conducive and relaxed working environments.

It became evident that participants tacitly subscribed to certain norms of behaviour in order to minimise the potential of conflict and enhance working relationships. This is due to their understanding of what the terms professional as well as the term community bring to the fore. In summary the findings of the study in this regard point to norms of behaviours and dispositions such as:

- assisting each other and refraining from being too critical or negative,
- not pulling rank and forcing ideas on the group,
- having an open mind and listening to other people's input
- Having the courage to speak your mind without not using criticising or insulting language, and
- conflict of ideas does not mean disunity, but by being open to considering different opinions, professional learning is enhanced.

Drawing on some of the literature reviewed in Chapter 2, the findings related to barriers and enablers confirms the views expressed by researchers such as Dufour and Eaker, (1998) Dufour, (2004) as well as McLaughlin and Talbert (2006). Hence the guidelines for establishing effective PLCs provided by Talbert (2010) are well-intentioned. Talbert (2010) provides us with some lessons learnt from research concerning the implementation of PLCs:

- System change entails dynamic tensions between bureaucratic and professional approaches
- Deep understanding of the core principles of PLCs ground effective change strategies
- Changing professional culture is a developmental process
- Changing a system towards PLCs requires coherent professional strategies, policies, and practices at all levels of the system over time

- System leadership for PLCs should mobilise bureaucratic resources to implement professional strategies

System leaders must manage context pressures and politics in ways that sustain and mobilise support for long term professional strategies for developing PLCs.

5.8 Sustainability

Research question 3 directed the study to exploring conditions for the sustainability of a PLC: *What are the factors that may promote sustainability of a Professional Learning Community as perceived in the LEDIMTALI project?*

The findings of this study with regard to sustainability is supported by Kilbane (2009), who suggests a number of environmental factors as prerequisites for sustainability of PLCs:

- Collaborative structures: time for teachers to collaborate; sustained PD activities; availability of the necessary physical and human resources
- Administrative support: leadership stability; access to resources; support systems; protection from other interventions
- Relational integrity: Teacher commitment; focus on student learning; goal setting and achievable targets
- Enablers: Recognition by administrators; Academic support by HEIs; available expertise among teachers, professional networks; proximity
- Coherence: alignment with district goals;

The study found that participants are of the view that when the project terminates, schools should organise themselves geographically and form smaller clusters that will be able to meet easily and regularly. Teachers noted that this approach would enable them to take initiative, share resources and present to colleagues on various topics as the need may arise.

Furthermore if this could happen in collaboration with subject advisors in the various districts the chances of sustainability will be improved. Teachers for instance commented that

departmental officials should play a greater role to facilitate this networking. This was further supported by the view that it is important that school management also takes responsibility for PD of the teachers in their schools.

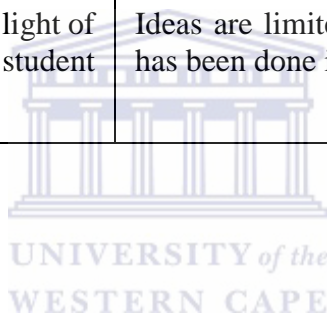
The role of the teacher unions in this regard have also been emphasised. In summary what the participants alluded to is firstly, that with departmental support, a PLC could be sustainable provided that it is not too big and is localised to a geographical area. Other respondents included the support and encouragement of school management as well as the teacher unions. They go further and emphasise teachers' own commitment to CPD. Other issues emerging from the responses of participants involves incorporating the feeder primary schools as this will mediate the finger pointing between high and primary schools in terms of the quality of Mathematics teaching at these institutions.

The key to success in this regard hinges on the creation of collaborative cultures in schools. Kohm (2009) posit that when teachers have many opportunities to collaborate, their energy, creative thinking, efficiency, and goodwill increase—and the cynicism and defensiveness that hamper change decrease. Kohm (2009) further illustrates the accrued benefits of a collaborative culture compared to a culture of bureaucratic regulation. This is captured in Table 26 below:

Table 26: The value of collaborative cultures

In collaborative cultures...	In top-down cultures...
Teachers support one another's efforts to improve instruction.	Teachers discourage challenges to the <i>status quo</i> .
Teachers take responsibility for solving problems and accept the consequences of their decisions.	Teachers depend on principals to solve problems, blame others for their difficulties, and complain about the consequences of decisions.
Teachers share ideas. As one person builds on another's ideas, a new synergy develops.	Ideas and pet projects belong to individual teachers; as a result, development is limited.
Educators evaluate new ideas in light of shared goals that focus on student learning.	Ideas are limited to the "tried and true"—what has been done in the past.

(Kohm, 2009)



5.9 Conclusion

This study showed that teacher experiences in a PLC may be characterised by three important constructs, namely a microclimate of commonality, epistemic agency and relational agency.

Chapter 6 shares some reflections on how the study managed to answer the main research questions. The chapter also provide some recommendations as well as issues for further research.

Chapter 6: Final observations and recommendations

By implementing professional development in schools that is experiential in nature, teachers can integrate innovative instruction such as differentiation, constructivist theory, discovery learning, inquiry-based learning, simulations, critical thinking, problem solving, technology-based learning, and performance-based assessment through demonstration, observation, collaboration, fieldwork, and reflection. With the help of experiential educators, perhaps professors, researchers, staff developers, school administrators, and teachers could create more opportunities for meaningful, transformative, experiential professional development in which classroom teachers understand and apply theory and research into practice effectively (Burke, M.B., 2013).

6.1 Introduction

Chapter 5 provided an analysis of the research data in so far as this study explored answers to the subsidiary research questions. In this chapter, I now reflect on the extent to which this study addressed the main research question. It is an important exercise which signals the conclusion of the study and considers the lessons learnt.

This study explored the answer to the main research question based on an interpretive phenomenological investigation of teacher experiences in the process of establishing and developing a PLC as a means of engaging them in CPTD.

The first area of reflection relates to the signifier of a PLC namely the way it is labelled: a professional learning community. The study explored teachers' sense-making when the three terms are considered separately and in conjunction with each other as the signifier of a specific CPTD model.

My point of departure here would be the statement by Morrissey (2000) suggesting that the term professional learning community defines itself. This must be read in conjunction with the notion espoused by Stoll and Louis (2007). The notion by Stoll and Louis (2007) that the phrase "Professional Learning Community" consists of three words, each encompassing an important meaning provided an interesting perspective on the PLC signifier. Hence it was

incumbent on me as a researcher to explore the participating teachers' lived reality concerning the declarations by Morrissey (2000) as well as Stoll and Louis (2007).

The second area of reflection is that of the relating the signifier and the identifiers of the PLC model of CPTD. By the identifiers I am referring to the features of a PLC as I described in it chapter 2 in constructing my conceptual frame work. These identifiers are (1) a shared vision, norms and values, (2) supportive and shared leadership, (3) reflective dialogue, (4) collaborative inquiry, and (5) deprivitised practice.

6.2 Summary of findings

6.2.1 The PLC signifier

This study found that the signifier for the CPTD model, namely a PLC, appropriately connotes the nature of the CPTD structure for teachers. This resonates with the notion espoused by Morrissey (2000) that the term professional learning community defines itself. Heffner (2011) elucidates this meaning clearly:

By using the term professional learning community we signify our interest not only in discrete acts of teacher sharing, but in the establishment of a school-wide culture that makes collaboration expected, inclusive, genuine, ongoing, and focused on critically examining practice to improve student outcomes (p. 24).

Taking the terms, professional, learning and community separately and exploring teachers experiences in interpreting these terms the following pattern emerged:

Table 27: Connotations attached by teachers to the PLC signifier

Terms in the PLC signifier	Connotations attached by teachers in the study
Professional	For the participating teachers this signified three related but separate dispositions: 1. A collective identity 2. An intellectual disposition 3. A normative indicator
Learning	An epistemic agentic affordance
Community	A relational agentic affordance

Reflecting on this section, the first observation is that the teachers' experiences in the PLC are contributory in the way they interpret the PLC signifier. In this regard, this study concludes that the PLC signifier indeed connotes an important perspective that frames the way in which CPTD activities will be enacted in the PLC. This implies that the findings of this study confirm that this model of CPTD is appropriately labelled in terms of what it suggests and promises to deliver.

6.1.1 The PLC architecture

In this section, the study reflects on the PLC architecture. The PLC architecture refers to the way in which the elements, in particular the PLC identifier elements and the PLC signifier elements fit together. In Figure 14 below, there is a representation of the theoretical architecture arising from the descriptions of these elements in Chapter 2 and an interpretation of how the signifier elements articulates with the PLC features as the identifiers as they are indicated in this study.

Professional	Shared vision, norms and values
	Supportive and shared leadership
Learning	Reflective dialogue
	Collaborative inquiry
	Deprivatised practice
Community	

Figure 13: A Theoretical PLC architecture

Figure 14 may be interpreted as follows:

- It suggests a possible articulation between the signifier, in other words the name of the model, and the identifiers of the PLC model of CPTD, in other words the core features of the model.
- The PLC model situates CPTD in a social context and hence CPTD activities are framed in a relational epistemology as well as a microclimate of commonality.
- Hence community affords a relational agency for teachers through which they engage in professional learning.
- A microclimate of commonality affords teachers a feeling of belonging and that their needs will be met through collaboration with others.
- The side bar on the left hand side signifies that professional learning is afforded by an important enabler, namely, an epistemic agency exercised within particular norms of engagement.

The theoretical construct represented in Figure 14 now serves as the backdrop against which this study interprets the teachers lived experiences as envisaged in the main research question.

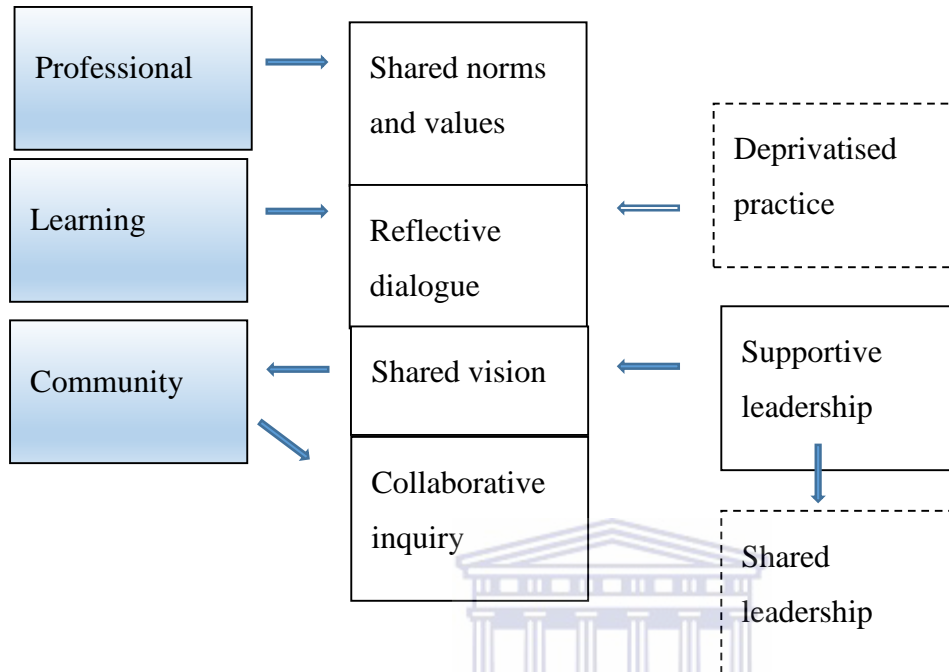


Figure 14: The experiential PLC architecture

Figure 14 may be interpreted in the following manner

- Human experiences are complex and intertwined. Hence it does not exhibit a neat pattern but a messy pattern of interdependences and linkages as a result of influences from the physical environment as well as the socio-linguistic environment.
- This is a demonstration that human experiences are intertwined and does not connect activities and the consequences thereof in a linear timeline as they interpret their experiences through frames that are formed historically through a myriad of inputs along their growth trajectory as a teacher over years, months and days.
- Teacher's lived experiences result in mental models that are at variance with the theoretical model.

- The elements of the framework which are indicated by the broken-line borders, are those constructs that did not feature as expected in the experiences of the participating teachers.
- A shared vision does not necessarily fit into the construct as envisaged in the theoretical model. This is accounted for by the fact that teachers believe that vision is a construct which emanates from leadership.
- Supportive and shared leadership do not reside together as one element of a PLC as envisaged in the theoretical model. Teachers have particular expectations of leadership as the fuel that propels the PLC forward and provides the directive vision of the pathway leading to the ideal future state.
- Shared leadership is a part of the leadership vision in their pursuit of sustainability, and must be intentionally inculcated.
- Teachers embraced the element of community and the relational agency that it affords them.
- The norms of engagement in a PLC is a consequence of how they interpret the construct of professionalism.
- Deprivatised practice is a feature that represents the ideal condition, but is not necessarily a practical solution for engaging in reflective dialogue. (See appendix I) for some suggestions of how this feature of a PLC could be developed.

6.2.3 A proposed PLC architecture

In concluding this reflection I now construct a proposed PLC architecture, based on the lived experiences of the participating teachers in this study.

This model is illustrated in Figure 15.

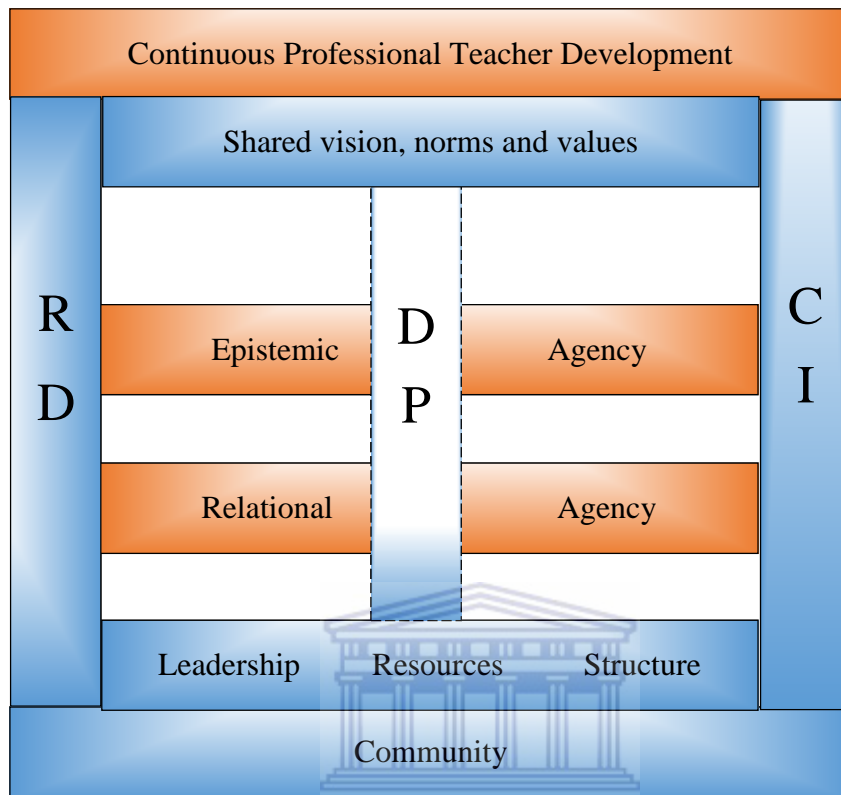


Figure 15: A reformulated PLC architecture

Note: **RD = Reflective dialogue**
DP = Deprivatised practice
CI = Collaborative inquiry

Interpreting the proposed PLC architecture represented in Figure 16, provides the following insights:

- The model structures the features of a PLC into a coherent and interlocking structure.
- The model is predicated on the relational nature of the PLC, hence it is rooted in the construct of community. This is significant when community is considered in Rovai’s notion of a microclimate of commonality as was discussed in Chapter 5.

- CPTD is enacted through reflective dialogue and collaborative inquiry. These two pillars of CPTD are braced by epistemic agency and relational agency.
- The activities leading to professional learning is supported through leadership provided externally as well as internally, resources and structures being provided by both an *outside in* approach as well as an *inside out* approach. The concepts of *outside in* and *inside out* are employed to indicate where the necessary inputs for operational purposes are coming from, implying that the sources of leadership and support are provided externally or internally by the teachers themselves. The ideal situation would be represented by a workable balance between these approaches and this will differ from context to context.
- The middle supporting pillar indicates that teachers should open their classrooms as sites of inquiry and professional learning. The more transparent shading indicates that it is a developing ideal and teachers should be supported, but also protected from embarrassment and shame in this regard.

6.3 Recommendations

The recommendations in this study is crafted in the following way:

- (i) Firstly I will label the recommendation by referring to a particular construct emanating from the study.
- (ii) Secondly I will offer the recommendation in a blocked paragraph.
- (iii) Thereafter I will provide a justification for the recommendation.

Recommendation 1: Relational agency should be unpacked for teachers in the PLC in order for it to be developed for optimal efficiency and efficacy.

Hargreaves (2007) argues that strong and sustainable professional learning communities are characterized by strong cultures of trusted colleagues who value each other personally and professionally, who are committed to their students, who are willing to agree and disagree about evidence and data that can inform them about how to improve their practices in ways that benefit their students, and who are willing to challenge one another's practice in doing so. The reason is that relational agency is an affordance empowering teachers to (a) acknowledge one another's ideas and dignity, (b) believe in each other's ability and willingness to fulfil professional responsibilities, (c) care about each other both professionally and personally, and (d) trust one another to put students' interests first. (Peretti, 2009)

Recommendation 2: Educational administrators should implement urgent strategies to develop teacher leaders with the capacity to facilitate and steer PLCs.

Wald and Castleberry (2000) defined three leadership styles critical to building and sustaining PLCs:

- Visionary leadership: Visionary leadership will promote future-focused leadership, and will work with teachers to develop their own leadership skills.
- Exemplary leadership: A leader with values will lead by positive example and action and will act as the keeper of the values and ethics for the organization.

- Servant leadership: Leaders with a servant attitude will implement a strategy to close the gap between its current abilities and the needed capabilities A service-based leader will “act as a steward to the purpose, vision, and values of the organization and to its individual members” (p. 22). Capacity building is imperative to the success of the PLC. S

Rasberry, and Mahajan. (2008:7) proposes that Districts can assist with the establishment of PLCs by:

- Sharing models for creative scheduling to principals and their school leadership teams so that teachers are able to spend greater amounts of time collaborating across grades and content areas.
- Limiting the number of new initiatives introduced in the district so that teachers are not overwhelmed and have the time needed to understand one reform and its components before pursuing another.
- Honouring the knowledge and skills of accomplished teachers and promoting innovation by developing hybrid teaching and district coaching roles, and
- Creating district-wide professional learning communities, both face-to-face and virtual, for teachers to collaborate across schools.

Recommendation 3: Policy makers should take cognisance of the following policy implications.

Government policies may help to support PLCs by:

1. requiring subject advisor preparation programmes to include training and education on how to implement PLCs and promote teacher leadership,
2. developing PD courses through the NICPD and PDCPD for subject advisors and teacher leaders interested in creating PLCs,
3. allocating additional funding to school systems for accessing expertise to serve mentors for teacher leaders at their DPDCs, and
4. evaluating subject advisors on their ability to share leadership and create collaborative cultures.

6.4 Proposals for further research

This study adds to a growing body of knowledge on CPTD as participation in a PLC. Findings from my research indicate from the teachers' perspectives that their participation in the LEDIMTALI PLC was an opportunity for ongoing professional growth and development.

There is certainly a need for more studies that examine the concept of PLCs as they manifest in the South African context. In particular there is a need for studies that investigate the actual interactions of the teachers who participate in PLCs and their discourse around these interactions. It is in through studying these interactions that researchers will be able to truly understand how participation in a PLC constitutes a resource for professional growth and can lead to changes in practice. Hence I suggest that in order to gain deeper knowledge and understanding of how teachers may act and learn collaboratively, the following questions provide worthwhile areas of further research:

1. What do teachers do or create when they meet for the purpose of PD in a PLC?
2. How can we describe the mechanisms by which new knowledge is created as teachers meet for collaborative inquiry and professional learning in a PLC?

6.5 Conclusion

The LEDIMTALI project brought teachers from different schools together to build a PLC. The LEDIMTALI project design established a partnership with higher education that supported the participants' continued increase in attention to their mathematical knowledge for teaching; developing some pedagogical practices such intentional teaching, spiral revision and working with feedback. Moreover it promoted social learning practices that support teachers' professional learning, as embodied in the PLC construct.

Participation in a PLC provided both structure and opportunity for professional growth and development for the Mathematics teachers in the schools where the project was run. Teachers were able to interact and collaborate within a common practice and share their own practice and learn from the practices of others. They experienced professional learning through internal expertise (as represented by the teachers) coupled with external expertise as represented by the departmental support officials as well as the university academics. The interactions and collaboration of the community was learning-centered with a common theme of improving participation and performance in Mathematics at their respective schools.

This study contributes to the exploration of ongoing, sustained, job-embedded PD in the form of PLCs as an alternative to the traditional, one-day PD workshops that many teachers have attended in the past. A collaborative vision and leadership style in schools and in the planning of PD for teachers is essential as schools become more complicated nodes of technology and rapidly changing pedagogy.

The conclusions drawn from this study may provide educational leaders with models of collaborative PD that focusses on data-driven instructional practices that support shared vision within the school. Outcomes of this study may compel social change by offering PD and school culture planning that is built upon shared leadership, shared vision, and collaboration. If this social change in professional planning for school districts is embraced by school leaders, PLCs inclusive of both administrators and teachers will be implemented. Professional dialogue in schools can occur within these PLCs and overall school improvement and improvement in student achievement may result.



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Appendix A: Guskey's 5 levels of CPTD evaluation

Evaluation Level	What questions are addressed?	How will information be gathered?	What is measured or assessed?	How will information be used?
1. Participants' reaction	<p>Did they like it?</p> <p>Was their time well spent?</p> <p>Did the material make sense?</p> <p>Will it be useful?</p> <p>Was the leader knowledgeable and helpful?</p> <p>Were the refreshments fresh and tasty?</p> <p>Was the room the right temperature?</p> <p>Were the chairs comfortable?</p>	<p>Questionnaire administered at the end of the session</p>	<p>Initial satisfaction with the experience</p>	<p>To improve program design and delivery</p>
2. Participants' learning	<p>Do participants acquire the intended knowledge and skills?</p>	<p>Paper and pencil instruments</p> <p>Simulations</p> <p>Demonstrations</p> <p>Participant reflections (oral and verbal)</p> <p>Participant portfolios</p>	<p>New knowledge and skills of participants</p>	<p>To improve program content, format and organisation</p>
3. Organisation, support and change	<p>Was implementation advocated, facilitated and supported?</p> <p>Were problems addressed quickly and efficiently?</p> <p>Were sufficient resources made available?</p> <p>Were successes recognised and shared?</p> <p>Was the support public and overt?</p> <p>What was the impact on the organisation?</p> <p>Does it affect the organisation's climate and procedures?</p>	<p>District and school record</p> <p>Minutes from follow up meetings</p> <p>Questionnaires</p> <p>Structured interviews with participants and district or school administrators</p> <p>Participants' portfolios</p>	<p>The organisation's advocacy, accommodation and facilitation</p>	<p>To document and improve organisation, support, facilitation and recognition</p> <p>To inform future change efforts</p>

Evaluation Level	What questions are addressed?	How will information be gathered?	What is measured or assessed?	How will information be used?
4. Participants' use of new knowledge and skills	Did participants effectively apply new knowledge and skills?	Questionnaires Structured interviews with participants and their supervisors Participants' reflections (oral and written) Participant portfolios Direct observation Video tapes	Degree of quality and implementation	To document and improve the implementation of program content
5. Student Learning outcomes	What was the impact on students? Did it affect student performance or achievement? Did it influence students' cognitive or physical or emotional well-being? Are students more confident as learners? Is student attendance improving? Are dropouts decreasing?	Student records School records Questionnaires Structured interviews with students, parents, teachers and/or administrators Participant portfolios	Student learning outcomes Cognitive (performance and achievement) Affective (attitudes and dispositions) Psychomotor (skills and behaviours)	To focus and improve all aspects of design, implementation and follow-up To demonstrate the overall impact of professional development

APPENDIX B: PLC Development Profile

Please complete and return to e-mail: charlesraymond.smith@westerncape.gov.za or fax to 0865090424

1. The concept: professional learning community (PLC) combines three dimensions of teacher development. Please indicate your level of understanding of the concept of a PLC. Circle the number that represents your own level of understanding of a PLC

Dimension	Description	Non existent	Emerging	Developing	Fully developed
Professional	Participants share a discipline (Mathematics). We are trained in the discipline. Participants are practitioners (teachers of Mathematics)	1	2	3	4
Learning	Participants are committed to a continual improvement of our knowledge and skills for the purpose of improving our practice	1	2	3	4
Community	Participants are committed to collaborative inquiry and mutual support based of a relationship of trust and a shared vision or purpose	1	2	3	4

You may comment qualitatively on your understanding as well.

2. The features of a PLC are given in literature as indicated in the Table below. Please indicate how you experience each of these features in LEDIMTALI. Circle the number that represents your level of understanding

Feature	Short description	Non existent	Emerging	Developing	Fully developed
Shared norms and values	There are negotiated rules for engagement and behaviour and a unified purpose	1	2	3	4
Mutual trust and respect	Every participant's opinion is valued	1	2	3	4
Reflective dialogue	Critical and reflective discussions	1	2	3	4
Sharing private practice	Visiting each other's classes	1	2	3	4
Supportive and shared leadership	No visible hierarchy – every participant's expertise is recognised and valued	1	2	3	4
Collaborative inquiry	Working together to solve educational problems	1	2	3	4
Collective responsibility for learner performance	Sharing resources and experiences in order to improve teaching and learning Reflecting on learner results	1	2	3	4

If a feature is either non-existent or fully developed please justify or write any comments on how you experience these features in LEDIMTALI

Appendix C: Profile of the teachers interviewed

Name	Gender	Years of experience	Number of colleagues in the subject team	Frequency of subject meetings	Nature of subject meetings

1	Andrew	Male	24	4	Once per term	Mainly admin and management issues are discussed. Since participating in LEDIMTALI, frequent informal discussions on teaching and learning takes place between colleagues.
2	Arlene	Female	21	4	Once per term	Mainly admin and management issues are discussed.
3	Erick	Male	24	4	Once per term	Mainly admin and management issues are discussed. Since participating in LEDIMTALI, frequent informal discussions on teaching and learning takes place between colleagues.
4	Eleanor	Female	18	6	Once per term	Mainly admin and management issues are discussed.
5	Elvira	Female	25	3	Monthly	Mainly admin and management issues are discussed.
6	Miranda	Female	3	6	Grade groups meets weekly and the subject team meets monthly	Grade groups discuss planning, common assessments and learner progress. Monthly meeting deals with administrative and management issues.
7	William	Male	10	5	Every 2 weeks	Mainly admin and management issues are discussed but often reflect on learner performance and interventions.
8	Lee-Anne	Female	18	4	Once per term	Mainly admin and management issues are discussed.
9	Gloria	Female	24	2	Monthly	Mainly admin and management issues are discussed.

Appendix D: Letter to interviewees

Mr. CR Smith

39 Hill Street

KUILS River

7580

Dear

INTERVIEW REQUEST

I hereby request an interview with you about issues relating to my research on Professional Learning communities.

I am a Ph.D. student at the University of the Western Cape doing research regarding the factors that promote or hinder the formation of Professional Learning Communities in some schools in the Western Cape. This research is embedded in the Local Evidence-Driven Improvement in Mathematics Teaching and Learning Initiative, project approved by the Western Cape Education Department.

This study aims to generate in depth understanding of how theory and practice regarding CPD of Mathematics teachers in the Western Cape may be implemented. In particular the research will provide some understanding regarding processes and issues involved in establishing a PLC amongst teachers of Mathematics across different schools.

The title of my thesis is

Continuous Professional learning Community of mathematics Teachers in the Western Cape: Developing a professional Learning Community through a school-university partnership.

This model of Continuous professional Development is also proposed by the national Department of Basic Education(DBE) in its strategy for teacher development, called the

Integrated Strategic Planning framework for Teacher Education in South Africa: 2011 – 2025
(ISPFTED:3, April 2011).

The letter of approval by the WCED to do this research in the project schools, is attached
In order to adhere to the ethical considerations that guides social research the following aspects
will be considered: 1) protection of all participants; 2) obtaining informed consent from all
participants; 3) ensuring validity and credibility of the data. Respondents will remain
anonymous and confidentiality will be maintained at all times.

It would be appreciated if you agree to an interview with the researcher in order to obtain
primary data that provide information related to my research.

These interviews will take place outside teaching time during the first and second terms of the
2014 school year.

Yours sincerely

Signature:

C.R. Smith

12 March 2014



APPENDIX E: Interview and recording consent form

Continuous Professional learning Community of mathematics Teachers in the Western Cape: Developing a professional Learning Community through a school-university partnership.

1. The purpose and nature of the interview have been explained to me.
2. Any question I asked about the purpose and the nature of the interview has been answered to my satisfaction.
3. I agree to be interviewed for the purpose of this study.
4. I understand that my name will not be cited or otherwise disclosed.

Name of the interviewee: _____

Signature: _____

Date: _____

I have explained the project and the implications of being interviewed to the interviewee.

I believe that the consent is informed.

The interviewee understands the implication of participation.

Name of the interviewer: _____

Signature: _____

Date: _____

APPENDIX F: Individual Interview protocol.

I would like to thank you for acceding to my request to be interviewed. I realise your time is valuable and I appreciate you taking time to assist me with my thesis research.

Guiding interview questions

Over the past year your school and a number of others have participated in the LEDIMTALI PLC

Biographical Questions

1. Give me a brief history of your teaching career
2. How long have you been at this school?
3. How many teachers are in the Mathematics department?
4. What is your position in the Mathematics department?
5. How often do you meet as a Mathematics department?
6. What do you discuss in your departmental meetings?

PLC Interview Questions

1. *What is your understanding of a PLC and what does the name “professional learning community” convey to you?*
2. *Describe the essential characteristics or features of the PLC in which you are participating.*
3. *What is your understanding of a PLC?. Why would you regard LEDIMTALI as a PLC and what are the features of Ledimtali which tells you that it is a PLC?*
4. *What do you see as the main drivers or enablers to becoming a PLC?*
5. *What do you see as the main barriers to becoming a PLC?*
6. *What do you see as the main drivers or enablers to sustaining this PLC? Do you think schools will continue networking when the project comes to an end? Why or Why not?*
7. *What do you see as the barriers to sustaining this PLC?*
8. *In what way has your teaching practices changed as a result of your participation in this PLC?*
9. *What aspects of the PLC supports these changes in your teaching practice?*

Possible probing questions

1. Would you elaborate or explain further?
2. Can you provide me with an example?
3. Please describe what you mean?
4. Can you clarify? I want to make sure that I understand what you mean?

Appendix G: Focus group Interview questions.

Focus Group protocol

I would like to thank you for attending this focus group interview today. I realise your time is valuable and I appreciate you taking time to assist me with my thesis research. To be respectful of everyone's time, please observe the following procedures:

1. Only one person should speak at a time,
2. Please avoid side conversations,
3. Everyone needs to participate and no one should dominate the conversation, and
4. The focus group interview will last no longer than an hour. If you do not mind I would appreciate that your cell phones are switched off during the interview process

Thank you.

Guiding interview questions

Over the past year your school and a number of others have participated in such a The LEDIMTALI PLC

1. In your own words, unpack for me your interpretation the three words in the name Professional Learning Community.
2. Describe essential characteristics or features of the PLC in which you are participating.
3. What do you see as the main drivers or enablers to becoming a PLC?
4. What do you see as the main drivers or enablers to sustaining this PLC?
5. What do you see as the main barriers to becoming a PLC?
6. What do you see as the barriers to sustaining this PLC?
7. In what way has your teaching practices changed as a result of your participation in this PLC?
8. What aspects of the PLC supports these changes in your teaching practice?

Possible probing questions

1. Would you elaborate or explain further?
2. Can you provide me an example?
3. Please describe what you mean?
4. Can you clarify? I want to make sure that I understand what you mean?

Thank you

Appendix H: Permission to do research in schools

Audrey.wyngaard2@pgwc.gov.za

Tel.: +27 021 467 9272

Fax: 0865902282

Private Bag x9114, Cape Town, 8000

wced.wcape.gov.za

REFERENCE: 20130729-14831

ENQUIRIES: Dr A T Wyngaard

Mr Charles Smith
39 Hill Street
Kuils River
7580

Dear Mr Charles Smith

RESEARCH PROPOSAL: Continuous Professional learning Community of mathematics Teachers in the Western Cape: Developing a professional Learning Community through a school-university partnership.

Your application to conduct the above-mentioned research in schools in the Western Cape has been approved subject to the following conditions:

1. Principals, educators and learners are under no obligation to assist you in your investigation.
2. Principals, educators, learners and schools should not be identifiable in any way from the results of the investigation.
3. You make all the arrangements concerning your investigation.
4. Approval for projects should be conveyed to the District Director of the schools where the project will be conducted.
5. Educators' programmes are not to be interrupted.
6. The Study is to be conducted from 01 August 2013 till 20 September 2013 and 16 January 2014 to 31 July 2014
7. No research can be conducted during the fourth term as schools are preparing and finalizing syllabi for examinations (October to December).
8. Should you wish to extend the period of your survey, please contact Dr A.T Wyngaard at the contact numbers above quoting the reference number?
9. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
10. Your research will be limited to the list of schools as forwarded to the Western Cape Education Department.
11. A brief summary of the content, findings and recommendations is provided to the Director: Research Services.
12. The Department receives a copy of the completed report/thesis/thesis addressed to:

The Director: Research Services
Western Cape Education Department
Private Bag X9114
CAPE TOWN
8000

We wish you success in your research.

Kind regards.

Signed: Dr Audrey T Wyngaard

Directorate: Research

DATE: 29 July 2013

Appendix I: The conceptual framework for this study

Dimension of a PLC	Identifying features
1. Shared vision, norms and values	
A PLC is guided by the vision that all students are capable of learning and the construction of learning environments supportive of students realising their potential	<ul style="list-style-type: none"> • A constant focus on learning • Improving learning environments and learning opportunities • Caring student-teacher relationships
Members of the PLC collaboratively establish the norms of engagement	<ul style="list-style-type: none"> • Professional conduct • Mutual respect and trust
The values embedded in a PLC are grounded in a sense of purpose and this provides focus and commitment to the vision	<ul style="list-style-type: none"> • A sense of community • Caring relationships • Positive and productive dispositions
2. Supportive and shared leadership	
Leadership is provided in an atmosphere of caring relationships and the nurturing of human capacity.	<ul style="list-style-type: none"> • Caring and nurturing • Shared decision making (democratic practices) • Follow-up and follow through
Leadership is situational and is executed on the basis of expertise and experience	<ul style="list-style-type: none"> • Differentiate between administrative and pedagogical leadership • Distributed leadership • Shared facilitation
Leadership is collegial and grounded in facilitative participation	<ul style="list-style-type: none"> • Facilitative participation • Listening • Collegial relationships
3. Reflective dialogue	
Teacher discourse revolves around student learning and reflection on real-time classroom practice	<ul style="list-style-type: none"> • Conversations about teaching and learning as well as barriers to learning • Sharing experiences on methodologies and teaching strategies
Reflection involves the teaching and learning dialogic as well as assessment for and of learning	<ul style="list-style-type: none"> • Collaborative reflection of student work including the results of common assessment tasks
Reflection and feedback is interactive and non- evaluative	<ul style="list-style-type: none"> • Reflection and feedback
4. Collaborative inquiry	
Teachers acting as change agents for each other	<ul style="list-style-type: none"> • Collegial and collective learning • Sharing teaching and learning resources • Collaborative development of teaching and learning resources

Identification of problematic issues of practice, including personal practice and the collective solution seeking discourse	<ul style="list-style-type: none"> • Problem identification and collective solution seeking • Action research • Seeking expert and/or external assistance
Working in Grade level teams and across grade levels	<ul style="list-style-type: none"> • Collaborative lesson planning and curriculum mapping to map progression of concepts • Design with the end in mind – including the demands of the high stakes exit examinations
5. Deprivatized practice.	
Opening classrooms as sites for collaborative inquiry	<ul style="list-style-type: none"> • Peer visitation, observation and feedback • Reviewing teaching strategies • Risk-taking and experimentation
Sharing personal practice, including successes and failures	<ul style="list-style-type: none"> • Sharing resources • Sharing classroom experiences • Sharing problems and solutions as well as successes and failures
Non evaluative review of teachers' practice and behaviours	<ul style="list-style-type: none"> • Collegial support and coaching/mentoring • Commitment to the vision • Regard for hard work



Appendix J: Research questions and interview questions matrix

Research Question	Interview Questions
<ul style="list-style-type: none"> How do teachers in the LEDIMTALI project make meaning of the concept of a Professional Learning Community 	<ol style="list-style-type: none"> 1. <i>What is your understanding of a PLC and what does the name professional learning community convey to you?</i> 2. <i>Describe the essential characteristics or features of the PLC in which you are participating.</i>
<ul style="list-style-type: none"> How do teachers experience the salient features of a Professional Learning community 	<ol style="list-style-type: none"> 3. <i>What is your understanding of a PLC?. Why would you regard LEDIMTALI as a PLC and what are the features of Ledimtali which tell you that it is a PLC?</i> 8. <i>In what way has your teaching practices changed as a result of your participation in this PLC?</i> 9. <i>What aspects of the PLC supports these changes in your teaching practice?</i>
<ul style="list-style-type: none"> What are the factors that promote or hinder the establishment of a Professional Learning Community amongst Mathematics teachers across different schools in the LEDIMTALI project? 	<ol style="list-style-type: none"> 4. <i>What do you see as the main drivers or enablers to becoming a PLC?</i> 5. <i>What do you see as the main barriers to becoming a PLC?</i>
<ul style="list-style-type: none"> What are the factors that may promote sustainability of a Professional Learning Community as perceived in the LEDIMTALI project 	<ol style="list-style-type: none"> 6. <i>What do you see as the main drivers or enablers to sustaining this PLC? Do you think schools will continue networking when the project comes to an end? Why or Why not?</i> 7. <i>What do you see as the barriers to sustaining this PLC?</i>