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The effectiveness of a Professional Learning Community (PLC) intervention to promote the teaching of critical thinking skills among four Grade 6 teachers.

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Dissertation submitted in fulfilment/partial fulfilment of the requirements for the degree in Master of Education in the Faculty of Education **at the Cape Peninsula University of Technology**

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Declaration

I, Helen Anetta Erlangsen, declare that the contents of this dissertation/thesis represent my own unaided work, and that the dissertation/thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

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Signed **Date**

Abstract

Much of today's classroom learning, particularly in the senior primary phase, focuses on activities whereby learners acquire facts and rules, employing only the lower levels of cognition: knowledge, comprehension and application (Sonn, 2000). In order to bridge the gap between the real and the ideal (Hartley, Bertram & Mattson, 1999) with regards to the development of critical and creative thinking, educators need to be trained and provided with the necessary tools and relevant teaching strategies to better align their teaching to the requirements of the Curriculum and Assessment Policy Statement (CAPS).

This research developed quantitative and qualitative instruments to investigate Grade 6 teachers' understanding of creative and critical thinking before and after a professional learning community (PLC) intervention. The implementation of the PLC involved the Creative Problem Solving (CPS) programme's generating tools, and was guided by Bourdieu's social field theory. The aim of the intervention was to consider the shifts and changes that teachers might make in their teaching practices to purposely include the development of creative and critical thinking skills in their pedagogy. A pragmatic paradigm was utilized, focusing on methodological flexibility with the use of an explanatory sequential mixed method approach. Although this small, convenient sample excludes any statistical evidence, it does reflect that given time and support, teachers' pedagogical habitus (see Feldman & Fataar, 2014) is adaptable. The meaningful, cooperative approach of the PLC and the development of creative and critical thinking skills, through the use of the creative problem solving programme, created the platform for change.

Keywords: cognitive intelligence, creative and critical thinking, creative problem solving, professional learning communities, explanatory sequential mixed method, Bourdieu, pedagogical habitus change.

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I am very grateful for financial assistance from the Oppenheimer Trust Fund to attend the world's largest conference on creativity at Buffalo University in New York State: Creative Problem Solving Institute (CPSI) in June 2017. It has forever changed my approach to education.

Opinions expressed in this thesis and the conclusions arrived at, are those of the author, and are not necessarily to be attributed to the National Research Foundation.

Dedication

I dedicate this to all the teachers of the future. May they realise their potential to change South Africa.

"Education is the most powerful weapon which you can use to change the world." - Nelson Mandela

This dissertation is a gift to myself.

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(numbered according to the chapter in which they appear)

Acronyms and Abbreviations

ACE	Advanced Certificate in Education
AECT	Association for Educational Communications
CPUT	Cape Peninsula University of Technology
CERG	Cognitive Education Research Group
CoRT	Cognitive Research Trust
CPTD	Continuing Professional Teacher Development
CAPS	Curriculums Assessment Policy Statement
CEF	Creative Education Foundation
CPSI	Creative Problem Solving Institute
CPS	Creative Problem Solving
CPTD	Continuing Professional Teacher Development
COP	Communities of Practice
DoE	Department of Education
DBE	Department of Basic Education
FGI	Focus Group Interview
HOTS	Higher order thinking skills
ISPFTED	Integrated Strategic Planning Framework for Teacher Education and Development
IACESA	International Association for Cognitive Education in South Africa
MMR	Mixed Method Research
NCS	National Curriculum Statement
NQF	National Qualifying Framework
OBE	Outcomes Based Education
PED	Professional Educational Development
PLC	Professional Learning Community
QUAL	Qualitative
QUAN	Quantitative
SACE	South African Council for Educators
SLP	Short Learning Programme
SPSS	Statistical Package for the Social Sciences
TTCT	The Torrance Tests of Creative Thinking
TASC	Thinking Actively in a Social Context
TSSA	Thinking Schools South Africa
VVOB	Flemish Development Agency
WCED	Western Cape Education Department

Chapter 1 Introduction

The effectiveness of a Professional Learning Community (PLC) intervention to promote the teaching of critical thinking skills among Grade 6 teachers.

1.1 Introduction

This study explores the effectiveness of a professional learning community (PLC) in supporting the introduction of creative and critical thinking skills within the Curriculum and Assessment Policy Statement (CAPS) in the South African school context. The teachers involved in the PLC are from an ex-model C primary school in the Western Cape. It is anticipated that the knowledge generated from this inquiry will provide new insights into how teachers can adapt their pedagogy to include creative and critical thinking skills.

This introductory chapter begins by presenting the problem statement, the purpose of the research and the research questions. This is followed by an overview of the study's historical background and context, including explanations of the main concepts of this study. The chapter contains an outline of the research methodology and the conceptual and theoretical frameworks that were used to analyse the research data. The limitations of this study are discussed. The chapter concludes with the presentation of the organisation of the chapters of this thesis.

1.2 Statement of the Problem

Research indicates that teachers struggle to purposely plan for and blend creative and critical thinking into their classroom practice (Engelbrecht, 1995; Esterhuizen & Grosser, 2014; Jansen, 1998; McGuinness, 1999; Sternberg & Grigorenko, 2007). Despite direction from CAPS to include higher order thinking skills in their pedagogy, teachers remain comfortable with more traditional 'chalk and talk' methods of instruction. Currently there is little information available as to why this phenomenon occurs (Grosser, 2015). This research sets out to explore the effectiveness of a PLC to infuse creative and critical thinking in the classroom practices of four Grade 6 teachers.

1.3 Research Questions

1.3.1 Main Research Question

How effective is a Professional Learning Community (PLC) intervention to promote the teaching of creative and critical thinking skills among Grade 6 teachers?

From this main research question the following sub-questions were generated:

1.3.2 Secondary Questions

- What are teachers' understandings of 'intelligence' and 'creative and critical thinking' as per the CAPS requirements?
- How can a PLC be facilitated for the introduction and development of creative and critical thinking skills into teachers' classroom practices?
- What are teachers' perceptions of an intervention of a new creative problem solving programme on their current and post pedagogical habitus (particularly tools for generating new ideas)?
- What shifts and changes can teachers make in their teaching practices to include creative and critical thinking skills through the lens of Bourdieu's social field theory?

1.3.3 Main Objectives

- To review teachers' understandings of 'intelligence' and 'creative and critical thinking'
- To explore teachers' perceptions of an intervention of a new creative problem solving programme (particularly tools for generating new ideas.)
- To facilitate a PLC for the introduction and development of creative and critical thinking skills into teachers' classroom practices
- To consider the shifts and changes that teachers make in their teaching practices to include critical thinking skills through the lens of Bourdieu's social field theory

1.4 Purpose of the Study

The purpose of this study is to explore the perceptions of the effectiveness of an intervention of creative and critical thinking tools to a small sample of teachers at a primary school in the Western Cape. This research sought to understand the life-world of teachers and their engagement with a discovery-type learning opportunity that encouraged their learners to actively participate in becoming creative and critical

thinkers. The knowledge derived from the research into the effectiveness of a PLC intervention, to promote the teaching of critical thinking skills among Grade 6 teachers, could contribute to a more informed understanding of pedagogical habitus change (see Feldman & Fataar, 2014) in teachers, regarding their pedagogy.

1.5 Background

Sternberg and Lubart (1996:169) recommend a multidimensional approach when studying creativity and suggest that an inclusive study comprises not only cognitive processes necessary for problem solving such as insight, but also personal qualities like social and emotional characteristics of, for example, commitment and openness to experience. The literature review will present a broader perspective of 'intelligence' as Sternberg and Lubart (1996:176) suggest "being a stellar student is clearly not a prerequisite to the production of great work". With the introduction of the internet and the ease of access which most learners have to the internet, the teacher is no longer the keeper of knowledge. The memorisation of facts no longer has centre place in teaching and learning and, as noted by the Department of Education (DBE), children now require "an active and critical approach to learning" in order to process the vast amounts of information at their disposal and to become "meaningful participants of society" (DBE, 2012:4).

Currently, within the South African teaching context, everyday classroom teaching tends to offer little intention to purposely grow and develop critical thinking skills (Grosser, 2015; Booyse, 2016). This thesis' research into the effectiveness of an intervention to promote the teaching of critical thinking skills among Grade 6 teachers also discovered an understanding of the obstacles that teachers encounter as they work towards the purposeful teaching of these critical skills which are essential for a 21st century education.

I have spent the past thirty years as a class teacher, a computer studies teacher and an enrichment teacher. My current enrichment programme is focused on creative and critical thinking to stimulate the minds of a core group of selected senior primary learners. The learners thrive on these lessons and compete to be included in this collaborative exploratory programme. It is thus my intention to develop an intervention for assisting all teachers to infuse these critical thinking skills, as effortlessly as possible, into their daily teaching practice.

1.5.1 Curriculum Requirements

The general aims of the current South African curriculum suggest a “critical approach to learning” where learners are able to “identify and solve problems and make decisions” incorporating skills to “collect, analyse, organise and critically evaluate information” (DBE, 2012:4-5). These aims are expected to equip learners with the necessary skills to approach their learning. If learners are required “to be able to use critical and creative thinking” as prescribed by the curriculum (DBE, 2012:4), it means that teachers are expected to specifically teach these skills to the learners.

The South African curriculum uses terminology consistent with Blooms’ Taxonomy (1956) such as *analyse, evaluate* and *solve problems* to produce competent learners (DBE, 2012:5). The use of words such as ‘higher order thinking skills’ (HOTS) and ‘critical and creative thinking skills’ or merely ‘thinking skills’ all mean an ability to use a more investigative, deeper thought process instead of content-driven and rote learning. South African teachers, with support from the curriculum, are guided by Bloom’s (1956) taxonomy towards higher order thinking. Whilst Paul (1993) recognises Bloom’s taxonomy, he suggests that many teachers incorrectly consider that knowing how to use Bloom’s verbs and the wording included in this hierarchy of skills, is the teaching of critical thinking. Many of these teachers are unaware that the teaching of critical and creative thinking skills involves a more focused approach to including these skills in everyday teaching and learning.

Thinking Schools South Africa (McIntyre & Van de Leur, 2015; Paul, 1993) advocate that it is necessary for teachers to have a solid foundation of creative and critical thinking before they are able to teach these skills to their learners. The current work on infusing thinking into the school curriculum in South Africa is undertaken by the International Association for Cognitive Education in South Africa (IACESA) and Thinking Schools South Africa (TSSA). The latter provides intervention tools such as Thinking Actively in a Social Context (TASC) (2001), Thinking Maps (2011), de Bono tools (1983) and Habits of Mind (2008) (McIntyre & Van de Leur, 2015). Presently there is no model available in South Africa (Grosser, 2015) that may easily be infused into the curriculum to assist teachers to teach thinking skills purposefully. Grosser (2017) also cautions that a one-size-fits-all approach is also not desirable as school contexts and learner needs differ.

It has become a cliché to talk of the “gap between policy and implementation” (Harley & Parker, 1999:181). Harley and Parker (1999:181) suggest that a “situation persists in spite of some highly innovative policy and the best intentions of the state department of education”. Research on the implementation of the CAPS by Umalusi (2010-2014), one of the three quality councils in South Africa who manage standard qualifications in education, suggest that the curriculum appears to focus on content-driven learning, leaving very little room for the teachers to interpret what and how to teach (Booyse, 2016). Other problematic issues identified by Umalusi point to the absence of teaching important 21st century thinking skills, dispositions or attitudes that would contribute to achieving advanced learner performance (Booyse, 2016). If learning is to be successful, teachers need to develop “interpersonal and self-directed learning skills”, providing learners with the “skills to reflect on learning” (Booyse, 2016:34). This pedagogy speaks directly to a more learner-centred, discovery-type teaching methodology, “rather than a rote or uncritical learning” of information (DBE, 2012:4).

Change, in any form is difficult (Langley, 2012; Henderson, 2017). The changing of one’s teaching style can be understood through the lens of Bourdieu’s social field theory (Bourdieu, 1990) that is used as the theoretical framework for the study. Bourdieu’s theory of practice offers insights and understandings into patterns of behaviour expressed through the thinking tools of habitus, capital, field and doxa.

1.6 Theoretical Framework: Bourdieu’s Social Field Theory

Langley (2012:1) asks the question “Why do people find it so hard to change when they know it’s good for them?” In this work I will explore the possibility that a sustained PLC may assist teachers to shift their pedagogical habitus (Feldman & Fataar, 2014). Much of our behaviour has been shaped by training and experience that has become habitual. Bourdieu (1990) refers to one’s habitus which he defines as the attitudes, values and beliefs that have become embedded in our dispositions. Bourdieu describes one’s habitus as the way in which an individual is in the social world and the way in which the social world is within the individual (Bourdieu, 1990). Our cultural history, from our early childhood, informs us how to act and respond without consciously being aware that we are conforming to a code of conduct with a given environment or field. This conduct or internalised set of rules become inscribed on and in individuals as ‘human nature’. Bourdieu posits that our habitus may be transformed by social interaction (Bourdieu, 1990). In order, therefore, for teachers to shift and adapt the way in which they teach requires a sustained intervention. This thesis work

involved teachers collaborating and dialoguing together in a PLC to find ways to accommodate creative and critical thinking skills in their everyday teaching. The role of a PLC, as a reflective intervention practice, holds the potential for teachers to question their taken-for-granted classroom practices.

CAPS is based on a pedagogy that embraces strong classification and framing (Bernstein, 1975;1977). Despite the curriculum policy stating that critical and creative thinking skills should be included in teaching and learning, this requires a pedagogical shift from a strongly framed pedagogy to a more organic, differentiated role, one that involves support and facilitation in order to include the complex and multi-faceted phenomenon involved in cognitive and metacognitive skills (Kloppers & Grosser, 2010).

1.7 Conceptual Framework: Intelligence and Thinking

Thinking skills are supported by theories of cognition where learners are seen as creators of their own knowledge, using knowledge flexibly to solve problems, while adopting a creative, yet critical attitude. This study elected to recognise Sternberg's (2009) triarchic theory of successful intelligence because of its simplicity in understanding multiple-intelligences. The Creative Problem Solving (Treffinger, Isaksen & Dorval, 2003) programme used in the intervention supported the concepts of experimental learning as a "transformative teaching methodology that supports a dialogical learning atmosphere…" (Samson, 2015:153). However, this study acknowledges and is supported by many other theories of intelligence mentioned in this study, relative to developing creativity and critical thinking in classrooms today.

1.7.1 Reinventing Intelligence

The question of what constitutes human intelligence is a dialectic topic. In *Teaching for Successful Intelligence*, Sternberg and Grigorenko (2007) relate the story of *The Grizzly Bear's Lunch*, to explain *successful intelligence*. In this story, two boys encounter a bear in the forest. The '*clever'* boy, who received excellent grades in school used a complicated mathematical formula to calculate if the bear would overtake them. The *street-smart* boy, whose grades are nothing special, runs off saying, "I don't have to outrun the bear, I just have to outrun you!" *Street-smart* outwits *book-smart* in this incidence. This points to the question of what, exactly, is successful intelligence?

Conventional views of intelligence seem to favour students who have strong memory recall abilities and analytical abilities (Sternberg, 2009). However, over time researchers were forced to seek a broader theory to match other talents that allowed individuals to succeed in life. In a quest to better understand successful intelligence the literature review in this study takes a closer look at multiple intelligences such as Sternberg's triarchic theory of intelligence (Sternberg & Grigorenko, 2007), and emotional intelligences with Duckworth's 'growth-mindset' theory (Duckworth, 2016:181) and Kaufman's 'theory of personal intelligence' (Valentine, 2016:43) which all suggest that it is "time to change the way we think about human potential" (Weir, 2015:58). This new concept of intelligence is related to the need to include creative and critical thinking skills in order to teach learning that is relevant for a 21st century learner. Whilst exploring an intervention of creative and critical thinking, one needs to explore the concepts of intelligence.

Intelligence is a complex, multi-faceted phenomenon involving inter-related cognitive and metacognitive skills (Kloppers & Grosser, 2010). These skills include both the critical thinking traits such as refining and evaluating, and generative, exploratory, creative cognitive processes (Nickerson, 1999). The CPS programme was selected by the researcher as part of the methodology because it combines the two aspects of critical thinking and creative thinking by emphasising divergent and convergent thinking skills.

1.7.2 Thinking Skills and Dispositions

Thinking skills are a basic set of advanced skills and subskills that govern our mental processes (Cotton, 1991). These skills include knowledge, dispositions, and cognitive and metacognitive operations (Cotton, 1991). Whilst creative thinking is characterised by novel ways of seeing things characterised by fluency, flexibility, originality and elaboration (Cotton, 1991; Torrance, 1974), critical thinking is defined by logic, accuracy, authenticity, analytical thinking and reason (Cotton, 1991; Sternberg, 1996).

Grosser and Lombard (2008) maintain that teachers need to be taught how to infuse creative and critical thinking into their daily lessons. If teachers are to recognise and nurture multiple talents in learners, they need to understand the current theories and new concepts on intelligence. Although a view of multiple intelligences includes many dated references, these founding forefathers of the 'thinking skills' revolution of the 1970s, are still valuable today. A collaborative version of Binet and Simon's standard

verbal and numerical tests (Binet & Simon, 1916) was used to measure intelligence for about 60 years until the 1970s when ideas about intelligence began to change. Major theorists who have changed the way we think about intelligence and learning would include: Torrance (1974), creator of the Torrance Test of Creative Thinking (TTCT); de Bono (1988) and his Cognitive Research Trust (CoRT) thinking tools; Reuven Feuerstein (Ben-Hur, 2006) and his Instrumental Enrichment (IE) programme; Gardener (1993) introduced his Theory of Multiple (8) Intelligences; Buzan (2000), presented his 10 Intelligences; Marzano (1992) presented his five dimensions of learning or thinking types; Costa and Kallick (2009) offered their 16 Habits of Mind, and the simple, three part view used as portion of the conceptual framework of this research, Sternberg's (1996) Triarchic Theory (3) of Intelligence. These theorists challenged traditional beliefs about intelligence and cognitive science by offering a wider vision for intelligence, inclusive of new ideas such as problem solving abilities and creative, effective ideas generation, all of which seemed to be more apt in describing successful people in the world.

1.7.3 Critical Thinking

At the 1987 conference for Excellence in Critical Thinking, Scriven and Paul (1987) defined critical thinking as "the intellectually disciplined process of actively and skilfully conceptualising, applying, analysing, synthesising, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning or communication, as a guide to belief and action". This has become the standard definition for critical thinking. One needs however to consider that much of the pioneering research into creative and critical thinking and its benefits are embedded in research done in the early 1960's to the 1990's in the United States of America. Paul (1993) reflects that 11 major international conferences on research into critical thinking and educational reform were held between 1980 and1991 at Sonoma State University. This research formed the bedrock for research on creative thinking today.

Facione (1990:8) describes the critical spirit in a positive sense as "a probing inquisitiveness, a keenness of mind, a zealous dedication to reason, and an eagerness for reliable information." He also reinforces that it is all about "how you approach" problems and issues that really matter (Facione, 1990:8). Facione (1990) offers six thinking ideals: identify problems, define the context, enumerate the choices, analyse the options, list reasons explicitly and self-correct. This process is very similar to the

Osborn-Parnes CPS model (Treffinger, Isaksen & Dorval, 2003) discussed in this research.

1.7.4 Creative Thinking

Paul and Elder (2008) view critical and creative thinking as inseparable as both are achievements of thought arising out of originality. Critical thinking is not a natural phenomenon, yet often our success in life depends on it.

Everyone is born with a level of creativity (Nielsen & Thurber, 2016). Torrance (1972) proved after teaching creativity for nearly twenty years that creativity can be taught (Nielsen & Thurber, 2016). Seventy years of research into the science of creativity has resulted in the development of comprehensive new skills and techniques to enable everyone to learn and improve creative thinking. “Creativity is the ability to produce work that is both novel and appropriate” (Sternberg & Lubart, 1999:3). Newell, Shaw and Simon (1962:66) see creativity as “a special class of problem-solving activity characterised by novelty, unconventionality, persistence, and difficulty in problem formulation”. Nielson and Thurber consider this skill to be the highest form of learning and state that “where it used to be a nice skill to have, now it is a need to have” (2016:18).

1.7.5 Creative Problem Solving

Alex Osborn founded the Creative Educational Foundation (CEF) in 1954 and started the Creative Problem Solving Institute (CPSI). Sidney Parnes joined him and together they developed a method for teaching creative thinking and problem solving. Joined by Ruth Noller, they created a graduate course at SUNY Buffalo University that is still going strong today. CEF hosts the world largest ‘creativity’ conference annually and continues to develop and refine the CPS material. CEF, with the support of much research, characterised creative problem solving into six phases namely; exploring the vision, gathering data, framing problems, generating ideas, formulating solutions and building a plan (Noller, 1977; Parnes et al., 1977; Torrance, 1988; Torrance & Myers, 1970). This research only used the ‘generating’ or ‘ideate’ phase of the programme.

CPS offers a “broad set of tools and methods to foster key behaviours conducive to creative thinking” (CEF, 2014:3). Two key elements of the CPS programme are that of divergent and convergent thinking. Brainstorming was an attempt by Osborn to structure the divergent thinking process. It encourages one to generate as many ideas as possible; freely, uninhibited, valuing bizarre ideas and without criticism or judgment

(Parnes et al., 1977). This allows the creative process to generate something new and useful. In the convergent thinking process, “criteria are purposely applied to screen, select, evaluate and refine the options” (CEF, 2014:13). These two elements are crucial in the creative thinking process.

Learners are often not taught how to solve problems and yet they are expected to make critical decisions daily (CEF, 2014). CPS is therefore regarded as a valuable life skill. This well-researched CPS programme offers learners tools and techniques, not only to solve problems, but it also teaches them to clarify new problems worthy of research. This study selected the generating-ideas tools from the CPS ‘ideate’ stage in a bid to offer an easy-to-use vehicle for the teachers to explore the use of creative and critical thinking skills in their classroom teaching. This intervention was supported by the establishment of a PLC for teachers in a primary school in the Western Cape.

1.8 Conceptual Framework: Professional Learning Communities (PLCs)

A PLC usually consists of a group of educators who meet regularly to share expertise and work collaboratively to improve their teaching skills and ultimately, the academic performance of their learners (Abbott, 2014). A PLC serves to improve the knowledge and skills of educators through collaborating and dialoguing about new or improved pedagogical skills (Abbott, 2014). The dialogical aspect of PLCs allows teachers to question, re-evaluate and refine their practice while improving their teaching strategies and pedagogical knowledge.

In 2011 the Minister of Basic Education, Mrs Angie Motshekga launched the Integrated Strategic Planning Framework for Teacher Education and Development (ISPFTED) that introduced the possibility of using PLCs within the South African context. In 2015/6, she endorsed a document entitled ‘Professional Learning Communities: A guideline for South African schools’ (DBE, 2016). In this document, the DBE’s vision for supporting teachers’ lifelong professional development, was that PLCs hold the potential to assist teachers in finding ways to provide learners with the knowledge and skills needed to succeed in the ever changing 21st century society (DBE, 2016:3). Drawing on this document, this thesis study seeks to inquire into the effectiveness of a PLC intervention in promoting the teaching of critical and creative thinking skills among Grade 6 teachers.

1.9 Research Framework

Although pragmatism forms the framework for this research, an element of post-positivism is suggested as the research considers the effects of an intervention to assist teachers to purposely incorporate new skills into their classroom lessons. However, the qualitative tools employed in this research, that of Bourdieu's social field theory and the collaborative ideals of the PLC, have a social constructivist approach. These aspects of the research seek to provide an understanding of the teachers' life-world and their ability to manage change.

1.10 Research Methodology

Framed within a pragmatic paradigm, the research process in this thesis used a sequential explanatory mixed method research that involved separate data collection and analysis of both quantitative and qualitative data. Whilst the quantitative data provided a base-line assessment of the teachers' early perceptions of staff development and thinking skills, the qualitative data and its results provided the researcher with a deeper understanding of the teachers' perceptions of an intervention strategy of creative and critical thinking skills. The data from the qualitative, open-ended questionnaire helped explain the quantitative survey data, while the qualitative focus group interview confirmed and integrated the data from both the quantitative and qualitative data. This quasi-experimental method attempted to reveal the ability of the independent variable (the intervention of creative and critical thinking skills) to influence the dependant variable (the teachers' pedagogy). The combination of both quantitative and qualitative data provided a more complete understanding of the research problem.

Mixed methods research is branded as "a new star in the Social Sciences sky" (Mayring, 2007:1). It is able to "narrate both the statistical trends and the stories of a personal journey related to the change" (Mayring, 2007:1). According to Mayring it allows the quantitative data to reveal the "linear unfolding of the game", yet includes "commentary by the color" from the qualitative data which is able to reveal the "individual stories and highlights of the personnel on the playing field" (2007:1). This coming together of both quantitative and qualitative data "becomes a natural outlet for research" (Mayring, 2007:1).

This reveals that quantitative and qualitative research each provides a different view of the problem. The combination of both methods of inquiry reduces the limitation of

each method when used separately. The general findings of the quantitative method are complemented by the detailed understanding provided by the qualitative approach (Creswell, 2014). Tashakkori and Teddlie (2003; 2010) have brought new understanding to mixed methods research. They claim that although it has its roots in the separate methodologies "mixed methods research has evolved to the point where it is a separate methodological orientation with its own worldview, vocabulary, and techniques" (Tashakkori & Teddlie, 2010:x).

1.11 Limitations of the Study

Mixed method research can be seen as a more complex process because the researcher needs to understand the separate attributes of quantitative and qualitative tools separately before undertaking a mixed method study. Researchers need to become acquainted with both data collection and analysis techniques from the literature available since the late 1980's. Collecting two different types of data may require extensive time on the part of the researcher. Sufficient time is needed to collect and analyse the data rigorously. Mixed methods are a relatively new methodology and may be difficult for some researchers to understand. The data for this study were collected from one school and it is therefore not suggested that the findings can be generalised.

This research was conducted over a six-month period of time in a school. Whist the timeframe of a research master's degree is generally limited, this study may derive greater benefit from a longer term of study. As this study seeks to explore how teachers adapt and change their practice, it is suggested that potentially a long-term study would provide more in-depth data regarding the phenomena of teacher pedagogical adaptation and change.

1.12 Organisation of the Study

This research study is presented in six chapters. Chapter 1 introduces and presents a general orientation of the study. Chapter 2 provides an overview of the literature relevant to this study. This chapter includes a discussion on the current CAPS within the South African education context; Bourdieu's social field theory; cognitive development, including critical and creative thinking, and the role of PLCs. Chapter 3 explains the methodology used in this study. Chapter 4 presents the data analysis of the quantitative and qualitative instruments and the findings for this study. Chapter 5

reflects on and discusses these finding in the light of the research. Chapter 6 concludes the thesis work and suggests possible further studies arising from this body of work.

1.13 Conclusion

In this chapter an overview of the research study and discussion on the context of the research has been presented. Included in the chapter is an overview of the theoretical and conceptual frameworks that underpin this body of work. Research methods and their limitations have also been discussed. Lastly, the organisation and lay-out of this thesis is presented.

Chapter 2: Literature Review

Conceptualising the development of critical and creative thinking through a professional learning community.

2.1 Introduction

Chapter 1 provided an overview of the study, highlighting its purpose, namely to research the effectiveness of a professional learning community (PLC) intervention to promote the teaching of creative and critical thinking skills among Grade 6 teachers. Chapter 2 thus presents the thesis literature review and explores the theories and concepts that underpin the research process. Included in the chapter is a closer look at the dependant variable (i.e. the teachers and their teaching practice) and independent variable (i.e. the presentation of creative and critical thinking skills) of the quasi-experimental research process.

The chapter firstly briefly situates the research within curriculum change in South Africa. Secondly, Bourdieu's social field theory is introduced as the theoretical framework for analysing the shifts and changes in the teachers' pedagogy. Thirdly, the concepts of creative and critical thinking in classroom teaching are discussed. Lastly, the chapter presents an overview of the role of PLCs in supporting shifts and changes in teachers' pedagogy.

2.2 A History of Curriculum Change in South Africa

2.2.1 From Curriculum 2005 to CAPS

The saga of post-apartheid educational reform needs to be understood for its complexity of policy, politics and practice (Sayed, 2001). According to Jansen (2014: ii), "South Africa has an education crisis, despite the fact that the government spends the biggest slice of its budget on education, more than any other African country". It is well known that the past curriculum has failed teachers, (Jansen & Christie, 1999; Sayed, 2001; Goetze, 2016) but what effect does a failed curriculum have on teaching practice?

Nurturing the new patriotism (Badugela, 2012; DBE, 2004) Curriculum 2005 (C2005) was launched in March 1997. C2005 was guided by ideologies of outcome-based education (OBE). This curriculum attempted to change the emphasis from rote

memorisation of facts to the demonstration of skills and outcomes (Spady & Marshall, 1991:68; Badugela, 2012). However, problems arose as there was a shortage of resources in many schools as well as a lack of support from government, particularly in the training of teachers in the new curriculum reforms (Jansen, 1998). Many curriculum managers “lacked the necessary knowledge and skills to manage the system” (Sayed, 2001:251) and the language of C2005 was complex, confusing and contradictory (Jansen, 1998:323; Badugela, 2012).

In 2000, a task team explored the challenges that the new curriculum placed on teachers in the education system. As a result C2005 was revised, and the New Curriculum Statement (NCS) was implemented in 2002 (Christie, 1999:279). The aim of the NCS was to build on the previous curriculum by adding clearer specifications of learning content (Padayachee, 2015). However, discontent with the curriculum continued and the Curriculum and Assessment Policy Statement (CAPS) was introduced in September 2010, and a further revised edition, CAPS 2 document, was employed from March 2011.

2.2.2 The Current Curriculum

The current CAPS is not a new curriculum but an amendment to the NCS as it follows the requirements of the same process and procedures of the NCS. Within the CAPS there is clear guidance for every subject in each grade, with a concise policy document that details precise instructions on what teachers need to teach and assess (Padayachee, 2015). According to Badugela (2012) the constant renewal of curriculum has resulted in a body of teachers who are afraid of any curriculum changes. This fear of change needs to be acknowledged and as Badugela (2012) suggests, in support of curriculum change there is a need for collaborative PLCs to be established where teachers may find ways to apply new approaches and articulate their personal ideas, thereby making valuable contribution to the implementation of new curriculum approaches.

2.2.3 The Ideal Teacher

Harley, Bertram and Parker’s (1999) vision of the ideal teacher is aligned to that of the Scandinavian counties who consider a good teacher to be a self-directed, well-informed, highly-skilled professional with a strong sense of ethics and accountability. Within the post-apartheid South African education landscape, Hartley, Bertram and Matterson (1999) suggest that teachers would benefit from engaging in PLCs as a way

to facilitate an awareness of new and dynamic innovations in education, which in turn holds the potential to up-skill the teaching profession as a whole. As Kruss (2009) and Badugela (2012) note, there is a need for teachers to change their attitude towards learning and to grasp the challenges and opportunities to assert their power over their own pedagogy in order to become competent, professional teachers with a healthy identity of self.

Professor Kader Asmal, Minister of Education, 1999-2004, was instrumental in developing a white paper on the seven roles and associated competencies for educators in February 2000 (DBE, 2000:12). It listed the norms for educator development, two of which are central to this study. Firstly, as learning mediator, the white paper describes a teacher's role as being able to "mediate learning in a manner which is sensitive to the diverse needs" of all learners (DBE, 2000:13). In alignment with this role, this research will motivate for teachers to move from a content-driven approach to a more mediated, discovery learning approach. Secondly, discussing the teacher as scholar, researcher and lifelong learner, the white paper describes competent teachers as being teachers who engage in "ongoing personal, academic, occupational and professional growth through pursuing reflective study and research" (DBE, 2000). In accordance with this competency, the professional learning intervention discussed in this study supports teachers reflecting on and reviewing their own teaching practices on an on-going basis.

The norms for educator development as presented in the white paper, require the creation of teaching and learning environments where teachers are positioned as professional agents of change informed by an internal accountability system as opposed to the external monitoring and authoritarian systems that are currently found in the CAPS (Feldman, 2015). Christie (2008:216) notes that the challenge is not to view what exists as inevitable but to engage with new, alternative ideas, and to keep challenging our pedagogies towards something better with a commitment to continuous learning. My research thus investigates teachers' perceptions of an intervention that was implemented to adapt their pedagogical practices to be more inclusive of creative and critical thinking in order to better prepare their learners for the 21st century.

2.2.4 Education Policy and Socially Engaging Pedagogy

While school reform is a global phenomenon in education, it often fails to take into account the depth, range and complexity of what teachers actually do (Bascia & Hargreaves, 2000:4; Christie, 2008; Feldman, 2017). Policies can only provide the framework to govern change, it is the teachers in their classrooms who actually provide the quality teaching in schools. Individuals, and not institutions, motivated by personal beliefs, implement core policy initiatives (McLaughlin, 1987).

CAPS is based on a mode of teaching that embraces strong classification and framing (Bernstein, 1975,1977:188) that provides explicit knowledge to all students. Bernstein (1990) suggests that schools were, and still are, in a process of transition from mechanical to organic solidarity as far as curriculum organisation and educational identities are concerned (Harley & Parker, 1999:188). Durkheim, cited in Harley and Parker (1999) suggests that mechanical solidarity is strongly influenced by a division of labour into hierarchical structures where people's identities are based on their position in the field, whereas organic solidarity, due to the advancement of technology, displays a high degree of interdependence between individuals in the sense that individuals have become independent of each other's specialised skills.

The concept of 'solidarity' has critical consequences for the kinds of social unity and fragmentation in which a school, a teacher or a learner's identity is embedded. According to Bernstein's (1990) definition, South African education during apartheid can be described as being characterised by a pre-industrial, mechanical solidarity, i.e. one where individuals knew their position in society and where strict codes of conduct were enforced. In post-apartheid South Africa, there is now an emphasis on human rights and a strong civil society. This emphasis is reflected in the previous C2005 and the NCS policy's attempt at an open, diverse and organic-type schooling system (Harley & Parker, 1999). The problem, however, arises as the post-apartheid curriculum policies attempted to create a social framework of organic solidarity for teaching and learning. Although recent teacher graduates are part of a 'born-free' society, supposedly not affected by apartheid, many older teachers' identities and roles were forged in an apartheid era of mechanical solidarity (Hartley, et al., 1999).

In response to the challenges experienced by teachers to the changes in curriculum policy post-apartheid, the current CAPS was introduced. CAPS is framed on the assumption that South African teachers are poorly prepared and therefore require a

restrictive, tightly controlled content-bound curriculum (Feldman, 2017). This approach leaves little opportunity for an enriched and critical perspective in education or for a socially engaging pedagogy (Fataar, 2012). In order, therefore, for teachers to engage in a more creative and critical thinking approach in their teaching and learning, this thesis seeks to investigate the role that a PLC can play in supporting teachers' identity shift, given the current CAPS teaching orientation, towards this approach.

2.2.5 Curriculum Reform

This idea of curriculum reform, that moves learning away from rote learning and memorisation of content knowledge, is not new. The general aim of the South African NCS suggested a "critical approach to learning, rather than rote and uncritical learning of given truths" (NCS, 2011). Furthermore, the curriculum required that "learners be able to use critical and creative thinking to be able to: identify and solve problems and make decisions" and "collect, analyse, organise and critically evaluate information" (NCS, 2011). This wording responds to the various levels of cognition as found in Blooms' Revised Taxonomy of Higher Order Thinking (Wilson, 2013). Focusing on creative and critical thinking skills, the multi-dimensional nature of these skills leads to a varied academic language, but all "refer to the development and application of inter-related cognitive and meta-cognitive skills involved in solving problems, understanding and expressing meaning" (Costa, 2009:16).

Much of today's classroom learning, particularly in the senior primary phase, focuses on activities whereby learners' acquire facts and rules, employing only the lower levels of cognition: knowledge, comprehension and application (Sonn, 2000:259). The reason for this according to Potterington (2008:15) is that "to a large extent teachers have adopted new curriculum ideas through patterns of the past." However, in order to bridge the gap between the real and the ideal (Hartley, et al., 1999) with regard to the development of critical thinking, educators need to be trained and provided with the necessary tools, concrete examples and relevant teaching strategies.

While the objectives of the current CAPS advocate a cognitive approach to teaching, learning and assessment with an emphasis on developing critical thinking (Grosser, 2015), many teachers still need to realise the value of developing critical thinking skills in their learners. Grosser (2015) suggests that teachers need to be introduced to strategies that will assist them to attain these objectives in the curriculum. Supporting the development of critical thinking skills in teachers via in-service training, i.e. while

teachers are working full-time, should not demand too great an expectation of additional work and administration (Grosser, 2017). What this thesis suggests, therefore, is that PLCs hold the potential to provide the support and professional intervention as a form of dialogue among teachers in order to infuse teachers' pedagogy with creative and critical thinking skills across all areas of the curriculum.

World-wide there is a keen interest to adopt critical thinking skills in classrooms. Stichting Leerplanontwikkeling (SLO), the Dutch institute for curriculum development in the Netherlands, is currently launching a Sternberg-based thinking talent programme. Carol McGuinness (1993) from Belfast has written prolifically on this subject and Grosser, the ex-president (2015-2017) of the International Association for Cognitive Education in South Africa (IACESA) recommends that we need "effective teachers who can model and mediate good thinking skills and dispositions to students" (Grosser, 2015:1). In South Africa, there is limited research that focuses on testing the merits of subject-related intervention programmes among school learners (Grosser, 2015). Thus, the research in this thesis aims to address the gap in this under-researched field by understanding to what extent a PLC as a form of intervention, or 'habitus engagement' (Feldman & Fataar, 2014), can influence the teaching of creative and critical thinking skills in the teaching practices of four Grade 6 teachers at a school in the Western Cape.

In order to discuss the nature of adaptation and change in the teachers' pedagogical practices, Bourdieu's thinking tools of habitus, capital and field are discussed. These tools provide the thesis with a framework to discuss the logic of the teachers' adaptation in their teaching via their interaction within the PLC that focused on introducing creative and critical thinking skills in their classroom teaching.

2.3 Theoretical Framework: Bourdieu's Social Field Theory as a Means for Understanding Teachers' Pedagogical Adaptations and Change

The purpose of this thesis is to investigate the effectiveness of a PLC intervention to promote the teaching of critical thinking skills among Grade 6 teachers. Drawing on Bourdieu (1990), the researcher will discuss the role of PLCs in shifting and adapting teachers' pedagogy, as a form of habitus engagement (Feldman & Fataar, 2014).

Bourdieu, through the concept of habitus, explains the manner in which an individual is in the social world as well as how the social world is in the individual (Bourdieu, 1977). Bourdieu's social field theory (1977) thus shows how different, often deeply

buried structures and mechanisms, make up our different social worlds (Reay, 2004). Although habitus is criticised for being deterministic, Bourdieu does provide a space for change in an individual's practice (Jenkins, 1992; Alexander, 1995; Reay, 2004).

2.3.1 Bourdieu's Social Field Theory

Bourdieu's social field theory reveals interplay between the individual and the dynamic of the social world in which we live (Reay, 2004). His work was concerned with the dynamics of power and the subtle ways in which power is transferred while social order is maintained. What this thesis argues, therefore, is that for sustained educational change to occur, teachers need to be involved in the process of challenging and rethinking their practice.

According to Bourdieu (1990) our everyday practices are shaped by our habitus. Our habitus includes our attitudes, beliefs, perceptions and practices which are formed throughout our life history (Nolan & Walshaw, 2012:348). The different social arenas or contexts in which our habitus is formed Bourdieu refers to as a field or a 'space of play' (Bourdieu & Wacquant, 1992:19; Nolan & Walshaw, 2012). These many, varied fields, throughout our life's history, all have their own peculiar social rules and regulations which impact and influence an individual's practice or 'way of being'. For teachers, this would refer to the manner in which they enact their teaching in a specific school 'field'.

Bourdieu's concept of capital plays an important role in understanding the relationship between habitus and field. Capital (economic, social and cultural) can be considered a synonym for status or position and refers to the resources that one brings to the field or that one has access to in the field (Grenfell, 2008). Economic capital exists in an objectified form such as income and property and refers for how one deals with financial assets. Social capital refers to social relationships, interactions, networks and relationships, and cultural capital is based on the accumulation of knowledge, skills, learning and know-how that advantages an individual in society (Bourdieu, 1990). Cultural capital, as a form of symbolic capital, is synonymous with an individual's status in the field, that is, one's power or recognition within a particular social space or field (Nolan & Walshaw, 2012). In education, this encompasses one's level of education, teaching experience, position in the profession, and so forth. Thus, for teachers, complying with the dominant discourse within the field of education is significant as this may position them more powerfully within their school field and enable them to access

positions of power such as becoming a head of department, deputy principal or principal. These positions of power, for Bourdieu, act as forms of social or cultural capital that an individual can gain within a specific field structure.

Each of Bourdieu's concepts, habitus, field and capital, plays a dynamic and complex role within an individual's practice and can together assist to illuminate the problems of domination and (re)production in education. Practice refers to domains or a system of activities, e.g. teaching practice. Habitus produces individual dispositions which in turn governs the manner in which one responds to the rules and regulations found in different social fields (Feldman, 2015).

In one interpretation of Bourdieu's theory it is suggested that the traditional role of schools may persuade teachers and learners to believe that the existing social structures within schools are just, normal and in their best interests (Nolan & Walshaw, 2012; Webb, Schirato & Danaher, 2002:113). Bourdieu refers to this as doxa. Doxa refers to the practice of accepting specific sets of beliefs or practices as inherently true and necessary without realising that there are alternatives to the status quo (Webb et al., 2002). Our doxa are thus unconscious core values that we view as natural, normal and necessary, and therefore are often not questioned or even recognised (Nolan, 2011; Nolan & Walshaw, 2012). It is this unquestioning acceptance of what has become normal and natural that Bourdieu refers to as doxa, (Bourdieu, 1990; Nolan & Walshaw, 2012) that means that we are unaware of core values that are imposed on one in a particular field context. Thus, when particular forms of educational doxa (unconscious core values) are enacted in a school field, these enable specific power relations to enforce domination and reproduction. An example of this in the school field is when the school management, as a specific form of power relation, is able to influence the teaching staff at a school to enact some form of teaching in a specific manner.

In his book *Distinction*, Bourdieu provides us with a formula to facilitate the connection between his concepts; (Habitus X Capital) + Field = Practice (Bourdieu, 1984). There is a close relationship between field and habitus, "when habitus encounters a social world of which it is the product, it is like a fish in water, it does not feel the weight of the water and it takes the world about itself for granted" (Bourdieu & Wacquant, 1992:127). To best understand the dynamic relationship between field, habitus and capital, Bourdieu uses the analogy of playing a game (Nolan, 2011:212). Similar to games, social fields are created where the players blindly accept the rules (doxa) as they

become natural and unquestionable (Nolan, 2008:209). Like games, social fields, for example a school, can be a competitive place where people compete for better positions. Most often those with capital, often found in positions of power, have learned how to play the game well, perpetuating or controlling the laws of that field (Nolan, 2011). Those in positions of power often have the most to lose when the field is changed and new skills or dispositions are introduced. When this happens, games take on a form of orthodoxy, meaning that the players are aware of other ways of playing the game (in schools this may refer to alternative pedagogical styles) but defend their practice as the best way (Nolan, 2011:205). The 'game' also mostly operates below the player's conscious level and this is what leads to misrecognition or a field of opinions that are not recognised or what Bourdieu calls symbolic violence when some players are treated in an inferior manner.

2.3.2 Habitus is Durable

Education as a field encompasses complex relations and structures between principals, teachers, learners and the curriculum that are constantly shifting and changing (Feldman, 2015). Bourdieu posits that habitus is able to be transformed by social interaction, "from restructuring to restructuring" (Bourdieu, 1977:87). For teachers, this can be described as taking place when a teacher's primary habitus reacts to different or diverse experiences and situations. Habitus is a multi-layered concept with general notions of habitus at a society level and multi-faceted, differentiated ideas on an individual level (Reay, 2004). This suggests that habitus is permeable and responsive to what is going on around it. Thus, by teachers engaging in reflexivity regarding their teaching practices, teachers are able to question, shift or change their taken-for-granted classroom practices, thereby adding an additional layer to their pedagogical habitus (Feldman & Fataar, 2014), shifting and adapting both their thinking and practice in their teaching context. Bourdieu notes that although habitus is durable, it is not eternal (Bourdieu & Wacquant, 1992:133), it is open to change and teachers prepared to take risks can shift and adapt their practices and possibly even change the 'rules of the game' which governs the manner in which teaching and learning takes place in their school field context.

Using these theoretical constructs we can reflect on the social practice journey (Nolan & Walshaw, 2012:349) of four teachers who participated in the research process at a primary school in the Western Cape. The research process considers the four teachers' involvement in two social fields namely the education field of the intersen-

phase of primary school (which will be labelled F1) and a PLC (labelled F2). The focus of the PLC dialogue was on finding ways in which the teachers could begin to introduce creative and critical thinking skills into their educational practices. Studies reveal that teaching is still dominated by traditional approaches (Nolan, 2008). Although many teachers are aware of inquiry-based approaches and critical thinking skills, many primary schools still use traditional teacher-directed approaches (Nolan, 2008). In her study on prospective mathematics teachers, Nolan (2011) found that their 'feel for the game' came from their experience of how they were taught at school, which became their reference for 'good teaching'. Their classroom teaching, what I refer to as the classroom field, or F1, is based on their own school experiences and many teachers see little value in changing the manner in which they routinely teach. While some might describe habitus as a deterministic social construct that predisposes a behaviour that reflects the position in which it was constructed, Reay (2004) states that one's habitus is capable of transcending structured social conditions in which it was produced and that this takes place as layers are added on to one's primary habitus over time as individuals move through, and interact with, multiple social fields.

In order to consider what pedagogical changes are envisaged within this study, I discuss the theories that underpin the concepts of creative and critical thinking in classroom teaching.

2.4 Cognitive Intelligence

Cognitive intelligence is a broad, complex and widely researched field and this review will limit itself to that which is relevant to this study. The thesis will include an overview of cognitive intelligence through cognitive theories and an understanding of modern views on intelligence, as well as a consideration of the currently popular term, thinking skills, critical and creative intelligences and problem solving. The Creative Problem Solving programme used in this research is also introduced and explained.

2.4.1 Conceptual framework: Creative and Critical Thinking Theories to Shape Knowledge

In keeping with the post-positivist, scientific method, this thesis includes a conceptual framework. This framework will draw on a number of cognitive theories which underpinned the PLC discussions. The PLC discussions were the vehicle which aimed to stimulate changes in the teachers' pedagogy in order to shift the teachers' pedagogy to a more discovery or inquiry based teaching approach. The Creative Problem Solving

programme (Treffinger, et al., 2003) supports the concept of experimental learning. Thus, the PLC discussion was shaped by the knowledge and theories informed by various cognitive theorists. Although this study acknowledges and is supported by many other theories of intelligence mentioned in this study, relative to growing creativity and critical thinking in classrooms today, the work of Sternberg (1996) and Osborn (1963), features prominently. Sternberg's triarchic theory of successful intelligence has been included into the cognitive conceptual framework of this study because of its simplicity in understanding multiple-intelligences. The principles of Osborne's Creative Problem Solving programme (Treffinger, et al., 2003), particularly the concepts of divergent and convergent thinking, were explicitly introduced in the latter part of the PLC discussions.

Other theories that assist our understanding of the teachers' adaptation to change in this study are Bourdieu's social field theory and the constructivist theories that advocate for discovery, learner-centred learning and reflective teacher practice.

In order to begin to understand the concepts involved in creative and critical thinking one needs to unpack the broader concept of cognitive intelligence. Cognitive intelligence is multi-faceted, complex, and supported by a cognitive theories.

2.4.2 Insight into the Concept of Intelligence

Intelligence, according to Sternberg and Sternberg "is the capacity to learn from experience, using metacognitive processes to enhance learning and adapt to the environment" (2012:17). Controversy relating to differences in intelligence abound and there are over seventy accepted definitions for intelligence. Recently it was agreed upon in the Journal of Education Psychology (Sternberg & Sternberg, 2012) by fourteen renowned psychologists that any definition of intelligence should include:

- A capacity to learn from experience
- An ability to adapt to the surrounding environment
- Metacognition: the ability to control one's own thinking process
- Cultural influences
- Personality variables

Intelligence broadly encompasses "the ability to learn, remember and use new information, to solve problems and to adapt to novel situations" (Biswas-Diener, 2017:1).

Harvard professor Howard Gardner's (1985) theory advocates that there are different types of intelligence, what the literature refers to as multiple intelligences. Gardner drew on the discipline of the neuroscience of the brain where different abilities are attributed to different parts of the brain, thereby making them independent of one another. Understanding that different parts of the brain govern different aspects of intelligence, he identified eight common intelligences including 1) logic-math, 2) visual-spatial, 3) music-rhythm, 4) verbal-linguistic, 5) bodily-kinaesthetic, 6) interpersonal, 7) intrapersonal, and 8) naturalistic (Gardner, 1985). A comprehensive view of intelligence also requires one to consider other more dynamic approaches to intelligence.

Carol Dweck (1986) offers a more dynamic approach to intelligence when she suggests that the way an individual thinks about his or her own intelligence predicts their performance. Dweck (1986) refers to this as a person's mind-set and having a growth mind-set suggests that intelligence has the potential to grow. Although evidence suggests that genetics is still an important factor in the intelligence equation, Dweck has research evidence that positive thinking encourages greater potential for human intelligence. Similarly Kaufman (in Weir, 2015) proposes his theory of personal intelligence that focuses on an individual's own growth, differences and aspirations, often via discovery-based learning, where learners are encouraged to explore an environment or subject matter. Angela Duckworth's concept of grit states that "having the passion to accomplish a particular top level goal and the perseverance to follow through" (Duckworth, 2016:250) promotes a persevering mind-set, with a propensity for talent, suggesting that talent is how quickly one's skills improve when effort is invested (Duckworth, 2016:42). Emotional intelligence emphasises the experience and expression of emotion and is a set of skills which enable one to accurately use and understand the emotions of others and themselves. Both Dweck and Kaufmann support discovery-based learning, where learners are encouraged to explore their own learning in a positive classroom environment where emotional intelligence is fostered.

Paul, Elder and Bartell (1997) suggest that the Socratic teaching method is synonymous with collaborative work, cooperative learning, guided discovery, discovery learning, discussions, problem-solving where the construction of knowledge is encouraged. Using this approach, classroom climates need to be conducive to mediation and negotiations where educators become facilitators of learning,

encouraging learners to become self-regulated and to collaborate with the learners on the construction of new knowledge (Kloppers & Grosser, 2010).

Sternberg (1996) similar to Duckworth's (2016) concept of mind-set realises the cognitive growth potential in his ideals for successful intelligence as shown below.

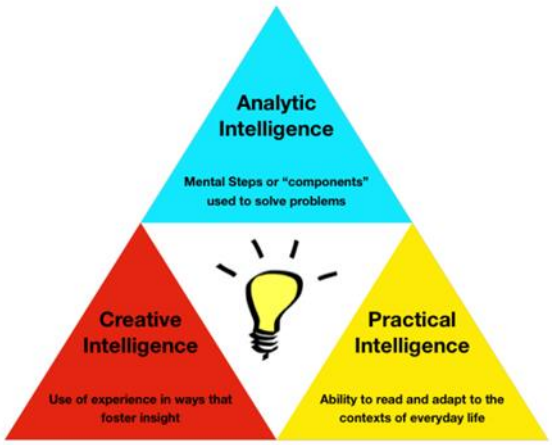


Figure 2.1 Sternberg's 2005 Triarchic Theory of Intelligence (Sternberg, 2005)

While Gardner's (1993) ideas separated the multiple, independent constructs of intelligence, Sternberg's Triarchic Theory of Intelligence, presented in figure 2.1, synchronised aspects of intelligence based on three information processing components, namely; metacomponants (higher order executive processes), performance (lower order processes) and knowledge (acquisition components used for problem-solving) (Sternberg & Sternberg, 2012). Sternberg moved away from conventional notions of intelligence and termed successful intelligence as the ability to adapt to, shape, and select environments to accomplish one's goal within the culture of a society.

Sternberg's (2005) Triarchic Theory of Intelligence embraces three types of intelligence:

1. Analytical intelligence: involves analysing, criticising, reasoning, and judging.
2. Practical intelligence: used while implementing knowledge.

3. Creative intelligence: evident in discovering, inventing and creating

According to the theory of successful intelligence, children's multiple abilities are underused in classroom learning as educational institutions tend to value analytical (as well as memory) abilities at the expense of creative and practical abilities (Sternberg & Kaufmann, 1998:496).

Sternberg's theory foresees that intelligent people will be able to identify their strengths and weaknesses, utilise their strengths to the maximum and compensate for their weaknesses while continually improving upon them (Grigorenko, 1969). Research conducted in 1996 of 199 high school students in the United States revealed that "students whose instruction matched their pattern of abilities performed significantly better than students who were mismatched" (Sternberg & Kaufmann, 1998:496). What this revealed is that taking students' creative and practical, as well as analytical abilities into account, greatly improved their performance.

In order, therefore, to find ways to incorporate Sternberg's strategies into teaching and learning in a South African primary school classroom, a PLC was established. The focus of the PLC was on finding ways to become more aware of the concept of 'multiple intelligences' as well as to assist to create a greater awareness of creative and practical learning approaches that can be used in the teaching and learning environment. Sternberg's "What's your thinking profile?" tool, (Addendum 2.2) was used to support the Grade 6 teachers in their efforts to engage their learners by using a more inclusive teaching style and incorporate creative, analytical and practical skills in the learning process.

Perhaps Perkins (1995) sums up true intelligence wisely when he states that one needs to "synthesize classic views as well as new ones" (Sternberg & Kaufmann, 1998:496). This highlights the fact that intelligence is a complicated issue and psychologists continue to research this topic, constantly yielding new understandings that can be incorporated into classroom teaching. A closer look at the popular term thinking skills, which represents higher order thinking skills, is necessary in order to fully understand the broader concept of intelligence.

2.4.3 Thinking Skills

Higher order thinking skills (HOTS), a term which is currently found in the CAPS, (DBE, 2012) includes critical thinking, problem solving, decision-making, and creative thinking (Lewis & Smith, 1993). These are the skills, which, if activated when learners are faced

with problems, questions and dilemmas, result in successful higher order thinking. Thinking skill programmes that are used in some South African primary schools to introduce thinking skills in the curriculum, are Costa and Kallick's (2008) *Habits of Mind*, de Bona's (1983) *Cognitive Research Trust Thinking* (CoRT) and Hyerle and Alper's (2011) *Thinking Maps*.

The understanding of the thinking process is a multi-dimensional one with a complex network of interactive capabilities (King, Goodson & Rohani, 1997). HOTS include creative and critical thinking skills and problem-solving. Although there are theoretical distinctions between the meanings of these, they define the nature of knowing and thinking as 'knowing how' rather than 'knowing that' (McGuinness, 1999). Despite the different names for HOTS, the elements of thinking, interpreting, analysing and manipulating information, suggest that the fundamental processes are all similar. McGinness (1999:5) states that "focussing on thinking skills in the classroom is important because it supports active cognitive processing which makes for better learning". By incorporating these skills into classroom teaching and learning, learners are expected to find meaning and then develop structures to systematically and flexibly deal with novel problem situations, question assumptions and critically evaluate information.

The infusing of critical thinking into school curriculums is a global phenomenon. In 1998 Carol McGuinness from Queens University in Belfast was commissioned by the Department for Education and Employment to review and evaluate the available research on thinking skills and related areas (McGuinness, 1999). The Delphi Report (Facione, 1990) was tasked with researching the critical thinking movement. Cotton's (1991) comprehensive research on Teaching Thinking Skills, while giving a thorough comparison of definitions, instructions and widely known programmes, confirms that thinking skills are very important in a rapidly changing, technology-oriented world. The Dutch curriculum developers, Stichting Leerplanontwikkeling (SLO), in the Netherlands are currently launching a Sternberg-based thinking talent programme.

According to Grosser and Lombard (2008) very little research has been done on thinking skills in South Africa. The Thinking Schools Project research at the North-West University during 2012-2014, which infused Habits of Mind (Costa, 2009; Costa & Kallick, 2008) and Thinking Maps (Hyerle & Alper, 2011) into the student-teacher's curriculum, identified the merits of the approach as supporting greater student independence, more focused ways of working, better planning, and an improvement

in marks for assignments. Currently there is a growing South African interest in developing and improving the instruction of critical thinking in classroom teaching and learning (Gvalvam & Le Grange, 2005) and the promotion of improved classroom interaction (Jacobs & Gawe, 1998) in order to encourage active learner participation and reflection of the content under discussion (Esterhuizen & Grosser, 2014:117).

While most of the research points to the success of creative and critical thinking in schools, there are valid opinions to the contrary. Carl Hendrick, an English teacher at Wellington College in Berkshire, offers a caveat. In his article titled, “Why schools should not teach critical-thinking”, Hendrick (2016) cites experiments done on air traffic controllers’ mental capacities. Air traffic controllers have sophisticated cognitive abilities, yet, when they were tested on skills outside of their area of expertise, they achieved average scores. Their superior cognitive abilities did not translate to a more general ability.

Hendrick posits that since the1980’s schools have insisted that learners learn a set of generalised skills to flourish in a contemporary world. He suggests that life is like a soccer team, where the skills of the goalie and centre forward are completely different. Hendricks concurs that critical thinking is essential to students’ success but he insists that the skills must be linked to content if they are to be meaningful. “Teaching students generic ‘thinking skills’ separate from the rest of their curriculum is meaningless and ineffective” (Hendrick, 2016:1). He cites a study that reviewed more than 130 papers and concluded that the addition of thinking skills did not provide “evidence for broad-based improvement in cognition” if thinking skills were included in “de-contextualised practice of cognitive skills devoid of domain-specific content” (Hendrick, 2016:1). McGuinness (1999) supports Hendrick saying that there is a clear argument in favour of infused, across-the-curriculum strategies when introducing thinking skills in classroom teaching and learning (McGuinness, 1999:28), as opposed to the teaching of general thinking skills.

In our evolving world the ability to think, whether it is critically, creatively or for problem-solving, has become of great importance (Nielsen & Thurber, 2016). Nielson and Thurber (2016) suggest that the art of making connections with the aid of divergent thinking (creativity) and convergent thinking (critical) are elements that allow creative people to stand apart. Although the concepts of creative and critical thinking and problem solving are interrelated, I will view each of these concepts separately.

2.4.4 Creative and Critical Thinking Skills

In *Enhancing Creativity*, Nickerson (1999) cites Mumford, Reiter-Palmon and Redmond's (1994:2) definition of creativity stating that "creativity is reflected in the generation of novel, socially valuable products". Guilford (1964) argues that creativity and problem-solving are the same mental phenomenon, while Nickerson (1999) suggests that creativity is just a social form of problem solving. In Paul and Elder's (2008) *Thinking guide to the nature and functions of critical and creative thinking*, they suggest that creativity and critical thinking are inseparable. They argue that these two thought processes are both achievements of thought; "creativity masters a process of making or producing, criticality, is a process of accessing and judging" (Paul & Elder, 2008:4). Thus, creativity implies a critical component. They further maintain that like the body, the mind has its own form of fitness reflected in activities performed in harmony with intellectual standards such as clarity, accuracy and precision. Outstanding creative thought involves both criticality and originality arising out of three possible conditions; a minimum level of inborn intellectual capacity, an environment that stimulates, and a positive attitude and inner motivation in the person. This seems to satisfy the intellectual history of intelligence from the analytical tests of Binet and Simon (1916) to the current attitudes of Duckworth (2016) and Kaufmann (2016) towards grit and inner motivation and personal intelligence that is needed to succeed. To sum up, Paul and Elder suggest that; "creativity without criticality is mere novelty" and "criticality without creativity is bare negativity" (2008:19). Nickerson (1999) states that it is essential to promote creative thinking and critical thinking in learners so that they adopt an uncritical mind-set when generating many ideas and yet become critical when it is time to evaluate or select a solution. Thus, creative and critical thinking are both essential aspects of the learning processes.

2.4.4.1 Critical Thinking

Nickerson defined critical thinking as “focused, disciplined, logical, constrained, down -to-earth, realistic, practical and conservative” (Nickerson, 1999:397). The intellectual roots of critical thinking are traceable to the teaching of Socrates 2 500 years ago (Paul, et al., 1997). He realised the importance of deep questioning and the metacognition necessary before ideas could be accepted and believed. Socrates “established the importance of seeking evidence, closely examining reasoning and assumptions (and) analysing basic concepts” (Paul, et al., 1997:1), via his Socratic questioning, a critical thinking strategy.

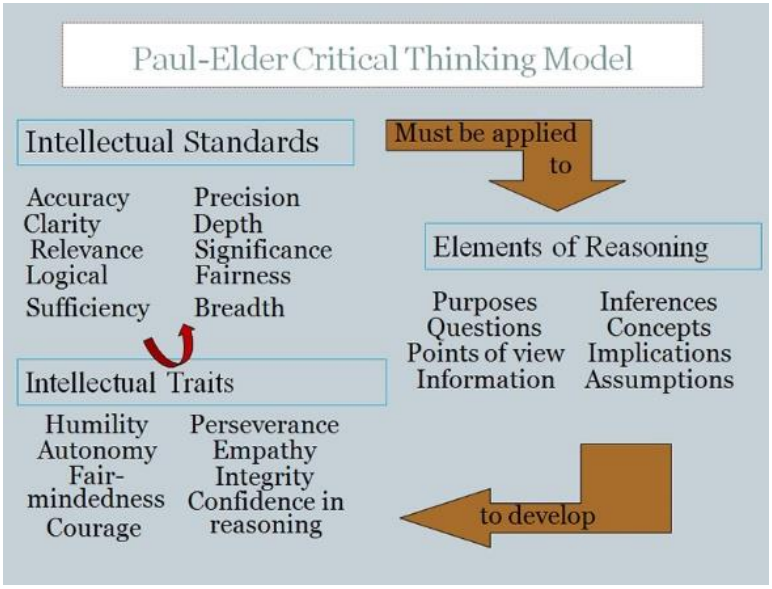


Figure 2.2 Paul and Elders Critical Thinking Model (Paul & Elder, 2010)

Today’s rapidly changing and challenging world demands “not only the teaching of facts, but also the cultivation of critical thinking” (Kloppers & Grosser, 2014:413). Paul and Elder’s (2010) critical thinking framework, figure 2.2, presents the multi-dimensional nature of critical thinking and suggests that intellectual standards of, for example accuracy and clarity, must be applied to elements of reasoning, e.g. questions, points of view and assumptions, in order to develop intellectual traits such as fair-mindedness, perseverance and integrity. Thus, critical thinking involves cognitive and metacognitive skills and strategies, critical thinking dispositions, that is, behavioural traits, and intellectual standards for reasoning.

Similarly, Brookfield (2012) advocated that critical thinking happens when we involve four processes: hunting assumptions, checking assumptions, seeing different viewpoints, and taking informed action. All of these suggest that thinking-as-a-skill is a developmental process which McGinness (1993:309) sums up saying that “a critical thinker must be able to analyse arguments, identify assumptions, judge credibility, spot logical errors in inferences” as part of a successful information processing strategy.

Angelo (1995) acknowledges that although critical thinking is a noble idea and articulates well with holistic development, its complexity should not be underestimated. He remarks that critical thinking is not a simple product of maturation but involves the purposeful teaching of skills that are notoriously difficult to teach and learn. Grosser (2015) (Addendum 2.3) reinforces this when she suggests that although the objectives of the South African CAPS support a cognitive approach to teaching and learning, it has not become a reality in most teaching and learning in schools due to a lack of strategies to promote critical thinking in classrooms. Grosser (2015) advocates that teachers and student teachers need to be guided as to how to deliver curriculum content by using strategies that enable teachers to attain the objectives of the curriculum while at the same time infusing thinking across the curriculum. The *Short Learning Programme*, developed at North-West University (NWU), in association with International Association for Cognitive Education in South Africa (IACESA) addresses exactly this problem (Grosser, 2017).

In order to fully understand the concepts of creative and critical thinking skills or thinking skills, one needs to consider the concept of creative thinking.

2.4.4.2 Creative Thinking

Nickerson suggests that creative thinking is “expansive, innovative, inventive, unconstrained, explorative, daring, uninhibited, fanciful, imaginative, unpredictable,” (1999:397) and associated with idea-generation. In his book, *The Nature of Creativity*, Sternberg’s (2009) credits J.P. Guilford and E. Paul Torrance as the forerunners of creativity and divergent thinking. The Torrance Tests of Creative Thinking (TTCT) (1974), emphasised the assessment of divergent thinking and are still widely used today. Torrance recognised and accredited the Osborn-Parnes Creative Problem

Solving training program (Torrance, 1972) and Osborn's (1953; 1963) 'brainstorming' tool for encouraging divergent thinking.

O'Hara and Sternberg (1999) believed creativity to be the outcome of cognitive intelligence but can only be termed creativity when the outcome of the cognitive process produces a novel idea. Instead of a programme, Sternberg offers twenty-five strategies for developing creativity in learners based on his investment theory of creativity (Sternberg & Lubart, 1991). This theory includes such ideals as: modelling creativity, building self-sufficiency, questioning assumptions, defining and redefining problems, generating ideas, cross fertilizing ideas etc., which over time were incorporated by his contemporaries into ready-made programmes.

Although creativity is thought to be a combination of genetics, situational environmental circumstances, nature and nurture, and a focus on traits and experience most of us fail to realise our creative potential, mainly due to a lack of exposure to strategies, skills and traits supportive of creative development (Nickerson, 1999). Creative skills need to be nurtured if the goal of education is to produce learners with the potential to solve hypothetical problems and challenges, to find innovative resolutions and numerous options, and to have the available tools and resources for succeeding in a rapidly changing world (Chavez-Eakle, 2010). Creative thinking thus holds the potential to enhance learners' ability to adapt to, and enhance their learning allowing for successful survival and resilience.

The idea that creativity can be enhanced through training has many supporters (Amabile, 1983; Amabile & Tighe, 1993; Cropley, 1992; Finke, et al., 1992; Sternberg & Lubart, 1991; Parnes, et al., 1977). Chávez-Eakle, suggests that, "(u)nderstanding, identifying, and nurturing creative potential is relevant in education and therefore should be taken into account when developing education programs, strategies and policies to achieve quality education for all children" (2010:1). She offers several methods, techniques and strategies for facilitating creative thinking into the classroom and advocates for the CPS method. This method, according to Chavez-Eakle "makes creative processes more visible, explicit and deliberate by organizing the creative approaches to problem-solving, therefore enhancing productivity and effectiveness" (2010:1).

2.4.5 The Creative Problem Solving (CPS) Programme

In our evolving world, the ability to think is more desirable than a fixed set of skills and knowledge (Fleetham, 2009). We need problem-solvers, decision-makers and innovators. We need to find new ways to teach and to rekindle our connection to our creativity. A thinking classroom does not threaten good teaching or the national curriculum; it merely offers a tool to extend students to their full potential (Fleetham, 2009). Samson notes that "creative problem solving is a powerful teaching method that can support a pedagogical shift in the classroom and foster both student engagement and motivation to learn" (2015:153). She goes on to state that:

> Creative problem solving can be a transformative teaching methodology that supports a dialogical learning atmosphere that can transcend the traditional classroom and inspire excellence in students by linking real life experiences with the curriculum. It supports a sense of inquiry that incorporates both experimental learning and the development of critical thinking skills. (Samson, 2015:153)

Simply put, an individual who wants to do or change something, needs a course of action, and the success of this action depends upon one's ability to use higher order thinking skills to seek out the best possible outcome. Most researchers classify creative problem-solving into four or six phases (Nickerson, 1999; Noller, 1977; Parnes, et al., 1977; Torrance, 1988; Torrance & Myers, 1970), namely; Finding, Recognising, Defining (or refining), Solution seeking, Action and Evaluation. This process is very similar to the Osborn-Parnes CPS model which was first popularised in the 1950's and later further developed and modified by Isaksen, Dorval and Treffinger (2011), who systematically developed a family of approaches based on decades of research during the 1970's and 1880's. The six steps of CPS employ well-known creative tools that facilitate divergent thinking or brainstorming and convergent thinking. Recently the Creative Educational Foundation (CEF) (1954- 2017), remodelled these six phases into four phases for simplicity, namely; Clarify, Ideate, Develop and Implement.

Brainstorming introduced by Osborn (Osborn, 1953; Osborn, 1963) evokes ideas of giving free range to one's imagination, uninhibited, no matter how bizarre the idea, without criticism (Nickerson, 1999). This element was incorporated into Isaksen and Treffinger's (1985) CPS process involving three stages: Understanding the problem, Generating ideas (brain-storming) and Planning for action. This programme entrenched the ideals of deferred judgement and affirmative judgment (Parnes, 1963; Isaksen, et al., 2011). If one evaluates ideas as they are generated it tends to disrupt the flow of novel ideas. The heart-beat of CPS favours the flow of many options, without any criticism or praise, thus holding back evaluation, during the idea-generating process. Figure 2.4 illustrates the relationship between these concepts.

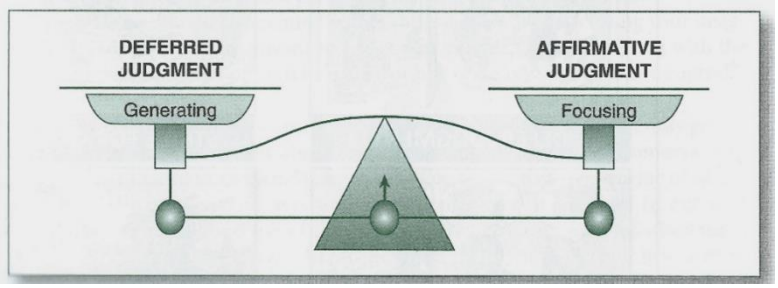


Figure 2.3 The Heartbeat of CPS: The Creative Problem Solving Group (Isaksen, et al., 2011)

CPS incorporates active learning strategies that engage learners in working with complex situations. The concept of student engagement, mediated learning and guided discovery is seen as an important factor in the quality of education that learners receive.

The CPS process can be an effective approach to include "the concepts of experimental learning and promote the development of critical and reflective thinking skills that can transcend the classroom and help students prepare for the real world" (Samson, 2015:161). Essentially the CPS programme guides learners in "creative and critical thinking skills in harmony, on one's own or in a group, to understand challenges and opportunities, generate ideas, and develop effective plans for solving problems and managing change" (Treffinger, et al., 2003:2). Amabile (1983:2) describes CPS as a programme that allows for creative expression involving both logic (left-brain) and creativity (right-brain), to solve novel and appropriate problems. In the words of the

founders, “CPS helps us find constructive and affirmative ways to use our creative and critical thinking abilities” (Isaksen & Treffinger, 1985:15).

This chapter now turns to a discussion on professional learning communities and the role that they play as an alternative approach to traditional staff development programmes in supporting teachers adapting and changing their pedagogy.

2.5 Professional Learning Communities (PLCs)

2.5.1 Traditional In-service Training

Traditional in-service training for teachers consists of professional development programmes in the form of workshops and seminars. These methods of in-service training have been criticised for being brief, fragmented, incoherent encounters that are de-contextualised and isolated from real classroom situations (Ball & Cohen, 1999:29). These programmes often do not focus on specific student or teacher needs or make use of actual classroom data or artefacts to support changes in teaching and learning and tend to be structured in isolation from the complex teaching and learning environment in which teachers work (Opfer & Pedder, 2011:377).

There is no one-size-fits-all programme for teacher development, and background contextual factors that interact with the learning needs of particular teachers within a particular school community must be taken into account. These factors include school traditions, school cultures, student population and curriculum and policy statements (Avalos, 2011:17). The way in which effective professional development takes place in one school setting can be very different from the needs of another school site. Professional development programmes need, therefore, to take into consideration how learning is embedded and enacted in specific school sites and classroom contexts. Fullen (2007:12), citing Elmore (1996) states that in order for teachers to make fundamental changes in their practices they need repeated opportunities of being exposed to new ideas, to argue these within their own normative belief systems and to have the opportunity to observe others practising these behaviours, and then to practice these new behaviours themselves in the settings in which they work.

Supporting the success of professional development programmes that are on-going and where teachers work collaboratively, Elmore states that the most powerful incentives reside in the face-to-face relationships among people in the organisation, not in external systems (Elmore, 1996). One model that has evolved as a way of supporting this form of on-going collaborative professional development and change,

and that has the potential to take into account the differences in school and teacher needs, is that of professional learning communities. Professional learning communities support the literature which cites the need for successful professional development to include more prolonged interventions and teacher learning within collaborative projects.

Within the South African context Jansen (2017) states that the DBE leaves little imagination in teacher education development and unrealistically believes that "doing the same thing over and over again, (will achieve) different results" (Jansen, 2017:1). He suggests that teacher development should include massive investments in primary school teaching and that teacher training should be replaced by mentor-based support to teachers. Fullan echoes these thoughts when he states:

> Nothing has promised so much and has been so frustratingly wasteful as the thousands of workshops and conferences that led to no significant change in practice when the teachers returned to their classrooms (Fullan, 1991:315).

Since the rise of the constructivist approach to learning, traditional teacher professional development has needed an alternative paradigm for professional development (Leu, 2004). Leu (2004) contrasts the different approaches to teacher learning in professional development in Figure 2.5.

Previous approach	Alternative approach
The goal is to have teachers who are competent in following rigid and prescribed classroom routines	The goal is to have teachers who are reflective practitioners who can make informed professional choices
Teachers are "trained" to follow patterns	Teachers are prepared to be empowered professionals
Results in passive learning	Results in active and participatory learning
Cascade model run as centralised workshops or programmes	School-based model in which all teachers participate
"Expert" driven	Teacher facilitated (with support materials)
Little inclusion of "teacher knowledge" and realities of classrooms	Central importance of "teacher knowledge" and realities of classrooms
Positivist base	Constructivist base

Figure 2.4 Leu's Professional Development Approaches (Leu, 2004:6)

Within the South African education system, education ministers, Angie Motshekga and Blade Nzimande, launched the Integrated Strategic Planning Framework for Teacher Education and Development (ISPFTED) in South Africa 2011-2025. Its primary aim is to "improve the quality of teacher education and development in order to improve the quality of teachers and teaching" (DBE, 2011). Within this framework there is brief mention made to the ideal that PLCs should be established and functioning in schools across the country by 2020. The DBE vision of PLCs is included in a guide entitled, PLC's A guideline for South African schools that was published in 2016 (DBE, 2016). The general ideals of a PLC will be explored below.

2.5.2 A Professional Learning Community as Means for Reflective Practice

A PLC is not a new idea. Our first knowledge-based social structures were used by cavemen to debate which berries to eat and how to capture prey more effectively (Wenger, et al., 2002). Wenger, discussing communities of practice (CoP), states that they "are groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis" (Wenger, et al., 2002:4). CoPs are groups of people who meet regularly to share insight and advice, placing value in their interactions. Typically they discuss, "their situations, their aspirations, and their needs" (Wenger, et al., 2002:4).

PLSs, building on the idea of CoP, are a collective, caring and cohesive group of professional people (Stoll & Louis, 2008) who wish to enhance learning in their schools through changing or adapting their own practices. PLCs thus provide a powerful tool for teachers to critically interrogate their own practices in an on-going, reflective and collaborative manner. The DBE's PLC vision highlights that professional developmental communities "build on previous knowledge ... involving educators in active learning … (to) promote critical and systematic reflection" (DBE, 2016:7).

2.5.3 Structure and Purpose of a Professional Learning Community

In fostering the development of PLCs there are six core elements on which successful PLCs have been developed, namely: a collaborative culture with a focus on learning for all; collective inquiry into best practice; an action orientation (learning by doing); a commitment to continuous improvement; and a focus on results. These core principles have been adapted over time depending on the context, focus and needs of the PLC,

but still form the basis of what constitutes successful collaborative professional development and learning within PLCs.

The success of the PLC concept depends not on the merits of the concept itself but on the most important element in the improvement of any school – the commitment and persistence of the educators within it. “Individual and collective professional learning, getting better and better in the setting in which you work, must be built into the culture of the school in both its internal and external interactions” (Fullan, 2006:12). Fullen states that what is missing in school cultures is that structurally and normatively schools are not places where every teacher is also a learner all the time (Fullan, 2006:12). This cultural change is both deep and necessary in order to build in continuous improvement (Fullan, 2006).

A crucial element within all PLCs is having a clear organisational purpose or focus (Katz & Earl, 2010:29) that the group may collectively reflects on (Brodie, 2013:6). In order for the inquiry to have the greatest effect on teacher-learning the focus needs to be both concrete and useful (Timperley & Robinson, 2003:29). Timperley and Robinson state that

> “[a] challenging focus is one that requires teachers to reconceptualise, unlearn, or make changes to existing practice and structures, legitimating the change process by making the status quo more difficult to protect, and offering opportunities for joint attention to issues that are larger than any one school could address alone” (2003:29).

While much literature discusses the value of PLCs for teacher professional development, creating and sustaining PLCs does not come without its challenges. A number of the challenges listed in the literature include: working within the pre-set organisational structures of a schools; external pressures from educational departments (Harris & Jones, 2010:178); and often concerning over-ambitious curricula or exam-driven learning resulting in time constraints. Hargreaves and Fink (in Stoll & Louis, 2008:8) describe sustainable improvement as learning that “perseveres and develops … that spreads and lasts”. Sustaining PLCs is understandably difficult within the ebb and flow of day-to-day school life.

A PLC makes substantial demands on teachers’ times and energies and so sustaining enthusiasm is key (Brodie, 2013). For this to happen each session held needs to involve meaningful engagement with the PLC focus, as well as being aware of an inner-

dialogue within the teachers regarding the possible shifts and changes that they were making in their classroom teaching practices. Respect for the teachers' time and knowledge is also crucial, as is a feeling of mutual respect and safety that needs to pervade each PLC meeting (Feldman, 2015).

The PLC proposed in this research is aimed at promoting rigorous inquiry and growth into the teachers' pedagogy in order to support and develop the general aims of the curriculum that states that teaching and learning must give "expression to the knowledge, skills and values worth learning … to ensure that children acquire and apply knowledge and skills in ways that are meaningful to their own lives" (DBE, 2012:4).The six interventions adopted by the PLC for the research discussion for this thesis work are included in Addendum 2.1. This PLC, therefore, supported the DBE's focus on high quality teaching and learning. The PLC was established to create opportunities for teachers to engage in educational activities and dialogues that would promote the teaching of creative and critical thinking in everyday classrooms.

2.6 Conclusion

This chapter has presented the theoretical framework for the study and a review of the current literature surrounding the purposeful incorporation of creative and critical thinking skills into the practices of four Grade 6 teachers via an intervention within a PLC.

The current trend in many South African schools to become a thinking school needs to be supported by rigorous research. In order for thinking schools to become a reality, teachers require an in-depth understanding of the multi-dimensional nature of cognitive and metacognitive skills and strategies. The collaborative form of a PLC is suggested as a means to provide in-service collaboration amongst teachers as they adapt their pedagogy to include the necessary cognitive and creative thinking skills. In order for this to take place within the South African schooling context, this chapter has suggested the use of a programme developed on Creative Problem Solving to encourage the creative and critical pedagogy of four teachers in a PLC. The introduction of these skills supports the ideals of the CAPS curriculum to better prepare learners for a 21st century world.

The following chapter presents the methodology used to investigate the effectiveness of a PLC intervention in promoting the teaching of critical thinking skills among Grade 6 teachers.

Chapter 3: The Research Methodology

3.1 Introduction

Chapter two offered a referenced and comprehensive discussion on the research on which this study is based. This chapter proposes pragmatism as the world view for this research as it places an emphasis on the practical aspect, allowing what's best for answering the research question and for methodological flexibility to solve a problem. This chapter discusses the approach that the researcher followed in order to address the research statement. To remind, the research statement is:

> The effectiveness of a Professional Learning Community (PLC) intervention to promote the teaching of critical thinking skills among Grade 6 teachers.

The chapter begins with a discussion on the research framework for this study followed by a description of the mixed method approach, which includes the history and definitions of this research approach. In this chapter the researcher aims to clarify the intent to mix quantitative and qualitative data in a single study. The Explanatory Sequential Mixed Method research design is fully explored and justified. The strategy of inquiry, involving a quantitative quasi-experiment, leading to a descriptive survey, and the qualitative, phenomological research are discussed. These quantitative and qualitative research approaches are deliberated on in terms of data collection, data analysis and data interpretation.

Finally, issues of validity and reliability, and the ethical considerations concerning this study are presented, along with the endeavours to maintain the trustworthiness of this study. The research framework that underpins this study supports the approaches taken to collect both qualitative and quantitative data.

3.2 Research Framework

In this study the constructivist-pragmatic paradigm influenced the knowledge that the researcher pursued, as did the concepts and theories that arose from the literature review. Pragmatism shows no loyalty to any philosophy but focuses on what works for the research question (Creswell, 2003). Constructivism suggests that our reality is socially constructed, and understanding "who we are and how we understand ourselves" helps to develop and support theories and patterns (Mertens, 2009). The

quantitative data in the pre-test survey conducted in this research had a post-positivism characteristic with its quasi-experimental survey. Although post-positivism is based in scientific experimental research it recognises that all observation is fallible and that theory is reversible (Creswell, 2014).

Quantitative data is concerned with discovering facts and social phenomena. The pre-test survey was concerned with establishing a base level of the teachers' current perceptions of creative and critical thinking in order to reflect if the Creative Problem Solving (CPS) intervention managed to influence the teachers' perceptions (Creswell, 2014). The qualitative, open-ended questionnaire and focus group interview sought to understand the human-behavioural elements of social constructivism as it aimed to understand the teachers' worlds, with their subjective habitus, based on their historical and social perspectives of the world around them (Creswell, 2008). Mixed methods combine research methods, placing emphasis on answering the research question, irrespective of the believed fundamental differences between paradigms (i.e. the seemingly opposing views of post-positivism and social constructivism (Creswell, 2014). The mixed method approach of this study used design quality as its framework since design quality is method oriented with a bottom-up approach (Tashakkori & Teddlie, 2010). This research, although experimental in nature as it sought to 'measure' the pre and post perceptions of teachers involved in an intervention, sought to explain the 'measurements' in human-behavioural terms. It hunted an understanding of the teachers' perception within their lived environments. The diagram in figure 3.1 reflects that the knowledge, theories and concepts that arose from the literature research led to the formulation of the research question, which in turn, determined the mixed method approach utilised in this study.

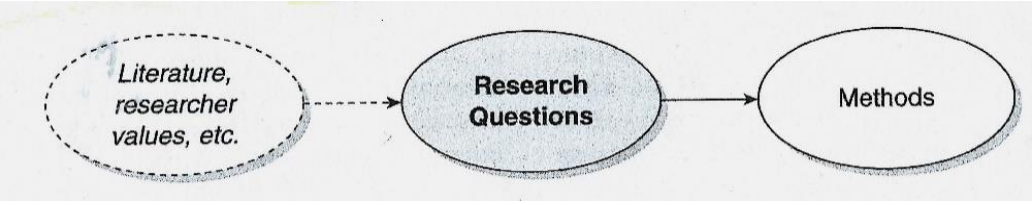


Figure 3.1 The research question dictates the method, (Creswell, 2010)

3.2.1 Pragmatism

Whilst quantitative and qualitative research can be characterised by the respective paradigms of post-positivism and constructivism, it is pragmatism that places emphasis on the practical aspect of research, that is, the most effective method for answering the research question. Creswell (2010:15) offers the above view as a dialectic stance where “the use of multiple paradigms in a single study contribute to a greater understanding of the phenomenon under investigation.” Thinking dialectically means that we take a stance which welcomes more than one pragmatic tradition and mental model (Creswell, 2010). Pragmatism focuses on the methodological flexibility to solve the problem, allowing one to use a myriad of methods as the core component of the study. Many examples of Sternberg’s research concerning his triarchic theory of intelligence begin with a pre-test against which he would ‘measure’ the element of change after an intervention. Although the researcher would focus on the qualitative responses from the teachers regarding their lived experience of an intervention, she wished to establish base-level of quantitative facts and social phenomena against which to reflect the qualitative finding.

Although the over-arching paradigm of this study is pragmatism, this mixed method study involved a small post-positivist dimension. Post-positivism refers to models of scientific inquiry but recognises the possible effects of human biases (Robson, 2011). The research included an intervention strategy that focused on assisting teachers to prepare lessons that developed critical thinking skills. This intervention provided the means and effect to influence the outcomes of the discrete quasi-experiment that is central to the research process. Thus a cause and effect approach was employed in order to identify and assess the influence of the critical thinking intervention that took place in the PLC discussions, which agrees with Creswell, 2014. This quasi-experimental approach was supplemented with qualitative open-ended questionnaires and semi-structured interviews that are considered a form of social constructivism as it enables the researcher to understand the lives and world of the participants.

3.2.2 Social Constructivism

The overarching research framework for this research, whilst being pragmatic, is based in social constructivism with a view that individuals construct their own meaning of a situation, content or context while interacting with other people or society. Unlike post positivists, who seek to confirm theories, constructivists generate theories.

Traditionally, cognitive thinking is deeply embedded in a constructivist epistemology, associated with Piagetian frameworks (McGuinness, 1993). Piaget contended that knowledge is constructed from actions and thus our interactions with the world need to make sense of our world (McGuinness, 1993). Although Piaget's insistence on a link between biological development and his key developmental stages of operational thinking to abstract thinking are criticised (King, Goodson & Rohani, 1997), he did encourage the shift of movement between stages towards higher order thinking skills, such as abstract reasoning, problem solving, self-reflection, and critical reasoning (Cowl, Kaminsky, & Podell, 1997).

McGuinness (1999) stated that a constructivist viewpoint in education requires that the learner is an active purveyor of his or her own meaning. This intervention seeks to interact with the teachers' pre-constructed habitus and assist them to construct new views and pedagogies concerning the use of creative and critical thinking skills in their everyday pedagogy. In this study learning and instructions need to be mediated between teachers and learners. Research reports that reciprocal teaching produces better results than does direct instruction (Palinscar & Brown, 1984; Brown, 1987). McGuinness (2000) suggests that inquiry learning, guided discovery and cooperative learning may enable learners to engage with higher levels of knowledge, especially with strategies of interrogation and confrontation (Collins & Stevens, 1982). The concepts of metacognition and self-regulation are aligned with teaching thinking skills to learners. Cooperative learning needs to be the primary tool for 'thinking' or cognitive instruction, enabling learners to clarify and reflect upon their own new knowledge (McGuinness, 1993). Learning and thinking are social interactions involving both content and the process of learning (McGuinness, 1993).

Vygotsky (1978) is known for his emphasis on the social origins of knowledge. For Vygotsky "learning involved internalising activities originally witnessed and (then) practised in a cooperative group setting" (McGuinness, 1993:313). Reciprocal teaching takes place in cooperative learning groups where learners are initially guided in strategies but the role of the teacher fades and assumes the role of mediator, scaffolding the social support of the class. De Corte (1990) explains how powerful learning environments raise cognitive levels of engagement in scaffolding from other-regulation to self-regulation. Self-directed, intrinsic motivation to learning is valued over extrinsic, teacher-driven motivation. The CPS programmes used in the intervention makes learners active and purveyors of their own knowledge. Socratic questioning and

discovery learning are metacognitive tools within constructivism, used to induce cognitive change.

3.2.3 Social Constructivism in the Classroom

Booyse & Chetty's (2016) article, entitled '*The significance of constructivist classroom practice in national curricular design'* highlights the importance of creative thinking and the ability to construct one's own meaning in an increasingly independent world. In a study of teachers enrolled for an Advanced Certificate in Education (ACE) course, the teachers reported that they "found it difficult to frame teaching theoretically and develop critical, creative and conceptual skills, while still teaching the required content" (Booyse & Chetty, 2016:16). Their biggest problem was in "develop(ing) the individual learner's ability to construct personalised meaning and solve increasingly complex problems in the learning area and daily life" (Booyse & Chetty, 2016:138). Learners struggled to personalise the school curricula as it was seen as filled with imposing content forced upon them in a direct teaching manner. School time was reduced to rote learning and fact reproduction while playing the school-game (Booyse & Chetty, 2016). Learners are required to adhere, unquestioningly, to teacher-instruction, abiding by the school's specific 'code of conduct' in order to be successful students.

Constructivism identifies the significance of the mind, making sense of curricula content, by assimilating prior knowledge and experiences to construct new knowledge in cognitive development (Booyse & Chetty, 2016). In this study the divergent and convergent tools acquired in the CPS programme encourage learners to actively construct their own knowledge, based upon their previous knowledge and sensitively guided by the teacher. Bruner (1962:139) recognised the connection between cognitive and constructivist thinking as a process whereby students construct new ideas from past knowledge. Vygotsky (1987) recognised the value of social structure and cultural knowledge in the classroom where learning takes place through social interaction with knowledgeable others. CPS is based upon open-discussion and divergent thinking where learners are encouraged to make connections based on other learners' answers.

Bourdieu's (1984) social field theory with its thinking tools of habitus, field and capital confirms the idea of cultural knowledge and one's life history as having an impact on one's life and learning. Bruner (1962) emphasised mediated learning supporting Vygotsky's belief in active dialogue where learners actively make meaning of new

knowledge. This learning, as a social construct, validates cognition and permits learners to go “beyond the information given”, allowing for metacognition and true learning (Booyse & Chetty, 2016:139). The success of the CPS programme is seen as being able to teach learners to make connections that other people don’t ordinarily make (Nielsen & Thurber, 2016) thus seeking creativity based on social constructs.

3.2.4 Social Constructivism and Teaching Practice

Embedded in the ideals of social constructivism is the notion that teaching needs to be facilitative, where the teacher is able to adapt and alter the teacher-learning process so that the learner is able to construct his/her own meaning and understanding, with the support of the grounded knowledge offered by the teacher and/or supporting media (Booyse & Chetty, 2016). It is essential that learners are seen as “complex and diverse individuals” involved in a process of “building and assessing knowledge … more as a product” merely being “expected to produce the correct answers” (Booyse & Chetty, 2016:140-142). In a constructivist framework the learner becomes the sense-maker while the teacher is the cognitive guide, monitoring knowledge construction in an open-ended, dynamic learning experience.

3.3 Mixed Method Research

Johnson, Onwuegbuzie and Turner obtained nineteen definitions from mixed method researchers and compiled this composite definition:

> Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration (2007:123).

Mixed method research (MMR) offers “methodological eclecticism” (Tashakkori & Teddlie, 2010:8), that is, variety and diversity. MMR also has ‘paradigm pluralism’ (Tashakkori & Teddlie, 2010:8) where a variety of paradigms may serve the underlying philosophy. MMR encourages diversity at all levels, triangulating the research and combining deductive and inductive reasoning whilst contributing to a greater understanding of the phenomenon under investigation. Green and Hall (2010) who welcome mixed methods and alternative paradigms as making practical sense of the complexity of human behaviour, offer two major stances or theoretical foundations for MMR research, namely Dialectics and Pragmatism. They prefer to call this paradigm

a ‘mental model’, which they describe as “sets of assumptions, understandings, predispositions, and values and beliefs with which all social inquirers approach their work” (Greene & Hall, 2010:122). Thinking dialectically means that one takes a stance which welcomes more than one pragmatic tradition and mental model. Mixed methods seek an “understanding and discernment through the juxtaposition of different lenses, perspectives, and stances” (Greene & Hall, 2010:124). This paradigm is best suited to this research project as it allows the researcher the freedom to use both methods of inquiry within the safety of traditional paradigms.

Creswell suggests a more simplistic and pragmatic definition of MMR and states:

> Mixed methods research is a research design (or methodology) in which the researcher collects, analyzes, and mixes (integrates or connects) both quantitative and qualitative data in a single study or a multiphase program of inquiry (2007:119).

Before the publication of the first edition of Tashakkori and Teddlie’s (2003; 2010) *Handbook of Mixed Methods in Social and Behavioural Research*, mixed methods was largely self-taught, with its origins in the 1980s and early 1990s. In 2003 several recognised authors such as Creswell, Tashakkori, Jensen and Shapley addressed issues of MMR. Together they provided precise guiding frameworks and principles for this emerging research methodology. Later, Morse (2010) developed a nomenclature for MMR that have become universally accepted. There is a link with the terminology of traditional research methods wherever possible, but a distinct, new language (Creswell, 2010), with its own recognised abbreviations, has emerged. Figure 3.2 provides three examples of mixed method nomenclature: quan, QUAL, + and →

quan (and) QUAL	**+**	**→**
Giving ***priority*** to the qualitative aspect of the research	Convergent methods	Sequential methods

Figure 3.2 Examples of MMR Nomenclature

MMR developed at a rapid pace and procedures needed to be established to support this research design. Several suggested sets of research designs were proposed, based on actual projects, but Creswell (2010), supported by Green (2008), suggested four main design procedures or distinctive methods of social inquiry for mixed methods research. This included triangulation, embedded (or nested), explanatory and exploratory mixed methods research frameworks which can be performed sequentially

or concurrently. Creswell welcomed the structure, especially for novice researchers wanting to use this research design as it “provide(d) a strong foot-hold into interpreting the many designs available” (2010:57).

MMR was selected as the research design for this study because it incorporates both deductive and inductive logic in the same study. This research design enabled the researcher to deduce information from the theories that arose from the literature and the data derived from the quantitative survey, whilst the open-ended questionnaires and semi-structured interviews allowed for inductive data to inform the researcher of the participants’ perception of the creative and critical thinking intervention. Thus, the focus in this study was always on the research question to determine the best approach for the research.

Whilst quantitative and qualitative data provided different types of information, MMR combined the data, allowing for a stronger understanding of the research problem. The qualitative finding assisted in explaining the quantitative findings. The data analysis process was amplified with a cross-over-track that integrated the qualitative and quantitative data to provide a more rigorous and complete understanding of the research problem. This quantitative pre-test survey informed and helped to explain the qualitative open-ended questionnaire.

The explanatory sequential mixed method approach used in this research is a two-phase project. Quantitative data were collected and analysed. The results informed the qualitative phase which then informed the types of questions that were posed to participants in the qualitative phase. The qualitative data were collected and analysed separately. Finally, the data analysis from both phases was integrated and interpreted. In this manner, the qualitative data helped to explain in more detail the quantitative results. Morse recommends that regardless of the theoretical drive, each qualitative and quantitative method must be individually respected, keeping each method separate until the point of interface, “[m]ixed methods are not data soup” (Morse, 2010:348). This study involved three separate stages where first the quantitative data were collected and analysed, then the qualitative data were collected and analysed, only then, the two sets of data were integrated.

3.4 Mixed Method Challenges

MMR is constantly challenged for its conceptual stance of a “transformation away from monolithic paradigms towards a more practical orientation that emphasises individual components of philosophy and theory guiding the research” (Tashakkori & Teddlie, 2010:804). Another mixed method concern is that of skills and training. Relating to this, experienced researchers questioned whether a new researcher could realistically become a connoisseur of both methods of research (Creswell, 2003) as new researchers may have a lack of skills and training. However, with the guiding frameworks created by leading researchers, the mixed method research process has been made very manageable. This research uses the pre-set framework of explanatory sequential mixed method. Creswell confirms that the “straight-forward nature” of the sequential explanatory strategy “is one of its strengths” (Creswell, 2003:24).

In this research the quantitative and qualitative data operate independently of one another and are only integrated in the final stage. Mason (2006), whilst realising the benefits of mixed methods, cautions that multi-strategy designs can become disjoined and forced if the researcher does not have a clear, logical approach to the design framework to guide the research. Creswell challenges this way of thinking when he suggests that the explanatory sequential method “is easy to implement because the steps fall into clear separate stages” (Creswell, 2003:24). Creswell elaborates that the main weakness of this design is the length of time involved in data collection, especially if the two phases are far apart (Creswell, 2003). This time lapse or ‘gap’ between the two data collection phases in this study, however, was necessary to allow for the intervention of creative and critical thinking skills, central to the nature of this research.

3.5 Sampling

The single sample, where participants were directly accessed, consisted of four Grade 6 teachers at an ex-model C school with a population of approximately 800 learners in the southern suburbs of the Western Cape. The teachers and the school were chosen as the researcher worked at this school and thus the school forms a convenient sample. The teachers were conveniently available as a cohesive class grouping and willing to participate in the study. The principal was supportive of the ideals of creative and critical thinking and welcomed the intervention and the research at his school. This naturally formed group or convenient sample consisted of two female and two male teachers, with ages ranging from 29 to 62 years. Although this group is representative of a South African teaching population, the sample size is too small to be of any

statistical significance. This study, however, could lay the foundation for a bigger study with a wider section of the South African teaching population. As part of the research process the reseracher was mindful of the strict ethical codes protecting research participants. All responses were anonymous to allow for freedom of expression and to protect the participating teachers.

3.6 The Research Design

3.6.1 Explanatory Sequential Mixed Methods

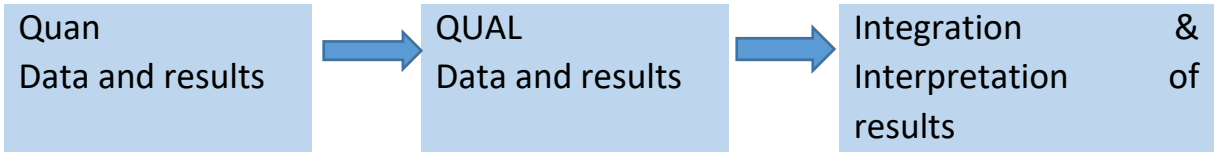


Figure 3.3 The Explanatory Sequence

Figure 3.4 seeks to visually confirm that the explanatory sequential strategy is the most straight-forward of the major mixed method approaches (Creswell, 2003:24). Its identifying characteristic is that the collection and analysis of the quantitative data are followed by the collection and analysis of the qualitative data. Priority may be given to either phase, or remain equal. In this research, priority was given to the qualitative aspect of the research process. Thus, the emphasis was on the human aspect of the teacher's perceptions of their teaching world. The two methods (qualitative and quantitative) are integrated in the interpretation phase of the study. This allows qualitative results to assist in explaining and interpreting the findings of the quantitative study. The reporting format, in this study, will follow this order.

3.7 The Research Strategy

3.7.1 Quantitative: Quasi-experimental

This quasi-experimental study is a fixed design where the phenomena of interest is qualified before the data collection. The study compared the outcomes of a single group of teachers before and after an intervention. The instruments of measurement were a pre-intervention survey, followed by open-ended questions and focus group interviews. Quasi-experiments are designed to empirically ascertain if improvements occurr in a treatment which was predicted to produce real improvements (Thyer,

2012:25). This design therefore included one group of participants with a pre-test measure followed by a treatment and a post-test of the four Grade 6 teachers.

Figure 3.5 indicates that one group was involved in a pre-test (01) survey, followed by a novel treatment or intervention (X), which was in turn followed by a post–test (02), open-ended questionnaire and focus group interview.

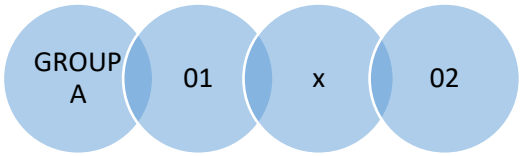


Figure 3.4 Single group: Pre-test – Treatment – Post

The questions in the pre-test survey specifically cross-reference with the research question, directly sought to measure four Grade 6 teachers' pre-intervention perceptions towards creative and critical thinking and professional development as a whole. Although this was a quasi-experiment, the teachers' perceptions were seen as the dependent variable that was influenced by the experimental treatment of an intervention of CPS, the independent variable. The independent variable (CPS) is the treatment variable in the experimental manipulation of the teachers' perceptions. This research documented the influences on the dependent variables, the teachers' perceptions, to the treatment. Rosenthal (1991) in Creswell, (2010:18) suggests that the researcher is aware of three possible outcome-measures in experiments, namely, the direction of the observed change, the amount of this change and the ease with which the participant changes. However, although the variables are acknowledged, this quasi-experiment focussed on the human aspect of how the teachers will evaluate their own practice after the intervention. These research findings, although in no way statistical because of their small isolated sample group (Thyer, 2012), could contribute towards education policy and improving the quality of teachers' pedagogy within the South African context.

3.7.2 Quantitative: Descriptive Survey

"Quantitative research is a formal, objective, systematic process in which numerical data are used to obtain information about the world" (Burns & Grove, 2005). It

describes variables and examines the relationship among them to see the cause and effect interaction. The research seeks to quantify a problem by generating numerical data that will be converted into statistical information (Wyse, 2011). This measurable data are used to uncover patterns using structured collection methods.

A quantitative approach employs strategies of enquiries such as surveys to collect data in order to test theories and reduce statistics to specific ideas and outcomes to better understand the phenomenon studied (Creswell, 2003). The results from this quasi-experiment are reported as a descriptive survey, yielding rich data that leads to important themes to explore in the qualitative phase of the research. Descriptive statistics apply data collection techniques and analysis to yield valuable information relevant to the research. The findings are organised into themes offering explanations, descriptions of habitus and, in this case, reflections on the teachers' pre-intervention-thinking, concerning creative and critical thinking. This research called for a description of the teachers' status quo prior to an intervention, in order to compare their perceptions before and after the intervention.

This descriptive research collected quantitative information that was organised as scores for how teachers perceive their current status according to four predetermined criteria: Current pedagogy, current support received, current pedagogical habitus, and current attitude towards creative and critical thinking. "Descriptive research involves gathering data that describe the teachers' perceptions of their lived experiences, reducing the data to a manageable form" (AECT, 2001:1). This in-depth research of a small number of participants, used description as a tool to shape data into patterns that develop during analysis. "Descriptive studies have an important role in educational research" (AECT, 2001:1). This phase of the research produced statistical information about the teachers' pre-intervention perceptions towards creative and critical thinking and professional development as a whole.

Internal threats to validity require the researcher to be mindful of experimental procedures e.g. changing instruments during the experiment and treatments, in order to draw correct inferences from the data of an experiment. External threats arise when the researcher seeks to generalise findings beyond the limits of the research group. This research lacks the statistical power to form any statistical assumptions.

3.7.3 Qualitative: Phenomenological Research

Qualitative research examines problems in order to gain insight and understanding of underlying sentiments and attitudes to uncover consistencies in thoughts and opinions (Wyse, 2011). The unstructured methods allow for a deeper dive into the problem to uncover trends amongst the participants' lived experience.

"Qualitative research uses multiple methods that are interactive and humanistic" (Creswell, 2003:20). The phenomenological method of inquiry seeks to identify the essence of human experiences concerning a phenomenon (Creswell, 2003) through the eyes of the participants. Phenomenology is a study of "people's conscious experience of their life-world" (Merriam, 2009:25) and their daily social interactions. Essentially it seeks to collect data from participants who have experienced a certain phenomenon and then to compile a description of the essence of the experience (Creswell, 2006). The description describes both the 'what' and the 'why' of the experience (Creswell, 2006). Phenomenology affords a researcher the opportunity to study a small number of people, over time, with a possible treatment, in order to gain deep insight into concealed meanings (Robson, 2011), with specific reference to their working environment. In this manner the researcher becomes aware of the knowledge claims of participants, based on their socially and historically constructed experiences. This knowledge often supports common theories that the researcher wishes to test. It is necessary for the researcher to explore his/her own experiences with the phenomenon and to be aware of any personal prejudices or viewpoints that he/she may have (Merriam, 2009). This epoch process, where one refrains from judgement, is crucial to extracting the meaning of the participants' experience of the intervention. Whilst the open-ended questionnaire elicited experiences and themes to explore, it is the semi-structured interviews that primarily confirms the teachers' life-world experience of the intervention.

In an effort to seek accuracy in qualitative findings the study needed to convey the logical steps taken to check for credibility and accuracy in the findings by, for example, checking for consistent patterns of a theme development. Recommended procedural perspectives included in this study involved triangulation of different data sources, member checking to determine accuracy of findings, and peer-debriefing to enhance accuracy.

3.8 Data Collection

The sequential mixed method's data collection process involved two distinct stages encompassing a rigorous quantitative sampling followed by a purposeful qualitative sampling. The quantitative results informed the open-ended questions in the qualitative phase and this, in turn, explored the quantitative results more fully. The same sample group was used for all phases of the study.

3.8.1 Quantitative Survey (Addendum 3.1)

As the sample group was small and contained, no drop-out rate was expected. The four participants were given a week to complete the survey and the results were analysed on collection.

The purpose of the survey was to capture the current status of the teachers' current pedagogy, with particular reference to their creative and critical thinking skill perceptions, so that inferences could be made about the change that might occur in their pedagogical habitus, after the intervention. The quantitative questionnaire (see Addendum 3.1) was limited to two pages for convenience and simplicity of response.

Advantages of this quantitative survey instrument are the economy of design and the rapid turnaround of results. The capturing of information with this instrument was made easy as it was limited by the convenient small sample of only four teachers at one school. Although this sample group is very small and limits the scope of the research, it does provide a glimpse into the teachers' perceptions of creative and critical thinking skills within a South African curriculum.

3.8.2 Qualitative Open-ended Questionnaire (Addendum 3.2)

According to Merriam good questions are the key to capturing relevant data (2009). Pilot interviews assisted with the critical wording of questions in order for the questions to be better understood and interpreted by the participants. Merriam (2009) indicates that interpretive, hypothetical, deep questions allow meaning and relevant responses from the participants and they define the focus of the instrument to collect meaningful data.

Robson (2011) suggests some guidelines for creating an open-ended questionnaire that includes keeping the language simple and the questions short to aid understanding. Long double-barrelled questions create confusion. Leading questions where participants are asked if they agree with a sentiment, leads to bias, as do

negative questions, which are often difficult to understand. Good questions are ones where the participant has the knowledge from their lived experiences to answer with ease and depth. Merriam (2009) suggests using personal wording where the respondent's own feelings or perceptions are required without asking direct, sensitive questions. See addendum 3.2 for the qualitative, open-ended questionnaire used in this study.

3.8.3 Qualitative Focus Group Interview (Addendum 3.3)

The focus group interview (FGI) used in this study involved one sample-group interview with a semi-structured questionnaire. The FGI is an open-ended group discussion where the facilitator guides the focus, typically lasting one hour (Robson, 2011). Interviews in focus group settings are highly efficient in gathering data from several people at the same time in an inexpensive and flexible manner (Robson, 2011). Participants are empowered to give their own opinion, while being able to consider statements or comments made by the other participants. Conversation in an FGI is stimulated by the thoughts and comments of others in the group. Contributions from quieter, more reluctant participants can be encouraged by the interviewer, so as to ensure equal contribution from all participants (Robson, 2011). However, facilitation requires a high level of expertise to deal with conflicts that may arise, particularly around issues of confidentiality. The results, especially from a small group, are difficult to generalise as they cannot be regarded as representative of the wider population (Robson, 2011).

Focus group interviews are able to ferret out several viewpoints. Because participants in a FGI are able to hear other people's responses, they are often able to comment beyond their original thoughts (Merriam, 2009). This aspect of an FGI assists with getting in-depth information. Interviews are best used for topics where people are encouraged to talk about their everyday lives, particularly where there is seldom a forum to express one's personal opinion. However, the researcher needs to remain alert and sensitive to these highly personal opinions (Merriam, 2009:94).

Robson (2011) suggests using interviews at the end of a study in order to amplify and consolidate the findings, as interviews assist in narrowing down the focus of themes. The facilitator is expected to generate interest around the research question topic, without leading the group. The FGI in this study contained a list of semi-structured, open-ended questions, with probes, specifically selected and informed by the analysis

of the open-ended questionnaire, to keep the conversation easy and engaged. Although audio taping is recommended for a small group, cryptic note taking is sometimes better as participants are wary of being recorded and held accountable to their sensitive, personal perspectives in the future (Robson, 2011). The semi-structured, focus group interview questions may be seen in addendum 3.3.

3.9 Data Analysis

Data analysis seeks to make sense of the data acquired. Coding tools are required to summarise the data into recurring themes in order to create meaning from the accumulated data (Tashakkori & Teddlie, 2010). Inferences may then be drawn from the outcomes of deductive and inductive reasoning that could lead to new insight concerning the research question. Although Tashakkori and Teddlie (2010:26) offer new trends to analyse MMR, the authors still recommend that MMR borrows from and adapts to qualitative and quantitative traditions. The quantitative and qualitative data bases are analysed separately in two distinct phases and only then integrated for a more complete understanding of the research question. This independent analysis is useful for beginners, as the one data base builds on the other, and can be spaced out over time (Tashakkori & Teddlie, 2010).

The process of coding, memo-ing and sorting is elaborated on in Chapter 4 where the findings of this research are presented.

3.9.1 Analysing the Quantitative Survey Data (Addendum 4.1)

Niglas (2010) suggests the following concise and informative vocabulary as indicative of quantitative data analysis (see Figure 3.6):

NUMERIC	OBJECTIVE	DEDUCTIVE	EXPLANATORY	GENERALISED
PREDICTIVE	THEORETICAL	POSITIVISM	CONFIRMATORY	VALUE NEUTRAL

Figure 3.5 Elements of Quantitative Data (Niglas, 2010)

These words in Figure 3.6 above aptly describe the type of results one receives from quantitative data analysis. The descriptive, statistical data provided by the quantitative survey in this research provided a pre-intervention measurement of the teachers' pedagogical habitus regarding creative and critical thinking and towards professional development in general. The questions were pre-coded into four sections of five questions each to simplify the analysis. The responses to the 20 questions were recorded on a 5-point Likert scale.

This data, from the four participants, were captured in the Windows based, Statistical Package for the Social Sciences (SPSS) programme (Addendum 4.2). It is a popular programme consistent in comparing groups or participants and for relating variables according to means, standard deviations and ranges. It formed the base measurement of the dependant variable, the teachers' attitudes towards creative and critical thinking and towards professional development in general. As mentioned, controlling variables such as age, gender and experience were considered to be reflective for a representative, convenient group of Grade 6 teachers, but they are not specifically mentioned in the research. SPSS is able to reflect the mean average scores for each question in the survey, while considering the range of scores, indicating the lowest and highest scores for the different facets explored in the survey. It is equally important to be aware of the standard deviation identified in some questions by the participants. This will reveal major variances in their responses.

3.9.2 Analysing the Qualitative Open-ended Questionnaire Data (Addendum 4.2, 4.3, 4.4, 4.5)

In contrast to the earlier table figure 3.6 on quantitative data, Niglas (2010) suggests the following (figure 3.7) succinct and instructive vocabulary as indicative of qualitative data analysis:

NARRATIVE	SUBJECTIVE	INDUCTIVE	EXPLORATORY	DEEP&DETAILED
DESCRIPTIVE	ATHEORETICAL	NATURALISM	UNDERSTANDING	VALUE LADEN

Figure 3.6 Elements of Qualitative Data (Niglas, 2010)

The words in figure 3.7 aptly describe the type of results one receives from qualitative data analysis. The questionnaire was the principal part of the research study and provided the most extensive and comprehensive data. Quasi-statistical approaches use the words and phrases of the participants (in vivo) as a crucial method of determining the relative importance of the data content. The questionnaire was the main instrument for gathering qualitative data and was pre-divided into three anchor-themes seeking specific data concerning. The three themes are: (1) the pedagogical habitus change of the participants and their attitude towards (2) PLC and (3) the CPS programme offered.

A thematic coding approach was adopted where all data were coded and labelled. Codes were then grouped together as themes. Themes occurring in the data were

determined inductively from the captured data. Once the relevance of the research question was established, theoretical affirmations of consideration were made (Robson, 2011). Addendum 4.2 presents the responses from the four teachers to the post intervention qualitative questionnaire. Addendum 4.3 offers an Excel table for data concerning the PLC. Addendum 4.4 offers an Excel table for the data concerning the CPS programme offered. Addendum 4.5 offers an Excel table for the data concerning the pedagogical habitus change of the participants. These themes then served as a basis for further interpretation, especially when combined in the final, integration phase of the MMR.

Qualitative analysis requires that the researcher process information in a clear, logical, meaningful manner (Robson, 2011:268). Systematic, documented approaches help to eliminate bias. However, because there is an emphasis on interpretation with qualitative data, it precludes definitive claims being made, but it offers guidelines and suggestions regarding the research question.

3.9.3 Analysing the Qualitative Focus Group Interview Data (Addendum 4.6, 4.7)

The focus group interview was semi-structured and loosely shaped around the responses provided by the participants in the open-ended questionnaire. This qualitative instrument was initially informed by statistical evidence obtained from the quantitative survey. Thus, the focus group interview afforded the opportunity for a research participant to consider the emerging information and confirm the researcher's interpretation of results emerging from both the survey and the open-ended questionnaire. Feedback from the participants attempted to exclude misinterpretations and add validity to the findings. Addendum 4.6 presents the report-back from the interview with the four Grade 6 teachers. Addendum 4.7 isolates the responses from the interview into the three themes; the PLC; the CPS programme; and the teachers' pedagogical habitus change. It is for this reason that the analysis of the focus group interview was fused with the final, integration phase of the MMR. Therefore, the focus group interview's main function was to consolidate the qualitative findings from the open-ended questionnaire as informed by the quantitative survey which layed bare initial descriptive statistics concerning the teachers' pedagogical habitus (Feldman & Fataar, 2014).

3.10 Data Interpretation

In the sequential mixed method strategy the integration of the quantitative and qualitative research were integrated after each method had undergone a separate collection and analysis of data. Although integration may occur at several different stages in other research methods, in this research, the quantitative data provided a base-level of understanding that in turn became the foundation for interpreting the results of the qualitative data. The mixing of data was done at the end of the research after the focus group interview which helped to consolidate and confirm findings from both methods of collection and allowed for the construction of validity (Tashakkori & Teddlie, 2010).

3.11 Limitations of the Research

Although research from many theorists (Chavez-Eakle, 2010; Cotton, 1991; Guilford, 1964; McGuinness, 2000; Nickerson, 1999; Paul, 1993; Sternberg, 1996; Torrance, 1972) reflects success in the use of creative and critical thinking skills, there are possible issues open to criticism in this study. The sample size of this study was very small and restricted to just four teachers at one school. The results therefore cannot be generalised. However, the present study has contributed to expanding the knowledge base in relation to existing beliefs and theories of the teachers involved. This research supports the notion that a PLC and a mediated learning approach are pivotal to educators' teaching effectiveness. The shift in teaching "how to think" and not "what to think" is synonymous with the learner-centred approaches of discovery learning and active-participation learning (Kloppers & Grosser, 2010).

The researcher has also been mindful of other limitations during this reach. The possibility of the intervention having a placebo effect (Thyer, 2012), where the participants are led to believe that the treatment they are receiving is credible, could be a motiving factor in itself. Another limitation could be regression to the mean (Thyer, 2012) where this intervention of thinking skills is a popular, new trend in education, naturally affording it a successful status. The possibility of therapist bias (Thyer, 2012) is real, based on the researcher's pre-existing investments in creative and critical thinking in her own teaching pedagogy. However, as the PLC is collaborative, it will be an individual choice for the teachers. There is no personal gain to the researcher and she is not in any superior position to the participants for them to feel any obligation to change their style of teaching. There was no selection bias, (Thyer, 2012) as this convenient sample is merely a coherent class group who were willing to participate in

the study. By chance, the sample offers wide demographic variables of age, socio-economic status, gender, experience and seniority. As the research involved only one researcher and one group of participants over a short period of time, there is no deferent treatment credibility and no maturation of the research (Thyer, 2012) where participants change or where a long passage of time could influence the perceptions of the participants. The intervention and its instruments were subject to treatment fidelity where they were delivered as intended and with a competent facilitator in a natural setting.

3.12 Validity and Reliability

Validity is the extent to which a concept is measured, meeting all of the requirements of the scientific research method (Shuttleworth, 2008). Internal validity is concerned with the steps of the design strategy, while external validity examines the results and any possible causal relationships. Reliability on the other hand, refers to the research's ability to be repeated with similar, significant results.

Construct validity is the over-arching category reflecting the "approximate truth of the conclusion that your operationalization accurately reflects its construct" (Trochim, 2006:1). In the current study construct validity verified the extent to which the survey and the open-ended questionnaire measured the teachers' perceptions of the intervention. Both instruments were born out of much research on creative and critical thinking and involved theoretical support for the interpretation of the construct (Cronbach & Meehl, 1955).

Content validity and face validity focus on whether the operationalisation is a good reflection of the construct (Trochim, 2006). It relies on good definitions of the construct against which to check the findings. Content validity seeks to question the content domain of the construct (Trochim, 2006). It requires a comprehensive description of the domain to be measured, including apt definitions and opinions, based on thorough research from experts. Face value relates to whether the test appears to be a good measure of the phenomenon established in the content value. It is essentially a subjective judgement (Trochim, 2006), but should be informed by successful research of experts if it is to have validity.

This research has offered a solid source of evidence in the literature review to support the incorporation of creative and critical thinking into everyday classrooms. A chain of evidence (Thyer, 2012) was built from the dependent variable, the teachers and their

current real-and-ideal teaching pedagogy, to the use of a PLC which offered an intervention (the independent variable) of CPS. The simplicity of this explanatory sequential mixed method, with its three instruments, should allow for the research to be repeated, particularly to a wider, more inclusive teaching population. The steps were thoroughly documented (Thyer, 2012) in this methodology and these same steps will be discussed in the findings. The coding has been clearly described and presented in Excel documents to allow for transparency of method. The variables were isolated to specific questions to allow for easy analysis. Although this research adhered to strict procedures and applied treatment fairly, the small, convenient sample limited the research and its ability to draw inferences from the data.

3.13 Ethical Considerations

All participants were asked to sign a letter of consent. They participated of their own free will and were eligible to withdraw from the study at any stage. As the intervention was to infuse the CPS techniques into the current curriculum, it did not compromise the curriculum or the teachers' teaching plan.

Permission from the Western Cape Education Department (WCED), the principal and teachers of the school was gained. The researcher received ethical clearance from the Ethics Committee at the Cape Peninsula University of Technology (CPUT). Principals and teachers involved in the research were made aware of the purpose of the research and full confidentially was agreed upon. Names have been changed to assure confidentiality. Permission from the pilot school was also gained. Member checks during feedback sessions and the post-intervention interview minimised any misinterpretations.

3.14 Conclusion

To conclude, this chapter sought to explain the nature of a MMR design and the reasoning behind the appropriate selection of this strategy for this study's specific research question. The explanatory sequential strategy of data collection allowed for a pre- and post-intervention data analysis in order to measure the influence of the proposed intervention on the teachers' pedagogical habitus. Priority of weight was given to the qualitative aspect of the research as there was substantially more data available in the two qualitative instruments. Whilst the quantitative and qualitative sections enjoyed separate data collection and analyses, they were combined at the end of the research during an integration of approaches and the subsequent final

interpretation of the mixed data. This methodological approach was guided by various theories arising from the literature, but specifically by the theoretical lens of Bourdieu's social theory of habitus and Sternberg's triarchic theory of intelligence. This chapter includes a discussion on the limitations of this research and it is also reinforced by the researcher's efforts to be ethically sound and to maintain validity and reliability.

In the following chapter the researcher presents the specific strategies employed to answer the research question and the findings of this sequential mixed method research strategy are provided.

Chapter 4: Research Findings

4.1 Introduction

This chapter presents the findings of the data. The aim of this study was to explore the effectiveness of a Professional Learning Community (PLC) to promote the teaching of critical thinking skills among four Grade 6 teachers. This was a fixed design, quasi-experimental research approach that aimed to investigate the effectiveness of how teachers dialoguing in a PLC can promote a shift in their teaching pedagogy, while at the same time supporting the current ideals of the Curriculum and Assessment Policy Statement (CAPS) with regards to creative and critical thinking skills. The study considered the teaching methodologies of four Grade 6 teachers with a specific focus on their use of the Creative Problem Solving (CPS) generating tools to introduce creative and critical thinking skills into their pedagogy.

Three instruments were used to collect data to determine the pedagogical adaptations and shifts made by the teachers during the PLC intervention: a pre intervention quantitative survey; a post intervention qualitative questionnaire; and focus group interviews with the four teachers. The findings are presented in three distinct, separate phases as per explanatory sequential mixed methods. Firstly, the quantitative data collection and analysis, followed by the qualitative questionnaire data collection and analysis. Finally, the two types of data were integrated with the focus group interview, where the quantitative results seek to explain and interpret the qualitative findings (Creswell, 2003b).

The research findings draw on Sternberg's triarchic theory of intelligence which supports the introduction of creative and critical thinking. Sternberg's theory of successful intelligence involves teachers using a set of pedagogical prompts which encourages learners to engage in memory learning as well as analytical, creative and practical learning (Sternberg, 2009c:185).

What follows in Figure 4.1 is a table showing the administrative sequence of the three instruments. The introduction of the adapted pedagogy via the PLC conversation that took place in a particular sequential manner to allow each intervention to expand on the previous one. In other words, as seen in the figure below, each action expanded on the finding of the previous action.

TIME ORDERED SEQUENCE - 2016			
INSTRUMENT	**TIME**	**ACTION**	**DATA**
	TERM 2	**PLC 1: Thinking Vision**	
QUANTITATIVE QUESTIONNAIRE		**Current Teacher Pedagogy**	**DATA COLLECTION & ANALYSIS 1**
		PLC 2: Multiple Intelligences	
		PLC 3: Other Schools and Thinking	
	TERM 3	**PLC 4: CPS- Generating tools 1-4**	
		PLC 5: CPS- Generating tools 5-8	
QUALITATIVE QUESTIONNAIRE		**PLC, CPS intervention & teachers' pedagogical habitus feedback**	**DATA COLLECTION & ANALYSIS 2**
QUALITATIVE FOCUS GROUP INTERVIEW & INTEGRATION		**Teacher reflections**	**DATA COLLECTION & ANALYSIS 3**
			DATA ANALYSIS INTEGRATION

Figure 4.1 Time-Ordered Plan: Explanatory Sequential Mixed Methods

This chapter presents the data findings on the pre-intervention quantitative survey, 4.2 Data Analysis 1. This is followed by the post-intervention qualitative questionnaire 4.3 Data Analysis 2 and finally the integration of quantitative and qualitative data findings

as per focus group interview are analysed 4.4 Data Analysis 3. A discussion on the major findings and the themes uncovered in this research follows.

4.2 Data Analysis 1: Pre-Intervention Quantitative Survey (Addendum 7)

One of the three objectives of this study was to review the teachers' understanding of how intelligence and critical thinking can be developed in their learners. The pre-intervention survey form completed by the participants provided statistical (quantitative) data on four areas:

> Questions 1 to 5 dealt with teachers' current 'teacher status-quo' (existing state of affairs).
>
> Questions 6 to 10 dealt with the professional support the teachers receive at their work.
>
> Questions 11 through 15 dealt with the teachers' current pedagogical habitus (Feldman & Fataar, 2014).
>
> Questions 16 to 20 attempted to garner the teachers' current knowledge and attitudes towards creative and critical thinking.

The idea of the pre-intervention quantitative survey was to record the teachers' current pedagogical disposition with a specific focus on their knowledge and attitude towards the teaching of critical and creative thinking. The qualitative survey was used as a base-line in order to be able to measure any changes in their teaching orientation after the intervention. Much of Sternberg's research (Kaufman & Grigorenko, 2009) on the theory of successful intelligence begins with a quantitative, base-line measurement of abilities.

Statistical Package for the Social Science (SPSS) is a Windows-based programme that was used to analyse the quantitative results. It is a programme that is capable of handling large amounts of data for analysis with easy conversion to tables and graphs. The simplicity of this survey made for easy analysis from the SPSS quantitative analysis programme. A summary table can be found as Addendum 7 in this thesis.

The convenient sample group of four Grade 6 teachers at a local ex-model C school was quite diverse in many ways. Two females and two males balanced the genders and their ages ranged from 29 to 60 years old. All the teachers had been in school governing body managerial positions at some stage and one was currently the head

of the Intermediate (Intersen) Phase. They worked well together as a team and willingly participated in this research study.

The highest mean average scores presented by the participants in the SPSS descriptive analysis (Addendum 7) bring into view that the teachers were all happy in their posts (4.25 mean) even though they felt that the volume of the curriculum content (4.50 mean) limited their teaching abilities. All were motivated to adapt their pedagogy to include teaching creative and critical thinking skills (4.50 mean) and were prepared to undergo training to learn new and innovative ways to blend creative and critical thinking skills into their everyday teaching (4.50). To date none of the teachers had used any of the popular thinking programmes of de Bono (1983), Habits of Mind (2008) and Thinking Maps (2011) in their teaching (2.25 mean) and admitted that they 'seldom' purposely planned for the teaching of critical and creative thinking skills, dispositions or traits (2.00 mean). This latter score had no standard deviation as all four teachers reported a score of 2 representing a 'seldom' used item.

The above data suggests that the four teachers were open to acquiring new skills and knowledge that they could apply to their current pedagogical practices. The four Grade 6 teachers were enthusiastic about being included in this intervention. They were, however, cautious that the CPS programme was not just another temporary fad, which would fade given time. They needed reassurance as to the value of the programme. The DBE's recently-launched PLC guide (DBE, 2016) concurs with the use PLC in schools and the document is supportive of collaborative professional development to support in-service teachers. Although the teachers were aware of some creative programmes, they had not used them in their teaching. This suggested a limited baseline experience in creative and critical thinking pedagogy.

The thought of 'taking on' yet more work in the form of new thinking skills methodology, was quite daunting to the teachers who already felt stressed by the volume of the curriculum content (4.50 mean) that needed to be taught each year in Grade 6. Literature reveals that well-performing South African teachers are under-paid (Armstrong, 2017). South Africa's teacher pay system does not effectively differentiate between "well- and badly-performing teachers" (Armstrong, 2017:1). Thus, there is little external motivation for teachers to upskill themselves. The data reflected that none of the teachers had used the currently popular 'thinking skill' programmes utilised in a few South African schools. These teachers 'seldom' planned to purposely teach creative and critical thinking skills as per the CAPS curriculum. The old adage that 'teaching is

a passion' seems true in this research as these teachers were enthusiastic about up-skilling themselves.

The staff development (4.50 mean) and learning support of the teacher participants of this study in the past has been facilitated by workshops, conferences, peer learning and whole staff training (4.25 mean). These teachers meet as a staff every Friday afternoon to facilitate the smooth running of the school and to share ideas to improve teaching and learning. The school supports and encourages staff to attend off-site development and training to grow and nurture their pedagogy.

The teachers supported a positive classroom environment (4.25 mean) and unanimously felt (no standard deviation) that they 'frequently' allowed for open discussions where learners' opinions and ideas were shared and encouraged in their classroom pedagogy (4.00 mean). The teachers did, however, admit that their classrooms were slightly more teacher-centred (3.75 mean) than learner-centred (3.50 mean). This question also reflected the greatest variance in answers, ranging from a 2 at 'seldom' to a 5 at 'always'. This finding reflected the largest standard deviation in the whole survey at 1,258. Question 14, just one above the teacher-centred question 15, asked the exact opposite question, 'Is your classroom learner-centred?' No teacher selected 'always' for being learner-centred. This is a miss-match and points to the teachers leaning towards 'how they would like to be' or knowing 'how they should be' in their structuring of how they teach as opposed to the real, every day, classroom situation.

Much has been written about the real versus the ideal classroom. In their book on researching teachers' roles on policy and practice, Harley, Bertram and Mattson (1999), found that teachers' beliefs and attitudes are rooted in national traditions and classroom realities. Teachers are generally firmly set in their own teaching traditions and find a change to include new pedagogy difficult (Harley et al., 1999). The data above suggests that teachers are aware of the need to make their classes more learner-centred and many often try to teach in this manner. However, ratings of 'seldom' are an honest reflection of the notion that the traditional teacher can impart great volumes of knowledge to a 'captive' audience with the favoured 'chalk and talk' lesson format. This data suggest that the teachers understand the value and importance of open-discussion, group work type lessons, but seldom make time for this methodology as they are pressed to complete a vast curriculum.

Three teachers (75%) reported that they ‘seldom’ used thinking programmes in their teaching. The data begs the question: Is non-purposeful, incidental teaching of creative and critical thinking, by means of only open discussions, enough to grow and develop creative and critical thinking skills as per CAPS requirements? If one’s pedagogy is not balanced between teacher-centred and learner-centred strategies, is it even possible to teach these skills effectively? Sternberg researched the success of purposely teaching with the triarchic instructional methods involving analytical, creative and practical teaching methods and claimed that learners, “learned more than did the student who received traditional memory-based instruction or analytically based instruction” (Sternberg, 2009c:213). He supported the thinking that one needs a purposeful, planned programme or intervention for creative and critical skills to be effective.

Whilst the teachers were motivated to receive training in creative and critical thinking, their teaching styles were still more teacher-centred and limited by the sheer volume of content required in each grade by the DBE. This single, limiting factor is the cause of much stress for teachers today (Booyse, 2016). Teachers feel bound and restricted by the syllabus and assessment demands. Older teachers follow the syllabus provided by the state and defer most decisions to higher authority (Harley, Bertram, & Mattson, 1999). The new teacher-vision should encourage teachers to constantly grow and develop their skills set to become self-directed, well-informed and highly skilled professionals with a strong sense of ethics and accountability (Harley, Bertram, & Mattson, 1999). The participants in the study were driven by a need to ‘complete the curriculum’ at all costs. They did not feel empowered to exercise any ‘personal interpretation’ of the curriculum to suit their learners’ needs. Currently, creative and critical skills are not directly assessed and reported on and are seen as an important extra if time allows (McGuinness, 1993). Therefore teachers feel that these skills can easily be compromised when time is limited.

To summarise, the teachers reflected that they felt relatively supported and satisfied in their posts. Although some had received off-campus support for professional development, they were motivated to receive training in creative and critical thinking. They admitted that their teaching style was more teacher-centred which they attributed to the sheer volume of content that needed to be covered in each grade by the DBE. The teachers felt bound and restricted by the syllabus and assessment demands. The data suggests that as creative and critical skills are not directly assessed and reported

on, the teaching of these skills can easily be compromised when time is limited. Although the teachers' current knowledge on 'thinking skills' was limited and they had not purposely used 'thinking' programmes, they were keen to experiment with the creative and critical thinking skills required by the CAPS.

The survey conducted at the beginning of the intervention was able to measure the four Grade 6 teachers' perception of their current pedagogy and teaching disposition (pedagogical habitus) in relation to the teaching of creative and critical thinking skills. These quantitative finding will be explored more extensively in the integration phase.

4.3 Data Analysis 2: The Post-intervention Qualitative Questionnaire (Addendum 8)

The mixed method research approach involved collecting and analysing data sequentially to explore the research question that is related to the effectiveness of a PLC intervention in promoting the teaching of critical thinking skills among Grade 6 teachers. Whilst the initial data involved quantitative and numeric information, the qualitative questionnaire sought to gather text-rich information.

As per the research title, the researcher sought to question the teachers' perceptions of the effectiveness of a PLC as provided by the facilitator. Essentially one needs to ask: Did the intervention manage to promote adaptations or changes in the four Grade 6 teachers' pedagogical practice to include the teaching of creative and critical thinking skills? In an effort to uncover the teachers' perceptions concerning the intervention, the qualitative question was divided into three anchor codes (themes) relevant to the research title.

> Questions 1 to 4 were concerned with the participants' experiences and impressions of being involved in a PLC for teachers.
>
> Questions 5.1 through to 5.6 questioned the participants' perceptions of the creative and CPS programme.
>
> Questions 6 to 12 dealt with the teachers' personal journeys in adopting creative and critical skills in their pedagogy.

The questions in this section targeted the teachers' pedagogical habitus change and included open-ended feedback on the intervention as a whole. All the data collected from the open-ended questionnaire were captured in one colour-coded document which listed each teacher's response to each question separately (see Addendum 8).

Figure 4.2 shows the division of questions in the open-ended questionnaire, shaped by the PLC, and seeking to reveal the teachers' perceptions concerning the intervention.

ANCHOR CODES OR THEMES AS PER THE RESEARCH TITLE		
Professional Learning Community intervention	Teaching of creative & critical thinking skills using CPS	Pedagogical habitus of four Grade 6 teachers
Questions 1, 3, 4 & 5.2	Questions 2 & 5.1 - 5.4	Questions 5.5, 5.6 & 6 - 12

Figure 4.2: Division of Qualitative Questions- Anchor Codes

A quasi-statistical approach was used where words and phrases and their inter-correlations determined the key method for defining the important themes and concepts (Robson, 2011:467). The data were coded and then grouped as themes.

As this questionnaire had been partly pre-coded into three major themes as per the research question (Glaser, 1978:83), insightful comments were added to these initial codes. Axil coding was used to find relationships between these three main categories. Matrices and thematic maps helped to refine the codes into meaningful overarching themes. Selective coding was then used to establish the core category or categories (Robson, 2011:489). In essence, a researcher has to reduce data, understand phenomenon, develop constructs and formalise, or relate data to a given theory (Robson, 2011). Figure 4.3 reflects the coding process.

CODING AND CATEGORISING			
CODING →	SORTING →	SYTHTHESIZING →	THEORISING
	CATEGORIES	THEMES	

Figure 4.3 Coding Process (Adu, 2013)

The exploratory questions used in this qualitative research were ontological in nature as the questions captured the participants' realities that are their lived experience of a creative and critical skills intervention. The first cycle coding method used was that of in vivo coding. In vivo coding is where the researcher uses the participants' own words to describe their perspectives of a situation, capturing their personal opinions and experiences (Adu, 2013). These groups of codes point to themes that are recurring in

the data. Finally, patterns and trends were identified in the second cycle of coding that supported the theoretical lens of this study.

The responses to the questionnaire by all four Grade 6 teachers were set out in one document. Tables were used to separate each teacher's responses to every question (Addendum 8). The responses were numbered as 1A, 2B, 3C and 4D each, representing a specific teacher's perception. Colour coding made it easy to track the opinion of individual teachers.

In order to isolate the in vivo coding of each teacher, Excel tables were created where the teachers' direct responses were recorded as emerging themes. Their responses were placed in three separate tables, representing the three main categories under discussion. The teachers' in vivo comments are presented in italics with direct speech marks throughout this thesis. Included are also the following addendums that present the data from the different surveys:

Addendum 9: Teachers' perceptions of a PLC

Addendum 10: Teachers' perceptions of a CPS intervention

Addendum 11: Teachers' perceptions of their pedagogical habitus change

A discussion of the themes emerging from each of three, pre-coded categories follows.

4.3.1 Professional Learning Communities (PLCs) (Addendum 9)

A PLC is "fundamentally about learning" and it facilitates teachers to "coalesce around a shared vision of what counts for high quality teaching and learning" (Brodie, 2013:6). It encourages teachers in a cohesive group to take responsibility for the students they teach and consider how they might shift their teaching to suit their learners' needs in a modern, 21st century world.

In the teachers' own words, they felt that the PLC was very successful as it "*made them think about their current teaching*" in a "*supportive*" and "*safe*" environment, "*without judgment*" (Question 3). This is in line with Brodie's (2013:6) sentiments that a PLC "should critically interrogate" teaching practices in an "ongoing, reflective and collaborative manner". The four teachers felt that the facilitator provided "*new ideas*" and "*different teaching styles*" to facilitate change. They valued the collaborative elements of the PLC process. Although, at times, one teacher felt "*overwhelmed*" and *"guilty*", the PLC successfully provided "*many, new ways for teaching creatively*".

The reflective element of the PLC allowed the teachers to acknowledge their weaknesses in a safe space. This is precisely what a PLC hopes to achieve: “to challenge their current thinking and to develop new conceptual ideas” (Brodie, 2013:15).

The four Grade 6 teachers supported the comment made by one of their colleagues who found that the collaborative, bottom-up support of the PLC “*really worked for me*” (Question 4). They felt that their opinions were being heard and they valued this professional respect. They appreciated that the facilitator was one of them, “*on the ground*”, ready to “*experiment*” with them. They found the sessions to be “*fun, exciting*” and “*motivating*”. The safe space of the PLC allowed the participants to really engage in the process. They “*enjoyed the tangible ideas offered*” in a “*practical*”, hands-on, manner. They began to feel “*comfortable*” with the “*big paradigm shift*” that offered new and “*different viewpoints*”.

The teachers enjoyed the practical manner in which CPS was presented in the PLC (Question 5.2). One of the participants indicated that “*this is how all new concepts should be taught*”. All the teachers felt that the tools were “*easy to understand*”, as each tool was demonstrated practically with the teachers participating in the process. By “*experiencing this process in a practical, hands-on*” manner, they felt that they knew “*what to expect*” in the classroom. This is synonymous with the ideals of discovery learning supported by CAPS. The data indicated that teacher 4D resonated with the practical aspect of the PLC. She indicated that “*the practical demo of PLC 4 and 5 were brilliant. Staff actively participated. The work became real and concrete”.* The role of the PLC in involving the participants actively in the learning process confirms the facilitator’s choice to make the new skills as real and practical as possible, and ultimately easier to implement in the classroom. “Reciprocal teaching takes place in a co-operative learning group and consists of guided practice in applying specific strategies” (McGuinness, 1993:307). McGuinness (1993) advises that the facilitator/ teacher’s role is to model and scaffold support for the novice in a practical manner as committed to in this PLC. McGuinness concurs with the participants of this study when she states that “reciprocal teaching produces better results than either direct instruction …or even teacher modeling alone” (McGuinness, 1993:307). The practical aspect of the PLC was vital to the acceptance of the new CPS skills.

The researcher felt that in order for the staff to accept the concepts and ideals, they needed to have a basic level of creative and critical thinking background knowledge

(Question 1). However, the two theoretical PLC's were not enjoyed by the teachers. Although they realised that this was vital information to the process, *"supposed to know"* and "*the building blocks*", which provide a "*good background*" and a *"good understanding*" of the thinking school vision, they found it "*overwhelming*" and *"uninteresting*". According to the participants it was "*too much theory*", and they wanted "*to get to the chase*" of the matter and deal with the creative and critical thinking in a more "*practical*" manner. Unconsciously, however, the data reveals that because the teachers accepted and understood the theory, they were able to accept the new skills more readily. Figure 4.4 suggests that the shift from a solid theoretical base, supported by the practical application of examples, could assist a level of change.

PLC ⟶		⟶
THEORY	PRACTICAL	CHANGE
supposed to know	how all new concepts should be taught	worked for me
building blocks		exciting
good background	work became real and concrete	big paradigm shift
overwhelming		motivating
uninteresting	practical, hands-on	tangible ideas

Figure 4.4 An effective PLC

The theme that emerged from this data is that the four Grade 6 teachers valued the collaborative style of the PLC and the active participation in the CPS lesson content. The data confirmed that a PLC is an effective means for delivering new content to staff.

4.3.2 The Teaching of Critical Thinking Skills using Creative Problem Solving (CPS) (Addendum 10)

CPS "is a process for approaching problems in an imaginative way, resulting in effective action" (1977:5).The researcher presented the eight generating tools to the PLC participants from a modern version (6.1) of CPS, for innovation and change, as set out in Creative Approaches to Problem Solving (Isaksen et al., 2011). The four teachers in this study saw CPS as "*fun, exciting, creative, valuable, hands-on*" tools that could be used to "*explore problems*" while "*engaging minds and enhancing teaching*" (Question 5.2b). This was a very positive response to the thinking skills programme.

The teaching of critical thinking skills using the CPS programme's generating tools, was found to be credible and useful (Question 2). The teachers saw this tool as "*helpful*" and "*useful*" in "*guiding the thinking process*". The "*new tool and techniques*" were able to promote "deep thinking", while being "*fun*" and "*attention-grabbing*". The teachers confirmed the advantages of engaging learners in their own learning as required in discovery-type learning. The teachers felt "*motivated*" to use this tool. The launch of this tool for changing the way in which the teachers enacted their pedagogy was successfully received by the participants. Figure 4.5 shows the eight creative and critical thinking tools utilized in the CPS programs' generating phase.

CPS: THE 8 GENERATING (IDEAS) TOOLS							
Brain storming	Brain writing	SCAMPER	Forced fittings	Visual relationships	Word dance	Attribute listing	Morphological matrix

Figure 4.5 The eight CPS generating tools. (Treffinger et al., 2003)

Whilst the PLC participants experimented with several of the tools such as brainstorming, brain writing, SCAMPER and attribute listing, it was the "*morphological matrix*" that really captivated the teachers' attention (Question 5.3). According to one of the participants this tool assisted their learners to write "*the most successful and creative fairy tales ever!"* The teachers were overwhelmed by their success with this exciting tool. Although not part of the research, they presented the researcher with their innovative CPS creative writing matrix lesson note. Whilst the teachers had only used the matrix lesson in "*English creative writing*" and *"attribute listing in Afrikaans poems*", they felt that there was *"potential*" to introduce other tools to Natural Sciences, Social Sciences and Social Wellbeing (Question 5.4). The teachers were eager to apply these new tools and to embrace these new teaching strategies. This suggests that there is a place for CPS in today's classrooms but it needs to be well-supported with a long term plan and ongoing support.

Although the teachers' use of thinking skills was limited to Bloom's Taxonomy (1956) and a hint of Thinking Maps (2011), two of the teachers found the CPS tools to be creative and flexible (Question 2). One teacher felt that CPS had the ability to *"teach the learners to think*" and thus they were "*able to provide their own solutions*" when faced with a problem scenario. The teachers were excited to see the learners meaningfully engaged with the content at hand.

Many of the experiences of the four PLC Grade 6 teachers relate to Samson's (2015) research outcomes on the benefits to students with a CPS intervention. Students are able to "express their own thoughts, feelings … in an atmosphere that incorporated respect for diversity" and "critically analyse and generate possible solutions" (Samson, 2015:153). The teachers confirmed that CPS does in fact offer specific tools and teaching strategies that evoke a deeper learning experience.

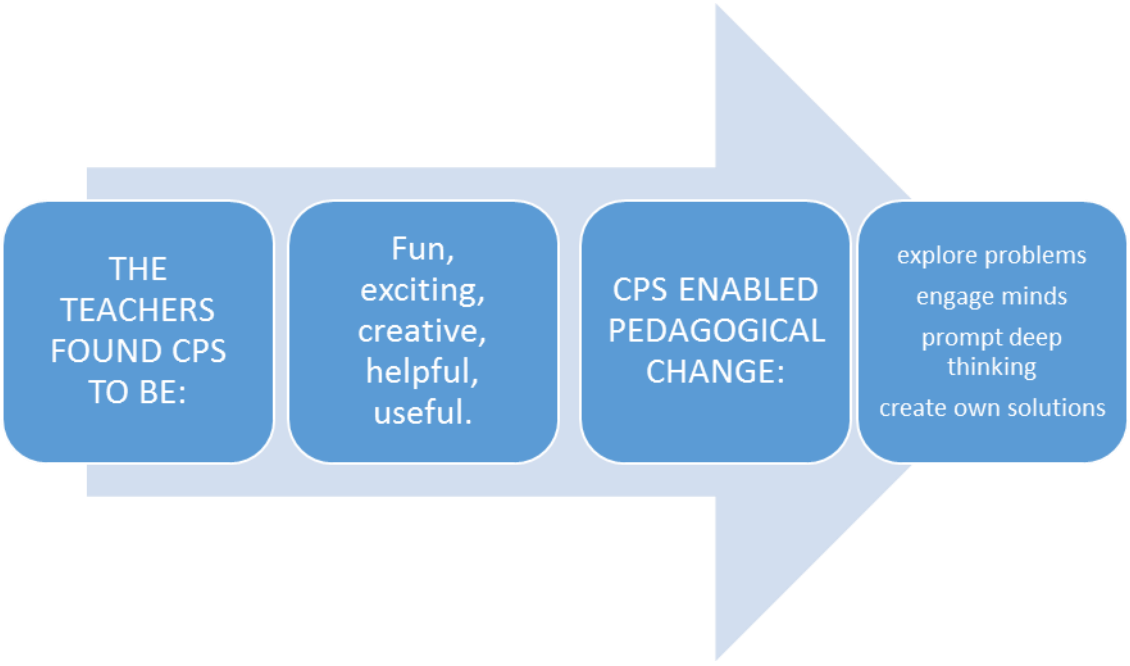


Figure 4.6 Creative Problem Solving as a tool for change

Figure 4.6 depicts the teachers' in vivo finding as recorded in the FGI (Addendum 12) on the CPS intervention. It suggests the possible potential changes in teachers' pedagogy, influenced by the potential benefits of CPS. CPS was considered fun and exciting yet it had the potential value of promoting deep thinking within the classroom.

4.3.3 The Pedagogical Habitus of the four Grade 6 Teachers (Addendum 11)

The teachers were asked to describe their experience of the creative problem solving journey within the PLC to a colleague at another school (Question 6). All four teachers agreed that the intervention had made them, and subsequently their learners, "*think*" more creatively. Teacher 2B suggested that this "*new journey*" encouraged her/him to "*think more creatively and to challenge ideas in a constructive manner*". Teacher 2B

saw the benefits of a creative and critical thinking intervention as "*a way to get learners to realise their own potential when thinking about problems*". This is a very positive result and speaks to the ideals of discovery and mediated pedagogy. The response that this process led the learners to think "*creatively and critically about their answers"*, was very encouraging as it supports the ideals of CAPS. This response highlights the enormous promise for the educational ideals of the South African Constitution which states "to free the potential of each person" (2003). The success of CPS was seen in the learners' responses to these CPS thinking tools. This realisation shifted the teachers' perceptions of these skills suggesting that they were able to teach learners more effectively.

Teacher 3C stated that CPS had the benefit of "*making your learners better understand and question*". She felt that it "*created smarter children*". Finally, teacher 4D saw the CPS intervention as "*an interesting way of making children think critically, for themselves, but allowing for creativity*". This statement suggests that PLC's have the potential to effectively support teachers adapting their pedagogy to include creative and critical thinking within the current school curriculum. This statement implies that the teachers understood the concept and motivation for applying these thinking skills in their classrooms.

Questions 5.5 and 5.6 in the questionnaire pointed to the possible problems introduced by the learner-centred teaching of group work and the subsequent issues of discipline. All the teachers felt that the learner-centred thinking skills teaching strategy, which involved group work and open-ended class discussions, were worth the extra effort. Teacher 2B was impressed with the beneficial aspect of open discussion. S/he noticed that "*the top learners challenge each other, while providing vocabulary to the weaker learners, so that everybody is involved and benefitting*". Teacher 3C however offered words of caution: "*like anything, too much of it could create a free-for-all classroom environment. So a balanced approach would be best*". Teacher 4D suggested that "*maturity is a big factor in the effectiveness of proper group work*".

A positive and engaging classroom climate is a vital aspect of successful teaching and learning (Fraser, 2006). The qualitative questionnaire asked the four teachers if open-ended, class discussion type lessons, with deep student engagement and brainstorming ideals, was more difficult to control or discipline. Three teachers responded "*no*" to this question. One of the teachers elaborated: "*not if you have a system that works".* The teachers suggested certain teaching strategies that they use

to maintain discipline such as ringing a bell to gain control of their classes after open-ended discussion times as well as the necessity for providing enough time for discussion. Teacher 2B suggested that *"fully engaged learners*" are not undisciplined. Teacher 3C confirmed this sentiment stating that "*topics can also play a role of how effective group work/ discussions can be*". Teacher 4D expressed the sentiment that "*as a teacher you are handing over control to the kids. Strong boundaries and buy-in from everyone is important*". S/he further noted: "*I guess when children are doing something enjoyable there is less boredom*", inferring perhaps that the learners will be self-absorbed and therefore self-disciplined. These participants were supportive of the class discussion-type lessons in theory. They realised the value of discovery-learning but admitted to having a teaching-centred pedagogy. The participants later realised that this type of lesson requires considerably more time. They believe that the over-ambitious curriculum forces them to employ the traditional 'chalk and talk' lesson as it is able to quickly impart the knowledge (curriculum content) necessary for the all-important examinations (Booyse, 2016).

Question 7 in the qualitative questionnaire pointed to the very heart of the study: "Has there been a shift in your pedagogical habitus?" The aim of this research was to see if an intervention of creative and critical thinking could be effective in changing the pedagogical habitus of four Grade 6 teachers. Three of the four teachers responded with a resounding "*yes*". The three teachers were able to see the benefits of incorporating creating and critical thinking skills in their classrooms. Teacher 3C put it aptly when she stated that it is "*an effective teaching style will constantly morph*" their teaching. Teacher 1A felt that the intervention made her teaching style "far more learner-centred", encouraging "*more discussion and freedom of ideas*" amongst the learners. However, teacher 4D, reflected that s/he thought that s/he often did "*some of this subconsciously in the classroom environment anyway*". As Harley, Bertram & Mattson (1999) discovered, many teachers feel that by asking deep questions and allowing for some class debate, it is in fact teaching in a creative and critical manner.

Research suggests that creative and critical thinking needs to be planned for purposely (Rudd, 2007). Whilst teacher 4D stated that CPS had the ability to *"purposely teach for creative and critical thinking*", s/he alluded to the reality of large unruly classrooms that many South African teachers face (Harley et al., 1999) and wondered whether it would be possible to infuse all schools with the creative and critical thinking skills approach. S/he suggested a level of caution in the actual practical implementation of the skills as,

even given the supportive school environment that s/he works in. S/he notes that it was "*a busy term too, so have not really tried anything new*". Although motivated, these teachers were cautious to fully embrace the new thinking skills. The realisation that the extra effort of this intervention would require extra exertion from hard-working teachers proved to be a limiting factor.

While it would appear that teachers are keen for change, they do not always feel they have the time to invest in sustained changes in their pedagogical approaches. This was confirmed in their responses to Question 10 where all four teachers noted that they were enthusiastic about continuing their creative problem solving journey, but two of them requested that they spend time consolidating the new tools and skills introduced before attempting anything new. This latter response underlines the fact that that these teachers needed time to incorporate this new tool into their class teaching. Teaching per se places many demands on teachers (Booyse, 2016). The teachers wanted to use CPS, but realistically, there were still hurdles to overcome as the Figure 4.7 indicates. The teachers suggested that although CPS is "*a way to get learners to realise their own potential when thinking about problems*" it also has a "*vast number of assessments",* "*it takes time to plan new lessons*" and teachers "*have to work with a curriculum*". This statement suggests that teachers would require much support from 'above' if they were to include these skills into their teaching plans.

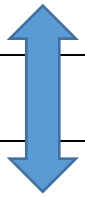
CREATIVE PROBLEM SOLVING PEDAGOGY		CPS is "*a way to get learners to realise their own potential when thinking about problems*".
	THE IDEAL	CPS led learners to "t*hink creatively and critically about their answers*".
		CPS "*making your learners better understand and question*".
		CPS "*interesting ways of making children think critically, for themselves, but allowing for creativity*".
		"*did some of this subconsciously in the classroom environment*".
		"*a busy term too, so (I) have not really tried anything new*".
		"*Yes, if time allow*".
	THE REAL	"*vast numbers of assessments - take away from the fun of teaching*".
		"*we have to work with a curriculum*".
		"*it takes time to plan new lessons*".

Table 4.7 The Pros and Cons of applying CPS in practice

Shifting or changing the manner in which teachers teach, i.e. their pedagogical habitus, is a long-term process that requires continual input and support. Bourdieu posits that habitus is able to be transformed by social interaction (Bourdieu, 1977:87) and that it is open to change. What the PLC intervention has shown is that teachers are prepared to change the way they teach if given enough time and support. The data suggested that if an intervention of this kind is to be successful, it needs to be a long-term project. This intervention was held every three weeks over term two and three of 2016. This time-frame was enough to confirm the need for creative and critical thinking in our curriculum in order to satisfy the curricula demands. The intervention of creative and critical tools motivated the teachers to want to teach using the CPS process. However, the actual implementation in the long term would prove difficult because the teachers required time to experiment and ongoing support from an experienced facilitator. The researcher asserts that in order to embed these creative and critical thinking tools into the core of one's pedagogical habitus, time and ongoing support is required. The analysis of this data reveals that the teachers are willing to change their pedagogical habitus, but they require assistance from experienced facilitators and time to implement the curricula changes.

Teacher 1A confirmed this ideal in Question 12, under 'any other comments' when s/he said,

> *A period of 2-4 years where we learn new techniques. There has to be time given for teachers to share with one another what has worked and what benefits they found. We need to also remember that we have to work with a curriculum and vast numbers of assessments which takes away from the fun of teaching.*

S/he repeated this sentiment (Question 11) when offering advice to the researcher: "*Go slowly – let us use these eight tools first – it takes time to plan new lessons and to see what works and what does not work".* Teacher 2B also suggested, *"I would like time to consolidate and use the CPS skills first*". All four teachers felt that they had access to resources and support to continue teaching in a creative and critical manner, yet as has been revealed above, time to engage with these new tools is a key factor (Question 8).

Teacher 3C, encouragingly suggested that change is possible, when s/he stated, *"…but then all that critical thinking requires, is a teacher willing to change their mind-set and a class to go with them*". Teacher 2B was grateful for the opportunity to change

his/her teaching through the intervention: "*Thank you for providing me with these exciting tools and resources. I feel that they are improving my teaching and I am able* to grow and teach the learners better". Teacher 3C was honest when s/he stated: *"Thank you for opening the door. Hopefully I have what it takes to walk through it".*

Overall, the intervention for the four Grade 6 teachers proved beneficial, as seen by comments such as "*learners enjoyed being heard and loved sharing their opinions*" or *"children thinking for themselves - expanding creatively*". It further appears that the benefits to the learners from CPS have encouraged the teachers to accept, in theory, the potential of the new teaching strategies. These qualitative findings will be expanded upon in the integration phase.

4.4 Data Analysis 3: Integration of Quantitative and Qualitative Data Findings as per the Focus Group Interview (Addendum 12)

In an effort to ensure validity and reliability the researcher used an open-ended focus group interview to confirm the conclusions from the qualitative questionnaire. The inclusion of a third instrument was used to confirm and cement the participants' perceptions and prevent any possible bias from the researcher. Strict adherence to methodological guidelines was followed to ensure rigor in this interview process. This process was also used to assist in explaining and interpreting the findings of the quantitative survey.

The focus group interview was used to triangulate the data sources in order to build a coherent theme (Creswell, 2003b). It also provided validity through member-checking to determine the accuracy of the previous qualitative findings in the questionnaire. This peer debriefing enhanced the clarity and accuracy of participants' perceptions.

The open-ended questions for the focus group interview were shaped from the responses to the qualitative questionnaire. This grounded element of the research sought to understand the teachers' real-life world in which they need to function successfully each day. The reason for the focus group interview was to clarify any queries resulting from the questionnaire. In essence, the focus group interview was a platform for an active, deep discussion with the four Grade 6 teachers. The teachers' views were presented as they unfolded, in a discussion format presented in Addendum 12 titled 'Semi-Structured Focus Group Interview Data'. As the focus group interview was an informal conversation with the four Grade 6 teachers, ideas were not assigned to specific teachers. Rather, the researcher allowed the major themes and the

teachers' perceptions of the subject under discussion to emerge from the data. This third instrument also provided the opportunity for the researcher's findings of the qualitative research to respond to the initial data offered by the teachers in the quantitative survey, which identified the perceptions of the four Grade 6 teachers before the intervention. The integration process served to consolidate and integrate the quantitative and qualitative findings. Addendum 13 presents themes arising from the data during the FGI and integration process.

4.5 Data Findings: Major Themes uncovered in the Research

4.5.1 Appreciation for the CPS Intervention

The data suggested that the teachers appreciated the sustained intervention of problem-solving skills during their staff development time. The quantitative survey revealed a supportive staff development programme at the school in this study, (4.50) and teachers who were serious about undergoing new training (4.50). The success and appreciation of the training in the PLC reported in the qualitative questionnaire, was "*most effective*" and "*valuable*". The four Grade 6 teachers found the intervention to be credible and useful. There was a positive response to the new thinking skills programme and teachers were motivated to use the new tools in their classroom practices. One comment in the qualitative data reflected his/her gratitude for this intervention when he/she stated "*Thank you for opening the door."* This statement implies that the participants valued the sustained, professional development in critical and creative thinking skills.

Clearly the participants enjoyed the intervention but would all the extra work required of these 'thinking skills' be sustainable in the long term? Currently there are no guidelines for the teaching or assessing of creative and critical thinking skills (Grosser, 2015). As the data portrays, the DBE places emphasis on the termly assessment of learners that relies heavily on analytical or cognitive aptitudes (Booyse, 2016). This would imply that these positive creative thinking skills would be seen as an extra luxury and not as essential 21st century skills. The participants needed to be sure that this new trend would be a lasting one and well worth their efforts. Although the teachers were *motivated to apply tools that were able to "release (learners') unique potential" and to "think for themselves*" they required confirmation and support from the DBE and school management to acknowledge the potential value of CPS.

The teachers were very keen to participate in this research because they "*got more out of kids*". The benefits of this sustained PLC were immediately visible. The participants were motivated to upgrade their skills. At the end of the study, the teachers were keen to continue with the intervention of creative and critical thinking skills, only now, on a whole staff level. The staff was also very keen to provide feedback concerning the intervention via the instruments. Being able to have a voice, even if only via the researcher, mattered to these teachers. They appreciated that their lived teaching experiences were being heard and acknowledged. These finding suggest that the DBE and school management would possibly derive great benefit by providing sustained PLC's on creative and critical thinking in schools.

4.5.2 Purposeful Planning

The data revealed that the teachers became aware that they had to purposely plan for the implementation of creative and critical thinking skills. The participants felt unanimously that they all 'frequently' allowed for open discussions where learners' ideas and opinions were encouraged (4.00). However, these teachers were surprised to see the direct benefits to their learners learning when they purposely incorporated specific creative and critical thinking tools into their lessons. The teachers valued their new, purposeful CPS tools that allowed "*learners (to) better understand and question*" the content being taught.

Rudd (2007) insists that thinking needs to be directly taught in order for learners to fully engage in the learning process and to reach their full potential. Question 8 in the FGI asked the teachers to compare their knowledge of other 'thinking' programmes (not directly taught) to their PLC experience of CPS. The table below (4.8) reflects that CPS and possibly other thinking tools, when purposely planned for, are enormously beneficial to learners (as per the teachers' in vivo comments) in achieving their full potential. Column one in table Figure 4.8 lists the teachers' thoughts concerning the value that CPS added to the lessons. The second column suggests the perceived benefits to the learners who experienced this new methodology. This data is reported in the focus group interview (FGI, Addendum 12). For example, CPS allowed for "*out the box thinking*" during lessons which allowed the learners to "*experience great success*" through "*the sharing of ideas*" and by being "*actively involved in their own learning*". Without the purposeful planning of CPS, few of these benefits would have been experienced by the learners.

BENEFITS TO TEACHERS OF CPS	
Benefits for LESSONS	Benefits for LEANERS
• Allowed for variety • Provided many, different strategies • Not a fixed, ridged lesson structure • "Got more out of kids" • Fitted well with 'Big Write' programme • Could provoke out-the-box thinking	• Experienced great success • Loved sharing ideas • Loved feeding off each other's answers • Symbiotic: weaker kids leaned on and elaborated on brighter kids' responses • Learners challenged each other • Actively involving learners in their own learning • Engaged in meaningful communication • Make them think for themselves • To think more creatively and to challenge information • Releasing their own potential

Table 4.8 The Benefits of CPS

All four participants agreed that one had to purposely plan for creative and critical thinking. "*One needs tools to provoke out-of-the-box thinking*", was suggested in the focus group interview. Clever questioning and discussions on content were important

elements of good teaching, but in order to unleash creativity, teachers needed to purposely employ tools specifically designed for this purpose. Employing a tool like SCAMPER (Eberle, 1977) to guide the learners to entertain novel and original thoughts is necessary. These teachers could already positively attest to the learning success that they had experienced while using CPS.

It is evident that the value of purposely teaching creative problem solving is very relevant to 21st century thinking-classrooms. Klopper and Grosser (2010:371) state, "in a competitive society, intelligence on its own is not sufficient and learners need to purposely develop cognitive skills in order to solve problems and reason in a rapidly changing world". It would seem that the great success that the teachers experienced with these new tools confirmed that change was necessary if they were to be held responsible for their learners' best education. If satisfying their 21st century learners' educational needs meant a shift in their own pedagogy, they suggested sustained professional development to support them in being able to make this change.

4.5.3 Practical and Participatory Teaching Strategy

The data from this research suggests that the teachers enjoyed learning the new concepts and tools in a participatory, practical, hands-on manner. All four teachers agreed in the focus group interview that the practical, active-participatory method used in the PLC made for the successful learning of new teaching strategies. One teacher stated that "*the practical demo of PLC 4 and 5 were brilliant*". Another PLC member remarked that when listening to passive lecturing and listening; "*you lose me*". Harley and Parker state that in general "policies do not speak the same language as teachers" (Harley & Parker, 1999:194). All four participants placed far more importance on tangible products than on educational theory. They disliked the two theory sessions in the intervention and loved the practical application of the CPS generating tools. The teachers also acknowledged that even as adults some staff feel threatened when asked to participate in group work activities. However, an active debate and a learner-centred classroom is exactly what is required for creative problem solving (Samson, 2015). It would therefore seemed beneficial for the teachers to experience the new content (CPS) in the same, practical manner that the students would experience original content in their classroom lessons. The teachers verified that the practical aspect of the PLC allowed them to know "*what to expect*" in the classroom situation where "*the work became real and concrete*".

The very heart of creative and critical thinking is that of open debate, discussion and participation (Samson, 2015). The method of delivery in the PLC had to be in line with this concept in order to be meaningful and useful. In the focus group interview, the four teachers preferred the "*visual and tactile*" appeal of the participatory workshop and subsequently all felt a level of confidence to experiment with CPS in their classrooms. Teachers were very motivated by the successes of their efforts during their experimentation with the application of CPS in the creative writing 'matrix' lesson.

The teachers realised that their classroom environments needed to become more learner-centred involving practical group work. Whilst the four Grade 6 teachers really appreciated the practical element of the PLC, the question is, would they be able to find the time, with all the curriculum demands, to engage in this methodology? The generating tools in the CPS programme offered tools that encouraged active, participatory discovery-type learning. Data revealed that the teachers were cautious of the new methodological change. They were concerned as to how they would manage to purposely prepare the extra new lessons and still be required to complete a demanding curriculum (Booyse, 2016). The 'ideal' does not easily fit into 'real' life situations (Harley et al., 1999). The four Grade 6 teachers realised that they would require extra time and support from management if they were to implement practical teaching methodologies.

4.5.4 Collaborative Element

The data from this research suggested that the teachers appreciated the collaborative element of the PLC which provided a collective, shared intervention of creative critical thinking concepts and tools. The teachers' success and appreciation for the training, reported in the qualitative questionnaire, stated that it was "*most effective*" and "*valuable*". A PLC is all about a shared vision of what contributes to successful teaching and learning (Brodie, 2013). The quantitative survey revealed that the teachers expected professional development (4.25) and the qualitative questionnaire discovered that the collaborative style of PLC "*really worked for me*" to have "*people on the ground*" who could be empathetic to their needs. The four Grade 6 teachers relished being a part of the cohesive PLC group. One teacher confirmed in the qualitative questionnaire that "*this is how all new concepts should be taught*". The teachers appreciated the opportunity to be reflective and mindful of their own practices while being trusted to evaluate the new tools on their own terms. An important aspect of a collaborative learning community is that teachers must be allowed to take

ownership of their own professional learning. The teachers valued being trusted and respected as professionals.

The DBE's guidelines for a PLC (DBE, 2016) confirm the above and expressly suggest that all professional development programmes in future should be "collaborative and reflective", with a "shared vision" allowing for "collective responsibility" (DBE, 2016:7). The PLC document emphasises "spirit where people are not afraid to talk about challenges they experience in their teaching" (DBE, 2016:8). It seems that these teachers would benefit from a two-way relationship with the 'authorities' so that they may be able to better serve the learners in their care. This 'angst' experienced by these teachers with the added pressure to teach for a 21st century and to be expected to service an ambitious curriculum, requires open debate between the DBE, schools and teachers.

4.5.5 Learner-Centred Classroom Environments

The teachers found that the CPS tools made their teaching more learner-centred. Learners became active participants in their own learning, leading to an improved classroom environment, conducive to successful learning. Whist the quantitative survey suggested that the teachers operated with a more teacher-centred pedagogy (3.75), the qualitative questionnaire and the focus group interview revealed a shift towards the teachers "*actively involving learners in their own learning*". In the interview the teachers felt that "*old school pedagogy of teacher-centred, content type delivery, needs to be balanced with the new CAPS ideology of releasing their unique potential to make them (learners) think for themselves*". This comment acknowledged 'old school pedagogy' with its content-rich traditional methodology yet it also suggested a renewed appreciation for a more learner-centred, discovery-type learning environment.

One teacher suggested that learners become "*naughty*" with "*passive, content-delivery type lessons*". This teacher-thinking supports Bernstein's theory that old fashioned corporal punishment and strict rules have given way to a democratic teaching practice with a learner-centred classroom climate (Bernstein, 1975:1977). In the past teachers often considered 'group-work and discussion-type lessons' to be an open to poor learner behaviour. The teachers in this study have seen the reverse of this situation as they now suggest that active participation of learners leads to improved behaviour with

motivated learners. The teachers suggested that a well-trained, 'good' teacher is able to manage group-work effectively with several, simple discipline techniques.

In the literature review of this study, it was purported that a successful classroom environment leads to successful learning (Fraser, 2012). The qualitative data confirmed that experimenting with CPS, made the teachers' teaching style, "*far more learner-centred*" with "*more discussion and freedom of ideas*" between the learners. The intervention heightened the participants' awareness of the benefits of active, learner-centred classroom environments. This learner-centred approach to teaching and learning aims to help learners construct their own knowledge, solve problems on their own and understand their own thinking processes (Fraser, 2006). This is in line with the DBE's vision that learners become independent and responsible involving "(a)ctive and critical learning, thereby encouraging an active and critical approach to learning" (DBE, 2016). *"The learners loved sharing ideas and feeding off each other's answers*", was a comment put forward in the interview, reinforcing the learner-centred nature of CPS. The four Grade 6 teachers confirmed in the interview that "*yes, it is important to have a classroom climate where different opinions are honoured*". Research reflects that a healthy, safe classroom environment is very conducive to successful learning (Fraser, 2006).

Data from this research provides evidence to support successful learning environments. Comments supporting a discovery-type environment used in CPS include, "*got more out of kids*" and "*the learners were engaged in meaningful communication*". Three of the teachers felt strongly that it was essential to find ways in which they could "*actively involve learners in their own learning*". One teacher, however, felt that "*there was still a place for content, chalk-and-talk, power-point presentation-type lessons*". This comment reflects that it is necessary to balance one's teaching strategies to suit the different learning styles of the learners in the class and the content being delivered. Sternberg's research confirmed this thought when he said, "[w]hen students are taught in a way that fits how they think, they do better in school" (Kaufman & Grigorenko, 2009:113).

4.5.6 Limited by an Ambitious, Assessment Driven Curriculum

The four Grade 6 teachers found that the time required to complete a content-rich curriculum placed enormous strain on their teaching. They felt limited by factors such as policy overload, and an ambitious, content and assessment-driven curriculum.

Figure 4.9 suggests the many restricting factors facing teachers that limit their potential pedagogical habitus shift to include new, creative and critical thinking skills into their teaching.

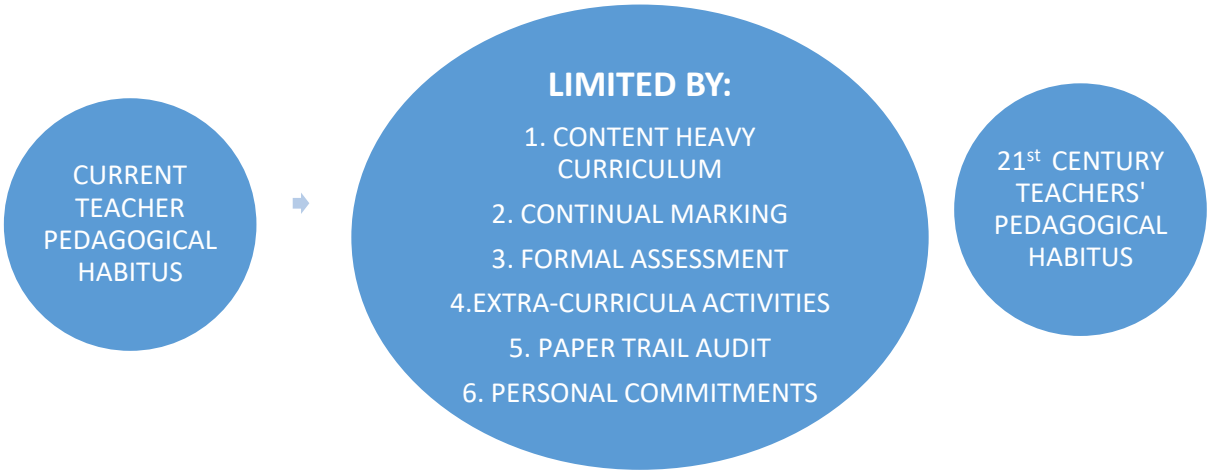


Figure 4.9 Limitations for pedagogical habitus change

A theme that came through in the quantitative survey was that the volume of the curriculum limited the teaching practice (4.50 mean). The teachers in this research stated that the "*vast number of assessments (necessary) takes away from the fun of teaching*". "*We have a curriculum to work with*" and "*it takes time to plan new lessons*" were reported in the qualitative questionnaire. Research suggests that teachers are under enormous pressure to satisfy a content-rich curriculum (Booyse, 2016) which demands an ambitious teaching and assessment load. The "*vast numbers of assessments take away from the fun of learning"* was cited in the qualitative data. Thus, the questions raised by Booyse (2016:22) is, "(a)re exams driving the learning process?" Booyse states that the CAPS has placed "academic performance as the single most important indicators of educational achievement" (2016:10). The teachers questioned the fact that academic performance and assessment are the major factors of measuring a learner's learning. These findings suggest that CAPS places an emphasis on controlled tests and exams and de-emphasises continuous assessment maintained in the NCS (Booyse, 2016:22). Learning in schools has become too fast and superficial in an effort to cover the massive content expectations.

In the interview all four teachers alluded to the fact that the teaching, plus all the extra anxieties of remedial action, enrichment and sports coaching left very little time for them to implement new concepts. The teachers were at odds because on one hand they were motivated to include the new CPS tools but they felt that there was little time to purposely prepare new creative lessons. These participants were part of a teaching population who have had to endure many new curriculum changes and are thus weary of new, temporary demands on their teaching. Even though the teachers realised the enormous benefits of infusing their teaching with the CPS tools, they suggested that initially preparing these new lessons would be time consuming. Extra demands on their roles as teachers needed to be validated and supported by the school and the DBE.

The four Grade 6 teachers problem-solved their time constraints associated with the CAPS and suggested solutions to resolve this issue. In order to create more time for thinking skills, strategies such as "*shaving the syllabus*" or "*redefining the syllabus*" by omitting repetitive topics e.g. the repeat "*teaching of conjunctions*" in every grade was suggested in the FGI. The thought of an additional workload to accommodate creative and critical thinking, while very attractive, is time-consuming. One teacher expressed his/her opinion on the potential values of adopting CPS tools into his/her everyday lessons. S/he suggested that although CPS lessons tended to initially take far more time to prepare and to deliver, the rewards were well worth the effort. S/he expressed this dilemma when s/he stated that s/he was able to "*teach a section of content in two hours and think, job done*". Yet when s/he employed CPS tools, investing more time (four hours) in the lesson, s/he received markedly improved results, and was able to think "*job well done*" suggesting that the extra time to prepare and present the lesson was of great value to successful learning. All teachers valued the intervention and felt that the group work and open-ended class discussions were well worth the extra effort. They indicated that they would all like to continue their creative journey in order to begin to shift and change their pedagogical practices as long as they had the time and support necessary for this change.

The teachers were motivated to shift their own pedagogy to include the new CPS tools as they realised that these strategies were necessary for teaching towards 21st century skills. However, teachers in this study suggested that it is not an easy or quick process. The data reveals that the teachers required sustained support and affirmation in the form of time for consolidation and the assistance of a facilitator if they were to shift their pedagogical habitus.

4.5.7 Time for Consolidation

The teachers requested "*time for consolidation*" to become comfortable with the new skills and concepts. However successful the intervention of creative and critical thinking skills was, the participants still requested time in the form of "*report back sessions*" where their ideas could be shared and confirmed for the consolidation of new knowledge. A PLC favours a collaborative inquiry approach (Feldman, 2015) which engages participants in conversation about their pedagogical learning and a possible shift in their pedagogical habitus. Teacher 1A requested time for teachers to "*share with one another*" to elicit the benefits and the problems of CPS.

The function of a PLC is to provide a mutually respectful, safe environment where teachers may offer their implicitly held beliefs and practices to the scrutiny and debate of others within the group (Feldman, 2015). This intervention encouraged open debate concerning the new CPS tools, by continually encouraging feedback throughout the PLC's. Remember that teacher 1A also re-enforced that "*it takes time to plan new lessons*". In other words extra time for consolidation and the brainstorming of new ideas was required by the four Grade 6 teaches. Teachers were keen to embark on this new journey, as a grade team, sharing the responsibility until such time that they felt comfortable and confident to execute the new skills. The process of scaffolding, discussed in the literature review, confirms the idea that initial support for the CPS programme is vital if it is to succeed. With the scaffolding process, support is gradually removed until the participants become confident with the new concepts and material.

4.5.8 Sustained, Collaborative Support with a Facilitator

The participants requested sustained support for the new creative and critical thinking tools introduced in the CPS programme. Although the quantitative survey revealed a very limited use of thinking skills (2.25), the qualitative questionnaire discovered a keen interest *in the new CPS tools. The four Grade 6 teachers thought it a "most effective" tool for "engaging minds*". The statement by teacher 1A: "*Go slowly – let us use these eight tools first"* suggests that new interventions take time and should not be rushed. The intervention required the teachers to adopt new skills and concepts with which they did not always feel 100% confident. The data therefore suggests that an intervention such as this requires a guiding framework and sustained support for a much longer period of time than was offered in this intervention. A period of possibly 2-4 years is necessary. The teachers requested the support of a facilitator to cement their new-found skills on a micro level in order that they might blend these new skills

into their curriculum. A PLC allows teachers to make sense of the new information in their own time. This concurs with the principles of mediation and facilitation that are embedded in the theory of constructivism which focuses on equipping teachers with the cognitive skills to construct their own sense of what is being learned (Grosser & de Waal, 2008:41). The researcher mediated the CPS skills, guided by the principles of an effective PLC, in an attempt to equip the teachers with new skills and knowledge to better inform their pedagogy. This support was necessary for a potential, constructive change in the teachers' pedagogical habitus. Darling-Hammond and Tucker (2017), who were tasked to analyse international trends in education, suggest the importance of empowering teachers by 'building effective systems to support educators and their work" (2017:1). Teachers, they state, "are so essential to the economic, political and social well-being of their nations that leaders have built entire systems to foster their recruitment, development, retention and advancement" (Darling-Hammond & Tucker, 2017:1). Data suggests that teachers do not, at present, feel empowered and supported as per this insightful recommendation.

The focus group interview suggested that the teachers benefited from being involved in the collaborative environment of the PLC during the intervention. The role of a PLC is to provide support for a deliberate intervention which will in turn provoke the pedagogical capacitation for change (Feldman, 2015:81). The dialogue of the PLC helped teachers to recognise their taken-for-granted assumptions and teaching practices. The facilitation on a micro, individual level attributed to the success of the intervention. This is in line with Jansen's (2014) statement that it is necessary to provide development and support inside the classroom in the real context of where and how teachers work (Jansen & Black, 2014:63) and not through the generic training of teachers. A PLC aims to support teachers with their perceived limitations of the CAPS by providing a professional space to expand and nurture the teachers' pedagogical repertoires (Feldman, 2015:84).

The role of a facilitator within a PLC is to provide an appropriate level of support and challenge to the group, while maintaining the focus on the shared vision. The vision of this study was the implementation of creative and critical thinking skills into the teaching practice of four Grade 6 teachers. The facilitator of the PLC provided the opportunity for teachers to construct their own knowledge. This facilitation provides the reassurance that the teachers were applying the skills correctly, helping with the flow of new ideas, and saving them valuable time.

4.5.9 Affirmation

Teachers requested a need to be generally affirmed in their practice and especially for their new efforts to apply creative and critical thinking skills into their teaching. Although the four Grade 6 teachers stated that they appreciated professional development, in the FGI, they suggested that *"Friday meetings are problematic. One is tired (at the end of the day) and can't really focus on new, important content".* The teachers brainstormed many ideas for change concerning the Friday staff meeting. Finally, they decided on refreshments during Friday PLC meetings, as a means to affirm and motivate them to actively engage in these professional development meetings. The symbolism of having eats provided had the ability to differentiate PLC meeting from the usual, compulsory staff meetings. The concept of refreshments perhaps suggests an element of control. At first glance it seems that these staff members are possibly setting conditions for an extrinsically motivated continued participation in professional development. However, knowing that they appreciated the intervention and are keen to receive new training, one is led to believe that these teachers merely wished to be involved in managing their own professional development process. A collaborative element of a PLC is that the participants usually set the parameters for the PLC meeting regarding times, dates and venue. Staff development time is set by the school within their school timetabling. The point that the teachers make, when questioning Friday meeting and requesting refreshments, is that by them being involved in this decision and choosing the how (e.g. having eats) is what makes it successful. The concept of 'treats' being presented as reward for attendance, points to the teachers' need to be acknowledged and affirmed for their efforts in purposely changing their teaching to be more in line with 21st century requirements.

In the FGI the teachers agreed that "*reward is an essential element for effort*" and they wanted to be "*acknowledged, even just verbally*" for those who "*actively tried to use CPS after the intervention*". The need for affirmation, however small, was very significant. It is evident that the teachers need support and affirmation from 'above'. The DBE is often perceived to be deaf to suggestions from its workforce (Petersen, 2017). This suggests that the DBE has little respect or value for teachers' input. This notion suggest a lack of teacher affirmation. The Department of Education has become the scapegoat for many of the current issues facing teachers today. They have become a faceless, nameless, authoritative power with little interaction amongst its vast work force. There is a chasm between 'us' and 'them'. Currently the DBE are seen as the

‘bad guys’ who do not reward teachers fairly in their teaching positions (Armstrong, 2017). The DBE needs to be seen to actively support and affirm its teaching staff.

One of the key roles of a PLC is to provide constant affirmation to the participants. The facilitator should nurture and hold the participants in healthy dialogue allowing the teachers (in this case) to question all concerns pertaining to their pedagogy. Due to their ongoing nature, PLCs hold the potential to provide ongoing feedback, support and affirmation to the teachers (Feldman, 2015). Thus, it was suggested that school management, with the support of a successful PLC, needed to affirm and honour teachers who extend themselves by incorporating creative and critical skills. Even though the school supported professional development and the teachers were keen to undergo new training, the teachers needed affirmation in order to support the shift in their teaching practices to include creative and critical thinking skills. The teachers were justifiably weary of change and required confirmation that the school was serious about the new creative and critical skill inclusion.

4.5.10 PLC’s to Support a Shift in Teachers’ Pedagogical Habitus

The success that the teachers experienced when applying CPS, as well as the positive responses from their students, encouraged and motivated the teachers to shift their pedagogical habitus. It became evident from the data in the qualitative questionnaire that the teachers, with continued support and affirmation, were motivated to continue implementing the CPS tools in their classroom teaching. The teachers were asked to reflect on the way forward, i.e. their continued journey in working with the CPS tools, in both the questionnaire and the FGI. Their responses were positive and provided ongoing direction for the PLC.

The very function of a PLC is that of providing ongoing support to shift and change pedagogy. Although the focus group interview revealed a request for more “*strategies for implementing creative and critical thinking skills*”, the teachers expressed a strong need to consolidate new knowledge before moving on to experiencing new and exciting tools. It seemed that the participants were afraid to lose the comforting role of PLCs which offered ongoing support to sustain their pedagogical habitus shift. It takes time to shift one’s embedded pedagogical habitus and teachers came to realise that any significant changes in their pedagogy would be a long-term process, and that this process would need the support of an experienced facilitator as previously discussed in 4.5.8.

PLCs can play a role in adapting teachers' pedagogical orientations to include a more enriched teaching platform in order to augment the current CAPS (Feldman, 2015). The intervention of critical and creative thinking skills provided a conversational, reflexive format which was able to challenge the teachers' current pedagogical habitus field. In bringing awareness to the teachers' pedagogy the teachers recognised that their tightly regulated methods of knowledge transmission did not engage as successfully with the learners as did the new CPS tools. It became evident to the teachers that the social structure of the school environment (field of play) valued these creative and critical skills. This was evident as seen in the principal's positive endorsement of the PLC for creative and critical thinking skills. The teachers were therefore encouraged to incorporate these new skills and shift their pedagogical habitus.

Findings revealed that the dialogical approach of the PLC, as a form of 'habitus engagement' (Feldman & Fataar, 2014), has the potential to provide a space for teachers to adapt and change their pedagogical habitus as required by the school and ultimately, the DBE. This gradual shift in the teachers' pedagogical disposition, as noted in the PLC conversations and observed in the qualitative finding, provided the PLC participants with the motivation to move to a more creative and critical approach in their teaching.

The data suggested that much more time and support is needed in order for the teachers to shift their pedagogical habitus and become "*more comfortable*" and willing to change their pedagogy. Bourdieu confirms this and states that "wanting to change one's habitus is easier said than done" (Nolan, 2011:213). When asked to rate their motivation to shift their pedagogy towards a more CPS inspired ideology, two of the teachers stated that they were very inspired and "*excited about the new ideas*". They wanted to continue to experiment and apply the CPS tools in their teaching. However, two other teachers reiterated that "*change is difficult*" while at the same time noting, "*but not to change is fatal*". The data reflects that the teachers' pedagogical habitus responded to the intervention, which the teachers internalised, adding another layer to their socialisation and habitus (Reay, 2004:434). One teacher was adamant that s/he wanted to continue to develop the use of the CPS tools in his/her teaching in order to "*keep pace*" but admitted that without ongoing support s/he would find this difficult. This data suggests that without active support and affirmation for teachers to integrate new

skills, such as creative and critical thinking into their pedagogy, teachers might revert to what they know best and be unable to shift their pedagogy.

This research revealed that teachers require a better understanding of who they are as teachers (their pedagogical habitus) and how they fit into the school and society in which they live and work (educational field). For teachers to change how teaching and learning takes place, professional development needs to take place on a macro, meso and mico-level, in a collaborative environment.

4.6 Conclusion

This chapter presented the data findings for the body of research conducted during this thesis. The quantitative findings provided a pre-intervention measurement of the teachers' perceptions of professional education and their understanding of intelligence, particularly as regards creative and critical thinking. The qualitative findings, with the use of the open-ended questionnaire, reflected on the teachers' lived experiences of an intervention of creative and critical thinking skills. It focused on the teachers' perceptions of a PLC, the success of the CPS programme and the possible shift in teachers' pedagogical habitus. The data from the qualitative findings were able to explain and interpret the findings of the quantitative survey. Finally the data were integrated with the use of a FGI to confirm the themes that arose out of this quantitative and qualitative research. The ten finding are presented in 4.5 Data Findings: Major themes uncovered in the research.

Data from this research suggests that these teachers came to realise the importance of creative and critical thinking skills in the school curriculum. They have become aware of the need to make changes to their pedagogy by purposely incorporating thinking skills into their classroom teaching. The teachers affirmed the ideals of an active, participatory classroom environment to aid successful learning. Teachers felt limited by an ambitious curriculum. Data highlights that teachers require support to manage curriculum adaptations and pedagogical changes in the form of facilitation, time for consolidation and ongoing affirmation if they are to shift their pedagogical habitus to successfully teach for the 21st century. The collaborative role of the ongoing PLC meetings provided the teachers with the knowledge and tools to adapt their pedagogy to include creative and critical thinking skills. The support of the facilitator was greatly appreciated. The facilitator encouraged dialogue about ways to adapt teaching to

create a more learner-centred teaching and learning environment with the use of the CPS programme.

In the following chapter recommendations will be provided based on the ten findings presented in this chapter.

CHAPTER 5: Recommendations

5.1 Introduction

This chapter provides a discussion of the recommendations that emanated from the data analysis and findings of chapter 4. Although this was a limited and small-scale study that cannot be generalised, the findings may be transferable in that the suggestions that result from the findings may benefit the broader educational community.

In chapter four ten themes arose from the sequential mixed method study. In this chapter, I suggest recommendations for these findings by dividing them into macro, meso and micro levels pertaining to the South African educational context. This chapter also includes an additional finding that has become evident from the overall analysis.

Aligning with the Delphi report of Facione (1990) and the writing of McGuinness (1999), the researcher's recommendations will include strategies for the implementation of critical and creative thinking, which are a pre-requisite in the current CAPS. Included in these recommendations, drawing on the research data, is a discussion on the reasons that these skills prove difficult to include in everyday classrooms. Several of the recommendations made in this chapter corroborate with findings in Jansen and Black's book, How to fix schools (2014) and with the work of Professor Mary Grosser (2016). The recommendations in this chapter endorse recommendations made by Booyse in a presentation made at the NWU, Vaal Triangle Campus on 9 March 2016 entitled: Bridges and Gaps in South African Schooling. A Research-Based Reflection on the Intended Curriculum.

The main themes emerging from Chapter 4's data findings will be discussed in this chapter at a macro, meso and micro level as illustrated in Figure 5.1.

MACRO	MESO	MICRO
DEPARTMENT OF EDUCATION	**SCHOOLS**	**TEACHERS**
• FRAMEWORK & SUPPORT FOR IMPLEMENTING CREATIVE & CRITICAL THINKING SKILLS/ CPS (1) • REMAPPING OF CURRICULUM / TIME AMBITIOUS CURRICULUM (6), EXAM DRIVEN CURRICULUM (6), ASSESSMENT OVERLOAD(6) • AFFIRM & SUPPORT TEACHERS (7,8,9)	• CREATIVE & CRITICAL SKILLS PROFESSIONAL DEVELPMENT AT A MICRO LEVEL (1) • ACTIVE, PARTICIPATORY, COLLABORATIVE PLC (3,4) • SUPPORT,CONSOLIDATION & AFFIRMATION (7, 8,9)	• PURPOSEFUL PLANNING FOR IMPLEMENTING CREATIVE & CRITICAL THINKING SKILLS/ CPS (1,2) • ACTIVE, PARTICIPATORY, COLLABORATIVE CLASSROOM ENVIRONEMNTS (3,4,5) • PEDAGOGICAL HABITUS CHANGE TO MEET THE NEEDS OF THE 21ST CENTURY (10)

Figure 5.1 The ten themes arising out of the findings

5.2 Recommendations on a Macro-educational Level

The Department of Education (DoE) needs to support and empower teachers by providing a framework for PLC's and guidelines for curriculum remapping. This support would enable the introduction of creative and critical thinking skills at macro, meso and micro levels.

5.2.1 Providing a Framework to Support Teachers in the Implementation of Creative and Critical Thinking Skills in their Classroom Teaching

This research suggests that the way in which teachers both 'think' about and 'do' teaching requires support and intervention from management structures. A long-term, meso and micro-level professional development opportunity for teachers within their school contexts would therefore hold the potential to shift and change the way teachers enact their teaching, i.e. support a pedagogical habitus shift. It is recommended that the curriculum needs to include a more explicit framework and vocabulary to encourage 21st century thinking skills, providing clear and practical guidelines within the curriculum for the introduction of creative and critical thinking skills at macro, meso and micro levels. The guidelines in the framework could support and empower teachers in their endeavours to introduce and use these skills in their classroom teaching. South African research from 2010-2014 has revealed that there is a "need for proactive fostering of productive thinking" and a "need for curriculum development

and innovation" (Booyse, 2016:11) to facilitate the "inclusion and assessment of 21st century skills such as critical thinking, problem solving, communication and collaboration" (Booyse, 2016:17).

The data revealed that the four Grade 6 teachers actively and explicitly embraced the CPS thinking skills offered in the intervention. The in vivo references suggest that the teachers were able to experiment with the higher order thinking CAPS objectives. The participants confirmed in the data that the intervention was "*an interesting way of making children think critically, for themselves, but allowing for creativity*" and "*a way to get learners to realise their own potential when thinking about problems*". It is thus recommended that the DoE finds a way in which it could support teachers in developing the tools to teach creative and critical thinking in their classrooms. As argued in this thesis, developing PLCs in all schools is in line with the Integrated Strategic Planning Framework for Teacher Education and Development in South Africa 2011-2015 (DBE, 2011) and concurs with the more recent guideline for developing PLCs in South Africa (DBE, 2016). The document supports PLC's and suggests that the major responsibility for professional educational development lies with the provincial educational districts (PED's) and teachers (DBE, 2016:7). The document lists roles for key players and directs them to work together "in order to change professional development practice and improve learning outcomes" (DBE, 2016:7). As a PLC is recognised as a teacher initiated or Type 1 Professional Development Activity within the SACE's Continuing Professional Teacher Development (CPTD) system, teachers involved in a PLC are able to claim 10 professional development points for the year (DBE, 2016).

Continuous professional development is not a new concept. I know of many professional friends, especially in the medical field, e.g. pharmacists, who are expected to earn points each year to remain registered practitioners. Yet, I am aware of many teachers, some of whom have taught for 30 years, who rely solely on their original qualification. Much of the research carried out by South African academics remains untouched, in bound copies or on academic library shelves (Feldman, 2015). Teachers, learners and society could benefit enormously from research that has been conducted by teachers within the education field.

Further, the DoE provides educators with the seven educator roles and their associated competencies (DBE, 2000). One of the seven norms of educational development points to professional development and lifelong learning. As stated by the DBE,

> The educator will achieve ongoing personal, academic, occupational and professional growth through pursuing reflective study and research in their learning area, in broader professional and educational matters, and in other related fields (2000:6).

Within the field of creative and critical thinking, valuable cognitive programmes have already been created. Professor Grosser and The Cognitive Education Research Group (CERG) recently secured accreditation from the North West University for a Short Learning Programme (SLP) in Cognitive Education (NQF Level 6) that will be presented as from 2017 (Grosser, 2017). The Research Group also received CPD approval from the South African Council for Educators (SACE), to present the SLP for 25 CPD points. The aim is to present the SLP as a one-year course (80 notional hours) for 25 CPD points. The SLP will contain a theoretical part comprising compulsory lectures and the participants will then complete the practical component completing assignments in their own time. Although the general aims of the CAPS request learners to have the skills to "identify and solve problems and make decisions using critical and creative thinking" (DBE, 2012:5), this has not gained traction within teachers' everyday classroom teaching repertoires or support from the DBE.

In order, therefore, to develop these skills into teachers' classroom teaching, the focus of any professional development intervention should be to "… equip in-service teachers with practical tools and approaches/strategies suitable for the South African teaching and learning context in order to transform classroom practices and intentionally unlock learners' cognitive potential" (Grosser, 2017). As presented in this research, teachers collaborating and dialoguing about creating and critical thinking skills in the ongoing structure of a PLC could assist other teachers to make creative and critical thinking become a meaningful part of the curriculum. The easy road is to indulge in creative and critical thinking skills as an extra, fun activity "*if time allows*". However, as shown in the data presented in the research, teachers are prepared to embrace the introduction of creative and critical thinking skills at an intrinsic level if they are to receive ongoing support to include the extra demands.

5.2.2 Support of Teacher in the Re-mapping of the Curriculum to include Creative and Critical Thinking Skills

It is recommended that teachers receive support and guidance from the DBE for the remapping of the curriculum in order to allow teachers to include creative and critical

thinking skills into their teaching practice. Findings revealed that these teachers felt insecure about making curriculum changes to suit their personal teaching requirements.

One of the ways in which remapping could be achieved would be to empower teachers to interpret the curriculum content. However, can the DoE confidently expect teachers to responsibly remap the curriculum to make it suitable to the current needs of their learners? In its support of PLCs, the DBE suggest two important topics/activities for teachers to discuss in a PLC. Firstly it suggests that teachers "discuss, critique and adapt the Curriculum and Assessment Policy Statements (CAPS) to their own circumstances" and that teachers "discuss how to interpret and use curriculum support materials such as the workbooks distributed to teachers and schools by the DBE" (DBE, 2016:12). This statement by the DBE would seem to support (at least in theory) the recommendation of teachers wisely remapping the curriculum to enable them to include creative and critical thinking skills into their teaching strategies.

Drawing on the data findings of this research, the enormous amount of content that is required to be taught by the teachers within the CAPS inhibited the amount of classroom time that the teachers had to give to the development of the purposeful and planned teaching of creative and critical thinking skills. CAPS denies competent teachers the opportunity to engage meaningfully in the interpretation of their own practices (Booyse, 2016:27). The four Grade 6 teachers confirmed this sentiment suggesting they would only consider these new skills, after the content-work, and "*if time allowed*". It is therefore recommended that permission and guidance from the DBE to remap the curriculum would allow teachers more time to teach 'thinking' skills and learners discovery lessons.

The inclusion of new 'thinking' skills into teachers' classroom practices would require assistance from the DBE to remap the curriculum to allow for the ideals of the CAPS curriculum to be realised. A deeper, richer, more meaningful learner-centred education could result from guiding teachers in making wise adjustments to their personal curriculum to suit 21st century successful learning. The recommendation of supporting teachers to remap the curriculum would allow for more efficient time management and result in opportunities to purposely teach creative problem solving.

5.2.3 Support and Affirmation from the Department of Basic Education

Teachers want to be respected and supported members of the educational process. Their cries often fall on deaf ears (Petersen, 2017). It is therefore recommended that teachers should be supported and affirmed by their school management structures, and most especially by their employees, the DBE. This includes the support for expected professional development to affirm that teachers comply with DBE expectations. The findings reveal that the four Grade 6 teachers directly requested affirmation. Years ago teachers could earn up to three merit awards as a way of being honoured for extra effort. This award was directly related to a small salary increase. Darling-Hammond and Tucker recommend that teachers be "aligned to an appraisal and career progression system built on clear and high standards of professional practice, designed to reward excellence" (2017:1). This recommendation supports that hard-working teachers who remain abreast of current teaching pedagogies will be rewarded for their efforts. Currently teachers earn points through SACE. Beginning in 2017 "all teachers must achieve (150) Continuing Professional Teacher Development (CPTD) points (over a three year period) in order to meet the mandatory requirements of the CPTD" (The Education Network, 2016:9). While this is a valiant effort to provide teachers with professional development, it is offered in a top-down, compulsory manner, with little input from teachers and carries no incentive as yet. The effectiveness of this initiative remains to be seen.

Darling-Hammond and Tucker undertook a study title *Empowering Educators* on 'teaching quality' and provided evidence recommending that in order to "deliver quality education" educational authorities "must forge a new commitment to teaching professionals focused on building effective system to support educators in their work (2017:1). It is recommended that the DBE needs to be a visible, tangible, supportive presence assisting teachers to deliver the best education possible to South African children. The DBE suggests that Higher Education Institutions (HEIs) should "instil recognition for the need of continuous professional development" and "strengthen the knowledge base on teacher professional development" (DBE, 2016:10). The DBE should not merely create policy. It needs to provide hands-on, meso and micro level support for the application of new policy to make the 'ideal' become the 'real'. South African education requires; competent, empowered teachers, responsible for implementing the creative and critical thinking guidelines offered by the CAPS. An

incentive ‘to be the best’ needs to be inculcated and developed, making teaching the honourable profession it ought to be.

It is in the implementation of its policies that the support and affirmation from the DBE is lacking. The DBE admits that “much professional development is still organised as isolated and one-off training, lacking a coherent strategy, monitoring and follow-ups” and that “one-off initiatives fail to have durable effects” (DBE, 2016:3). The PLC document of 2016 recommends that the DBE “assist with the development of meaningful activities to stimulate …” and “provide teachers with resources … the latest research-based knowledge and content and practice” (DBE, 2016:9). These DBE’s new professional development guidelines and the vision of the CAPS offer a sound framework for the support of teacher development, particularly to infuse creative and critical thinking into classroom practises.

5.3 Recommendations on a Meso-educational Level

School principals and their management teams should be responsible for providing long-term, professional development in a participatory, collaborative manner that supports and affirms the teachers’ need to incorporate creative and critical thinking skills into teaching practices.

5.3.1. School Management, assisted by the DBE, should provide PLC’s for Teachers, encouraging the Development of Creative and Critical Thinking Skills.

Most school staffs meet weekly to coordinate school activities which assist in maintaining a healthy school order. However, meaningful, sustained, professional staff development in areas such as creative and critical thinking, needs to be specifically planned for. The findings of this study revealed that providing a structured PLC for teachers had a positive impact on their teaching practices. A key observation, given the data from the intervention, is that PLC’s hold the most potential for facilitating staff professional development and ongoing learning. It is therefore recommended that schools provide PLC’s for the implementation of creative and critical thinking skills into teaching practices. This recommendation is underpinned by the notion of support for teachers to become lifelong learners who stay abreast with new educational trends as an essential component of staff development. Staff development, whilst the cornerstone of the seven teaching competencies, is “still the most neglected aspect of our current policy” (Potenza & Monyokolo, 1999:247). Hopefully, the new PLC

document from the DBE (DBE, 2016) will provide the impetus for current, practical professional development for teaching staff.

The Delphi report recommends "[e]xplicit attention to the fostering of critical thinking skills and dispositions should be made an instructional goal at all levels of K-12 curriculum" (Facione, 1990:15). Data from this research supports the Delphi findings and recommends that school principals and their management teams should be accountable to provide frequent, relevant, quality PLC's to keep staff abreast of new educational trends in creative and critical thinking skills. Whilst the DBE suggests that the provinces are mainly responsible for "enabling environment(s) for PLCs" and that it is the districts role to provide "a hub for exchange … and … facilitation resources and expertise", it is the schools' role to "motivate teachers to engage in PLC's and creating conditions wherein PLC's can thrive" (DBE, 2016:8). It is recommend that it is the principal's responsibility to establish PLCs in schools and for him/her to provide the "coordinating, logistics and timetabling" necessary for PLC's to run successfully in the schools (DBE, 2016:8). This recommendation thus complies with the requirements from the DBE. It is also recommended that principals in schools should receive support from the DBE for structuring and providing two-way PLC's to motivate their staff to include creative and critical thinking into their pedagogy.

5.3.2 The Development of Participatory, Collaborative Professional Development that supports the Implementation of New Skills

It is recommended that school management, supported by the DBE, should provide practical, tangible PLC's, which incorporate practical examples and demonstrations of new skills to be applied in education. Findings from the four Grade 6 teachers suggested that the intervention made it easy to understand and implement the new tools because they were experienced in a practical, hands-on manner. Unfortunately previous training offered by the DBE involved "more telling sessions rather than learning-by-doing workshops" (Jansen, 2001:274). In contrast, the intervention that is the focus of this research, using PLC principles, allowed the four Grade 6 teachers to experience the new knowledge in a practical and hands-on manner. The four teachers reported that by experiencing the new skills practically themselves in the PLC's allowed them to better understand and apply these new skills in the classroom. The support for a practical teaching methodology was further supported when the teachers reported that the two theory sessions of the PLC were less interesting than the lessons involving the practical application of the CPS generating tools. The DBEs document on PLC's

states that “effective professional development … that has a sustainable, positive impact on the quality of teaching and learning” should “involve educators in active learning” (DBE, 2016:3). These research findings concur with the DBE finding above that the practical aspect of the PLC’s made the new tools both easy to understand and to implement. The practical style of the PLC had an impact on these four teachers and they were motivated to include these new outcomes in their teaching practices.

The researcher recommends the collaborative style of the PLC which encouraged a high degree of interpersonal communications. This resulted in an opportunity for the teachers to reflect on their own personal pedagogy by reflective discovery, independent of the other teachers’ pedagogy in the group. The DBE confirm this recommendation when they suggest that the characteristics of a good PLC should offer “mutual respect … collective responsibility … (and a) responsive change in practice” (DBE, 2016:5). Real change happens at an intrinsic level and the recommended, collaborative PLC has the ability to allow teachers to reflect honestly on their own teaching pedagogy and to make meaningful changes within their own pedagogical habitus. Hargreaves (1994) in Harley and Parker (1999:194) argues that teachers’ professional development needs to focus on teachers’ mind-sets, internalising the theory to enable embodied change to take place. A successful, collaborative PLC, such as recommended here, has the power to provide the platform for teachers to shift their own habitus and pedagogies to suit current educational trends.

Mc Lester (2012:67) best describes the collaborative power of a PLC when she quotes Rick Du Four to discuss the success of a PLC: “Now they are empowered to decide for themselves but they also own the results – good, bad, and ugly” (McLester, 2012:67). Ultimately, it is the teachers, with support from their schools, who are responsible to make the changes necessary for 21st century education. Effective, collaborative, professional development, such as is recommended here, provided by schools and supported by the DBE, would go a long way to improving education in South African schools.

5.3.3 The Importance of Support and Affirmation from the School Management Team

Encouraging teachers to take ownership of the new skills and to apply them confidently and enthusiastically requires ongoing support. It is therefore recommended that a supportive work environment is provided via the school management team. This ideal

concurs with Darling-Hammond and Tucker who recommend that school's "systems support their professionals by providing intensive induction and mentoring … ensuring (that they) have access to high-quality curricula instructional support" (2017). Findings revealed that the four teachers in this research required support from their principal to include these new skills into their curriculum. The teachers requested support from the principal to 'own' the tools and not just merely 'know' about them.

The researcher recommends that teachers be given support by the school management team to actively use new tools and concepts in their daily teaching practice. An example of this recommendation would be that support is offered in the form of a facilitator. The facilitator could join the teachers at their termly planning day session to help them to infuse creative and critical thinking skills into their classroom lessons at the planning stage. The facilitator would be able to support and guide the application of these skills in order that the 'ideal' theory becomes the 'real' teaching practice.

This recommendation is supported by McGuinness's (1999) research on 'Thinking Classrooms'. She fully supports the argument for facilitation at meso (school) level. McGuinness concurs with the teachers' request for support when she advocates assisting, guiding and motivating the individual teachers until they are confident and comfortable to operate alone. School management should acknowledge the work of Jansen and Christie (1999) who suggest that a mistake of past training was to focus on generic training of teachers when what they actually require is support "inside the classroom" (Jansen & Christie, 1999:69).

The four Grade 6 teachers suggested that after the intervention, those teachers, *"who actively tried to use the CPS*" tools and techniques, should be acknowledged. In Darling-Hammond and Tucker's (2017) article on '*Empowering Teachers'* they relate that in countries noted for their top-notch education systems, teachers are revered and honoured. Successful education systems worldwide affirm their teachers (Darling-Hammond & Tucker, 2017). "In Singapore, they are called nation-builders. In Finland, they are revered as highly respected professionals. In Canada and Australia, they are paid on par with accountants and engineers" (Darling-Hammond & Tucker, 2017:1). States like Iowa and Massachusetts "are taking purposeful strides" to affirm teachers by "offering competitive salaries" (Darling-Hammond and Tucker, 2017:1). The disparity and oftentimes unsatisfactory salaries (Armstrong, 2017) earned by South African teachers does not help to affirm practising teachers. If education wishes to

attract academically capable, passionate teachers, it needs to make the profession an attractive and fairly rewarding effort. School principals and management teams need to find ways to support teachers to continually improve their practices.

5.4 Recommendations on a Micro-educational Level

There is a need for teachers to change the way in which teaching and learning takes place to include creative and critical thinking skills. It is thus recommended that teachers purposefully plan for and create classroom that are collaborative, participatory and learner-centred.

5.4.1 The Importance of Purposeful Planning by Teachers for the Implementation of Creative and Critical Thinking Skills in Classroom Pedagogy

If the DBE states that it is important for teachers to be “actively participating in PLC’s as an integral part of the teaching practice” (DBE, 2016:8) and the CAPS requires learners to “identify and solve problems” (DBE, 2012:5), it would seem that the purposeful teaching of creative and critical thinking skills supports our educational policy. It is therefore recommended that PLCs are utilised to support teachers in the purposeful planning and implementation of creative and critical thinking. The findings in this research reveal that the teachers were keen to purposely teach creative and critical thinking skills; however, the purposeful planning of these lessons, would require support and motivation on a meso-level, which relates to 5.2.3. The teachers in this intervention purposefully infused the CPS matrix tool into a creative writing lesson with very positive benefits to the learners’ writing. The success experienced by the teachers provided the motivation to purposely include the CPS tools in other learning areas. The many positive benefits realised by the teachers was a strong incentive to continue finding time to purposely incorporate the new skills in their pedagogy. It is therefore recommended that teachers take responsibility for their own teaching planning and practice. They should also liaise with school management, and provide personal insightful ideas and solutions, to afford extra time and resources to include these 21st century skills into their curriculums.

5.4.2 The Importance of Creating an Active, Participatory, Collaborative Classroom Environment in order for Creative and Critical Thinking Skills to Thrive.

It is recommended that there is a shift from the 'chalk-and-talk' traditional teaching to a more cooperative methodology, similar to the one used in this intervention. This thinking aligns with the Socratic teaching method (Paul, Elder & Bartell, 1997) which is synonymous with student-centred approaches where collaborative work, cooperative learning, guided-discovery, discovery learning, problem-solving and the construction of knowledge is encouraged. Scaffolding is recommended. This involves giving learners support at the beginning a lesson and then gradually turning over the responsibilities of knowledge construction to the learners to explore the content intrinsically and to solve problems on their own (Esterhuizen & Grosser, 2014:116). Findings from the FGI suggested that the participants realised that a school pedagogy that involved teacher-centred content-type delivery needed to be balanced with discovery learning, which is encapsulated in the current CAPS ideology. It is thus recommended that teachers develop participatory, learner-centred classroom environments with a curriculum focus that fosters creative and critical thinking.

One of the seven competency roles of the teacher as identified by the DBE is that of: "Learning mediator: The educator will mediate learning in a manner which is sensitive to the diverse needs of learners" (DBE, 2000:5). It is thus recommended that learners be allowed to experience their own learning in active, participatory classroom environments.

This recommendation is supported by the fact that the active involvement of the teachers in the PLC assisted them to understand the benefits of their learners being actively engaged and participating in their own learning, as advocated by the CPS programme. The CPS programme lends itself to the recommended learner-centred, discovery type learning. As a result of the intervention one teacher felt that his/her teaching style was "*far more learner-centred"* placing emphasis on *"more discussion and freedom of ideas*", suggesting an improved classroom climate and pedagogy. If teachers are to be responsible for delivering a high standard of education to their learners, they need to consciously include more practical, learner-centred teaching into their everyday teaching style, as is recommended in the above discussion.

5.4.3 The Necessity of Shifting Teacher Pedagogical Habitus to Align with the 21st Century Needs of Creative and Critical Thinking.

It is recommended that teachers empower themselves and make changes to their teaching pedagogy in order to stay abreast of current teaching trends, especially those regarding creative and critical thinking. Teachers need to engage and discover strategies to learn how to work smarter and not harder. Thus, a personal, co-operative professional development framework is necessary to effect organic solidarity in schooling and the curriculum. It is recommended that teachers actively work towards what is required to develop 21st century learning in the South African context. This organic process, as found in the PLC intervention, involved the sharing of authority and accountability. The process requires much self-reflection and adaptation (Harley & Parker, 1999:193). However, what this research has shown is that ongoing PLC's that grow and nurture critical and creative thinking skills have an essential and meaningful place in our educational institutions.

The researcher has previously recommended that support from the DBE and the school management is required if teachers are to shift their pedagogical habitus. Excuses for not shifting their pedagogical-style were provided by the teachers. They expressed their fear when they conceded that they were "*scared of change*" and only "*considering (the benefits of) CPS*". One teacher admitted that s/he had a busy term ahead and that s/he might not actually be able to really try anything new. All of the participants were cautious of change in their pedagogy and even though they realised that as competent teachers, they needed to keep pace with research in education. Jansen and Christie (1999) suggest that individuals never really trust new innovations in education until they have had time to test the required changes themselves. Our choices, although seemingly instinctive, are shaped by our habitus and based on our past experiences. However, habitus is not static but permeable and can be "endlessly transformed" as it is a product of social conditioning (Bourdieu, 1990:116). It is thus recommended that teachers consciously embrace the responsibility to ensure that his/her teaching is current, valuable and meaningful to his/her learners. In order to achieve the above shift in the teachers' pedagogical habitus, the researcher recommends a sustained PLC of creative and critical thinking skills to provide a safe space for teachers to be able to responsibly and intentionally shift their pedagogical habitus to include new trends in teaching.

5.5 Shared Responsibility

The findings in this thesis have revealed that teachers require support and affirmation from both school management and the DBE. However with all the support and affirmation in the world, it is the teachers themselves, who will ultimately need to make this pedagogical shift. A final recommendation is that each one of the participants take responsibility to actively realise their own roles and responsibilities in creating sustained and effective educational change for the 21st century.

As revealed in the findings, teachers currently feel that there are few channels available to them where their views, opinions and ideas may be respected and supported. Professional accountability for an intervention of creative and critical thinking is a shared responsibility. The DBE needs to work directly with the teachers, sharing the responsibility when planning new curricula. I concur with Sayed and Jansen (2001:246) who offer this advice:

> It needs to be said that matters relating to education and training cannot be decided by education and training policy alone. Multidisciplinary, collaborative and unfragmented research and inquiry is necessary.

The findings of this research support this ideal as the four teachers enjoyed being researchers of their own teaching. The data from this research is in line with DBE policy that states that teachers should “adopt a professional attitude … driven by knowledge and research” and “that teachers contribute to the research base by investigating and reflecting on their own practices” (DBE, 2016:4). Once again, the policy is in place but it lacks real implication where teachers’ researched ideas and contributions are heard and acted upon. Further, the DBE states that “when teachers take ownership of this commitment” to learning and “make changes” to “inform their own learning needs” (DBE, 2016:4) they are able to improve their current practices. However, despite ‘research and teacher reflection’ being supported in DBE policy within the South African context, teacher development has taken place in a top-down direction with very little input from the teachers at the coal-face. This authoritative management style of the DBE reveals little support for its own work-force, suggesting incompetency and an inability to manage their own practices.

Bernstein’s (1975; 1977) theory, as discussed in the study’s literature review, suggests a shift from a hierarchical, mechanical solidarity to a more organic solidarity, with interdependence between individuals. The DBE would be showing support for teachers

if this sharing of power and responsibility involved all stakeholders in the development and implementation of the curriculum 'on the ground' so to speak. Figure 5.2 is a visual representation suggesting that the implementation of creative and critical thinking is a shared responsibility. Support for teachers would be exercised by including the teachers in the decision-making processes.

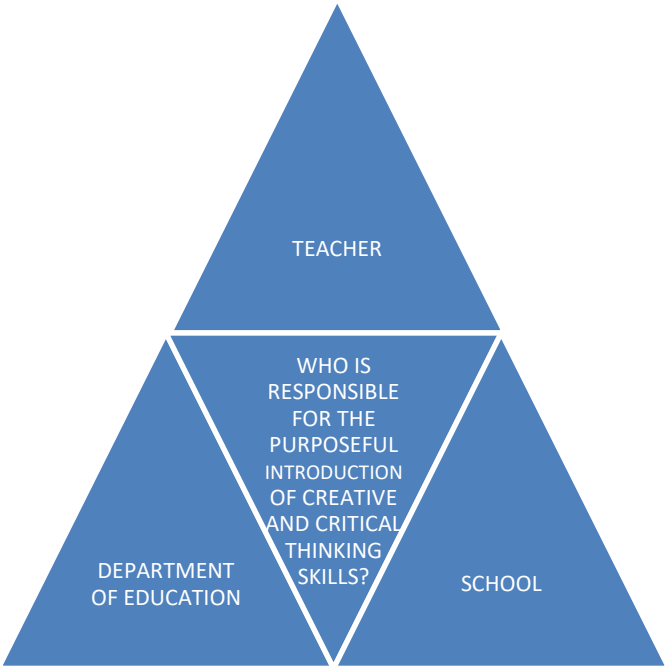


Figure 5.2 An interrelated, three-way triangle of responsibility affirming and respecting the role that teachers play in the broader education picture

Relevant professional development, provided by schools, guided by teacher input and directed by the DBE, could provide the necessary support required by teachers.

In order to remap the curriculum wisely and confidently, as was discussed in 5.2.2, teachers would need to empower themselves in their own classrooms, owning the right to provide what is best for their learners in their particular context, while recognising the broader framework provided by the DoE. This shift in authority is vital for real change in South African classrooms. Perhaps, as previously suggested, it is time for the DoE to allow for the Bernsteinian (1975; 1977) shift from a mechanical-era of a top-down, authoritative management style to a more organic, mediated approach, when setting out policy and curricula.

Figure 5.3 presents a visual representation of the roles of the teacher, the school and the DBE as per the recommendations presented in this chapter.

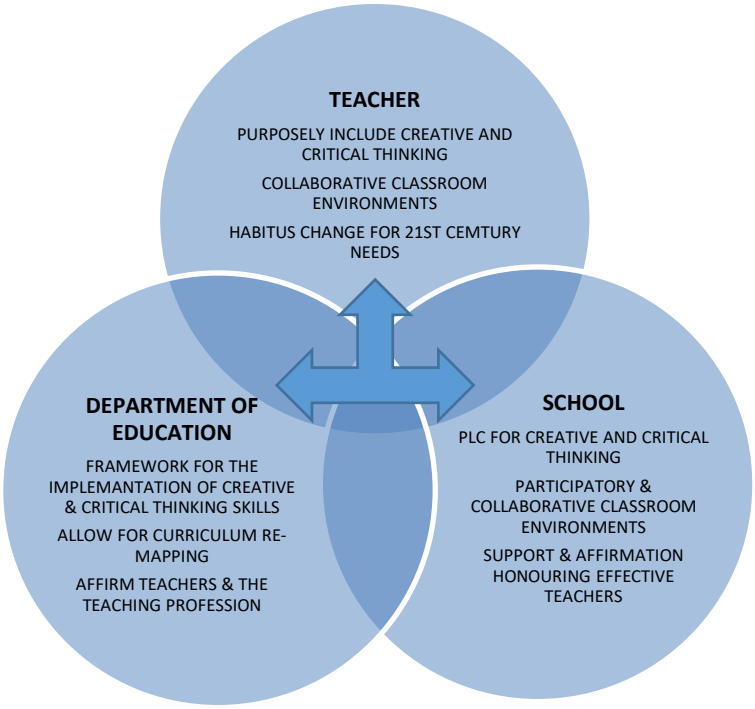


Figure 5.3 Recommendations for the integrated, complex nature of shared responsibility

5.6 Conclusion

The focus of this chapter has been on providing recommendations on a macro, meso and micro levels within the education field. These recommendations could assist in nurturing sustained and embodied pedagogical change to meet the needs of 21st century teaching and learning in the South African school context.

In support of the above recommendations provided in this intervention of creative and critical thinking, I refer to Booyse's (2016) educational ideals for future education in South Africa. She is supportive of thinking strategies and asks and answers a vital question relevant to this research:

> What qualities and life skills does a candidate need to have to have the confidence to deal with future challenges and to add value to our socio-economic landscape in a holistic, competent and efficient manner?
>
> (The answer is…)
>
> South Africa needs people who can solve problems, the ability to think strategically and analytically, have empathy, have people-and-communication

> skills, are self-motivated and optimistic, have strong work ethics, innovation, and the ability to work independently and in a team (2016:36).

The findings of this research have led to these recommendations. In summary, some recommendations, like the ‘purposeful implementation of creative and critical thinking skills into everyday classroom teaching’, were central to this study and were therefore discussed on all three levels, macro, meso and micro. Recommendations suggested the possible need to remap the curriculum to allow more time for ‘thinking skills’ to be included into the curriculum. Closely linked to the introduction of creative problem solving skills, is the importance of a sustained intervention with continual support and affirmation for the teachers. Further recommendations encourage a collaborative, participatory, learner-centred classroom environment that is conducive to the implementation of creative and critical thinking skills. PLC’s provide the means for an intrinsic shift, however incremental, in a teacher’s pedagogical habitus (Feldman & Fataar, 2014). Finally, the recommendation of accountability and responsibility that arose out of this study suggested that responsibility is a three-way, shared commitment. These recommendations require healthy dialogue between the DBE (macro), the school (meso) and the teacher (micro).

Chapter 6 Conclusion

The previous chapter presented a discussion of the recommendations from this research. This chapter concludes this research and highlights its scope for further study.

6.1 Introduction

Chapter 1 gave an overview of this research which inquired after the effectiveness of a Professional Learning Community (PLC) intervention to promote the teaching of critical thinking skills among Grade 6 teachers. This thesis reviewed the teachers' understanding of intelligence and critical thinking and how creative and critical thinking could be developed in the current curriculum (CAPS). Chapter 2 undertook an in-depth review of literature of cognitive intelligence, especially as it regards creative and critical thinking skills and creative problem solving. Sternberg's theory of successful intelligence (Sternberg, 2009) was used by way of introducing the concept of multiple intelligences, thus allowing for a broader perspective of intelligence. New knowledge was offered in the form of a PLC that facilitated the introduction of creative and critical thinking skills in the sampled teachers' classroom teaching practices in a collaborative, cooperative manner. The focus of the PLC process engaged teachers in a process of personal and collaborative reflection, enhancing their teaching practices. The participants were inspired by "*new ideas*" and "*different teaching styles*", delivered in a collaborative, mutually agreeable manner, even if at times they felt, "*overwhelmed*" by the intervention. The success of the PLC method was evident in the teachers' in-vivo comments of, "*it makes you think about your teaching*" in a "*supportive*" and "*safe*" environment. This is exactly what a good PLC should provide as a professional development scenario.

The research was viewed through Bourdieu's social field theory to consider the shifts and changes that teachers might make in their teaching practices to include critical thinking skills. Chapter 2 discussed Bourdieu's (1990) thinking tools of habitus, field and capital, which were utilised in explaining the sustained educational shifts that occurred in the teachers' pedagogical habitus (Feldman & Fataar, 2014) via their interaction in the PLC. The PLC allowed teachers the opportunity to challenge and rethink their teaching practices.

Chapter 3 introduced the concept of pragmatism which formed the over-arching paradigm for this research. It was selected because pragmatism places emphasis on the practical aspect of research that is what works best for answering the research question: How effective is a PLC intervention to promote the teaching of critical thinking skills among Grade 6 teachers?

The mixed method strategy for the data collection in the study focussed on the teaching methodologies of four Grade 6 teachers and their purposeful implementation of creative problem solving tools. The explanatory sequential strategy was a straightforward approach to solve this problem. This approach was characterised by the collection and analysis of quantitative data followed by the collection and analysis of qualitative data. The data was mixed in the final interpretation phase and confirmed by the qualitative focus group interview (FGI). A FGI triangulated the findings and helped to isolate the reflections and themes discussed in this research. The numeric and text findings sought to provide an understanding of the world in which these four teachers live and work. The benefits of this multi-strategy was that it allowed for the corroboration of the data.

6.2 Discussion of Reflections

The data analysis presented in Chapter 4 uncovered ten findings from the research. The emerging themes from the data findings were discussed in at a macro, meso and micro level in Chapter 5. From the data findings and outcomes of the research presented in this thesis, the suggestion is made that South African education needs to find ways to encourage teachers to accomplish the general aims of the South African curriculum, which is “to identify and solve problems and make decisions using critical and creative thinking” (DBE, 2011).The four Grade 6 teachers in this research valued the presented creative and critical thinking skills and opportunity, via the PLC facilitation and support, to implement them in their classroom teaching. However, what this thesis data also highlights is that any changes that teachers make in their teaching is a long-term process that requires sustained support. The data shows how the four Grade 6 teachers needed time to reflect on new knowledge to be able to embody the changes in their pedagogical habitus.

Emanating from this research is the suggestion that the Department of Education (DoE) and authoritative bodies such as the South African Council for Educators (SACE) would do well to support the initiative of PLCs within school contexts. As

discussed in this thesis, I further advocate for a focus, within PLC work in schools, on the purposeful implementation of creative and critical thinking skills into every classroom. Support for an intervention of creative and critical thinking in schools and classrooms would need to be on a macro, meso and micro level if the intervention is to be effective and meaningful.

Although the researcher has suggested that this short-term research study was partially successful in changing the pedagogical habitus of teachers to include creative and critical thinking, it also proved very fruitful in unearthing the limitations that prevent teachers from integrating these skills in their classroom teaching. This study discovered that teachers want to find ways to improve their pedagogical practices and embrace new tools such as those from the Creative Problem Solving (CPS) programme, however the realities of what takes place 'on the ground' in schools often constrains their ability to engage fully with these possible pedagogical changes in their teaching. The teachers in the study were excited to realise the positives of the CPS programme intervention and the data provides evidence of the benefits of their adapted pedagogy as displayed in their learners work. The teachers thus came to acknowledge that integrating creative and critical thinking skills in their daily classroom teaching was essential to successful learners learning.

Finally it was realised that the responsibility of creating effective, lasting change in South African education needed to become a collective undertaking between the DBE, the schools who administer their policies and the teachers who make the policies 'happen' in the classrooms. Table 7.1 presents a summary of recommendations considered in this study.

SUMMARY OF RECOMMENDATION		
MACRO	MESO	MICRO
The Department of Education (DoE) needs to support and empower teachers by providing guidelines for curriculum alignment and the introduction of creative and critical thinking skills at macro, meso and micro levels.	School principals and their management teams need to be responsible for providing long-term, whole staff professional development in a collaborative manner that allows for habitus change and intrinsic motivation to incorporate creative and critical thinking skills into teaching practices.	There is a need for teachers to change their traditional teaching habitus to purposely incorporate creative and critical thinking skills in a collaborative, participatory learner-centred manner

Figure 7.1 Summary of recommendations for this study

6.3 Limitations and Scope for Further Research

Many important findings were unearthed in this limited study suggesting new fields for research in the professional development of teachers in South Africa. Naturally a larger more inclusive sample group would benefit future research topics. A further study might need to separate findings into ‘well-resourced schools’ and ‘under-resourced schools’, as the specific needs and findings of these two economic factors might well be very divergent. A collaborative study researching a better understanding of the needs and requirements of the three players in the education field, the DBE, the school and the teachers, needs to be explored in order that each participant may contribute accordingly to allow for successful education for South African learners.

Time to include new skills into the current curriculum was a significant limiting factor in this study. At the time of writing this thesis the PLC was continuing and the researcher was recording the perceptions of this continued intervention. The researcher hopes to have the opportunity to report back to the DoE, even though such a report would not form part of any official study. With this in mind, the researcher would recommend that this research contributes to further research on PLCs and the promotion of the integration of critical and creative thinking skills in teachers’ classroom pedagogy. Education needs to provide successful learning to suit the needs of learners when they leave school. “Creativity used to be a bonus … but as technology and global competition cut into our jobs and market share, creative thinking skills are looking less like a luxury and more like a necessity” (Nielsen & Thurber, 2016).

In conclusion the researcher would like to offer a word of caution to all concerned parties when deciding to implement an intervention by way of Jansen and Black's advice, "[y]ou cannot photocopy change … Every school is different in terms of the context in which it operates, the culture of the school and the challenges it faces" (2014:77). This research was a small but significant intervention which I hope may lead to a larger, more comprehensive research study that will be able to inform the broader policy context on how to assist teachers to incorporate creative and critical thinking into their current teaching practices.

6.4 Conclusion

Creativity is not about artistic expression. It is "about problem solving, the type of thinking that allows you to remain open to ambiguity, see gaps, follow hunches, reverse assumptions, spot strategic opportunities, connect ideas and imagine a future so compelling that others will follow your lead" (Nielsen & Thurber, 2016). To instil this potential in each learner is my wish for South African education.

This research, whilst suggesting the effectiveness of an intervention of creative and critical thinking skills, also includes the limitations of such an intervention as suggested by data provided by the four Grade 6 teachers in the study. New pedagogical programmes offered to teachers via the ongoing and collaborative PLC is suggested as the best process to motivate teachers and to develop sustained change in schools. Further, and one of the key suggestions from the study, is that any intervention aimed at making sustained changes in teachers' pedagogical practices must be supported at a micro, meso and macro level. I would therefore value the opportunity to share this research at each of these levels as, after a successful career as a teacher, I feel that it is important for me 'give back' and present the findings of this research with all interested parties.

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Addendums

Addendum 1 (Chap 2.1)

The six professional learning communities (PLC) consisted of Power Point's presentations and hands-on, practical implementation of Creative Problem Solving:

PROPOSED PROFESSIONAL LEARNING COMMUNITY (PLC) LESSON PLAN	
PLC1	Why the need for change, 'Thinking school vision' – different stokes for different folks
PLC2	Multiple intelligences', One size does not fit all – Sternberg's triarchic theory of intelligence
PLC3	Three teachers from 'Other schools' with thinking skills in operation, share their experience.
PLC4	CPS@KPS – facilitator launched four CPS tools for generating creativity in children
PLC5	CPS@KPS – facilitator launched next four CPS tools for generating creativity in children
PLC6	PLC6. Open reflection of CPS@KPS: shared the trials and tribulations of their CPS

PLC Lesson Plan

Whilst the facilitator led the new knowledge based sections of the PLC, purposeful, open debates around the material offered was encouraged and staff were pressed to offer dialectic opinions. New tools were offered in a democratic/open manner, allowing staff to take responsibility for and shape their own education, reflecting on their personal practice and pedagogies. Whist the Creative Problem Solving programme easily enables creative and critical discussions, it was just a vehicle for teaching more creatively.

Addendum 2 (Chap 2.2)

Email communication with Mary Grosser

(2015) Prof. Mary Grosser: Associate Professor: Cognitive Development and Critical Thinking Development
(2017) Prof. Mary Grosser: Extraordinary Professor: Cognitive Development and Critical Thinking Development
Optentia Research Focus Area, North West University: http://www.optentia.co.za

IACEP Africa: Vice-President: http://www.ia-cep.org
IACESA: Past President (2015-2017): http://www.iacesa.co.za Website: http://marygrosser.co.za

School of Educational Sciences, NWU, Vaal Triangle Campus and IACESA: President: http://www.iacesa.co.za

Sat 2015/05/16 04:59 AM
Mary Grosser <Mary.Grosser@nwu.ac.za>
Re: Tools to teach thinking skills to South African children

Helen: I wish to explore that gap between curriculum guidelines where cognitive higher order thinking (think Bloom) and creativity (think de Bona, Art Costa, Torrance) are expressed and yet many teachers rely on content delivery, imparting knowledge. This is the reality. Content is easily testable/ measureable but fails the education of the whole child.

Mary: A very valuable and justifiable concern. This has been my concern as well for many years. The objectives/outcomes of the curriculum are indeed noble, and advocate for a cognitive approach to teaching, learning and assessment, but these ideals do not become reality in the classrooms due to the strategies/methods used during teaching, learning and assessment that rather promote rote learning. The Short Learning Programme that my research group at NWU developed in association with IACESA addresses exactly this point. However, we need to get this information across to teachers, show them how to deliver curriculum content by means of strategies that will assist them to attain the outcomes/objectives of the curriculum without demanding from them a lot of extra work and time. In other words, how to infuse the teaching of thinking across the curriculum.

Helen: So my research plans to provide an intervention programme in higher order cognitive skills for teachers of a grade 6 class.

Mary: Do you have a specific subject focus? It is always better to infuse the teaching of thinking into subject content. There is limited research that focuses on testing the merits of subject related intervention programmes among school learners - pre-school through to high school. So, your research will definitely address a gap.

Helen: My questions for you are:

1. Has anyone ever carried out a case study on junior school students, on this topic?

Mary: This is an under-researched field, so you will make a valuable contribution.

2. Have models been created?

Mary: There are many teaching models/approaches/strategies available to enhance thinking during teaching, but strong evidence-based research projects with these models are needed to conclusively argue for their merits in terms of nurturing cognitive capacity among learners.

3. What ideas are on offer from the curriculum developers?

Mary: I am not aware of any offerings from curriculum developers.

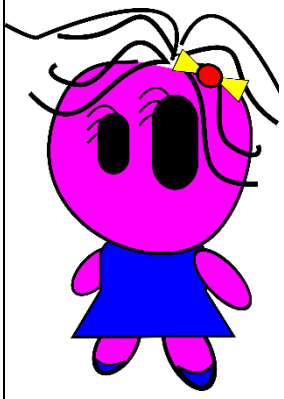
King regards, Helen Erlangsen

Addendum 3 (Chap 2.3)

What is your thinking profile?

People think in different ways. According to Prof. Sternberg you may have a preference for analytical, creative or practical thinking. It is important to know which one most suits you to benefit from different situations. To be successful you need all these thinking types. They complement each other and work well together. Once you know your own thinking type, you may work mostly with your strength, but it is important to develop and grow your other thinking skills too. As you practise using them all, you will become more successful.

Below are examples of different ways of thinking. What do you like to do most often?



	Analytical thinking		**Creative thinking**		**Practical Thinking**
☐	Reflect on characters in stories	☐	Design new things	☐	Repair things
☐	Offer opinions to others	☐	Discover new ideas	☐	Learn to fiddle
☐	Be critical of my own work	☐	Enjoy (use) fantasy-world	☐	Maintain friendships
☐	Think logically, step-by-step	☐	Role play, drama, acting	☐	Consider other's comments
☐	Reflect on other's opinions	☐	Invent unusual solutions	☐	Change thoughts into actions
☐	Judge behaviour	☐	Think deeply	☐	Resolve disputes / arguments
☐	Be able to explain difficult things	☐	Think in pictures	☐	Advise on problems
☐	Solve problems logically	☐	Invent new things	☐	Correct / help someone
☐	Love brainteasers	☐	Propose different things	☐	Learn by working together
☐	Enjoy logical reasoning	☐	Daydream often	☐	Apply knowledge to new ideas
☐	Be able to sort and categorise	☐	Compose songs, plays	☐	Participate in teamwork / group work
☐	Enjoy my own thoughts	☐	Draw, paint, sew	☐	Adapt to new situations

Adapted with permission from: SLO, 2015, Onderwijs & Talentontwikkeling, Enschede, Netherlands. www.talentstimuleren.nl

Addendum 4 (Chap 3.1)

Professional Teacher Status Quo

Thank you for offering to take part in this research study. Your honest reflection on yourself as a teacher in this country is most valuable. You are guaranteed absolute and complete confidentiality. The finding of this report will be reported as general findings and conclusions. No names, gender or details are requested to assure the absolute privacy of information.

		Never	Seldom	Sometimes	Frequently	Always
1	(I am a teacher at heart and although I deserve far more remuneration), I am happy in my post at this school.	1	2	3	4	5
2	Do you feel that your teacher training prepared you well academically and practically?	1	2	3	4	5
3	Does 'teaching' fulfil you as a person and meet your expectations as 'a teacher in the world?''	1	2	3	4	5
4	Do you feel empowered to express your own teaching style and change systems that limit your success as a teacher?	1	2	3	4	5
5	Are you treated as a respected, professional adult, valued by your principal and the Department of Education? (DoE)	1	2	3	4	5
6	Do the teachers in your school meet as a whole staff to discuss ways to improve teaching and learning?	1	2	3	4	5
7	Are teachers provided with opportunities and training to gain a deeper understanding of the subjects they teach?	1	2	3	4	5
8	Is teacher-learning supported through outside workshops, conferences, peer sharing and whole staff training?	1	2	3	4	5
9	Do you have the tools, resources and support to implement new teaching strategies?	1	2	3	4	5

10	Are the DoE supervisors (your management) helpful in providing training courses to keep you up to date on current trends and new teaching strategies?	1	2	3	4	5
11	Are you consciously aware of the general curriculum aim: "to identify and solve problems", to "use critical and creative thinking" & "analyse, organise and critically evaluate information?"	1	2	3	4	5
12	Do you purposely encourage open discussions where pupils' personal opinions and ideas are shared and encouraged?	1	2	3	4	5
13	Do you consider your classroom environment, that is how supported the students feel in your classroom, as important as academic success?	1	2	3	4	5
14	Is your classroom pupil-centred, accommodating individual needs and where knowledge grows out of group-work, research and discussion?	1	2	3	4	5
15	Is your classroom teacher-centred where you decide on and deliver content according to textbooks / syllabi?	1	2	3	4	5
16	Do you use 'thinking' programmes by de Bona or Habits of Mind and Thinking Maps in your teaching?	1	2	3	4	5
17	Does the volume of the content that you are required to teach in any way limit your teaching strategies?	1	2	3	4	5
18	Are you motivated by a new trend that sees the teaching of critical thinking skills essential for a successful life in the 21st century?	1	2	3	4	5
19	Do you purposely plan for teaching critical thinking skills, dispositions and traits?	1	2	3	4	5
20	Realistically and seriously, would you be prepared to undergo training to learn new, innovative ways of blending critical thinking skills into your everyday teaching?	1	2	3	4	5

Complete this sentence: If you had a direct line to someone at the DoE who would really listen to you, what one request would you make?

Addendum 5 (Chap 3.2)

Post-intervention Teacher Questionnaire

Please answer the following questions as truthfully as possible to allow for a valid research outcome. Confidentiality is guaranteed and the researcher will value positive criticism.

PART 1: Rating your experience of the Professional Learning Community (PLC)?

1. How important were the initial three PLC sessions to your overall understanding of critical and creative thinking? *(They introduced the concepts of: Thinking School Vision, Multiple Intelligences and hearing what other schools are doing in this field?)*

2. How would you compare the thinking tools commonly used in South African schools with the Creative Problem Solving Process (CPS)? (de Bono's Thinking Hats or CoRT lessons, Bloom's Taxonomy, Habits of Mind and Thinking Maps)

3. In your experience is a PLC, which aims to assist teachers to critically interrogate their own practice in a reflective and collaborative manner, a successful manner to shift the teaching-style (habitus) of teachers?

4. How important was the PLC style of collaborative, bottom-up support to you as compared to the usual manner in which new knowledge is imparted to teachers at meetings.

PART 2: The Creative Problem Solving (CPS) Process

5. Describe your experience with the CPS process from the following viewpoints:

5.1 Do you think that the CPS model is credible and useful? Does it have tools that can help you teach in a more critically reflective manner?

5.2 How would you describe (rate) the two interactive PLC sessions where the 8 generating tools were taught in a hands-on, practical, interactive manner?
5.2 How would you describe the eight 'generating tools' of CPS to someone who has never heard of them before?
5.3 Which of the tools did you like and think that you would use (or have used) in your classroom teaching? *Please support with lesson-note feedback worksheet.*
5.4 Can you think of a specific content area in the Gr6 curriculum where you might be able to use any of these tools in the future? Would you purposely plan for CPS in the future?
5.5 Do you think that the pupil-centred, thinking skills teaching strategy which involves group work and open ended class discussions is worth the extra effort ?

5.6 Are open-ended, class-discussion-type lessons, with deep student engagement and brainstorming ideals, more difficult to control or discipline?

PART 3: Your personal journey

6. How would you describe the intervention (all 5 PLC's) to a colleague at another school?

7. Has there been a shift in your habitus? (Your teaching style.)

8. Do you feel that you have access to resources and support to continue teaching critical thinking skills? What suggestions would you make?

9. Were there any other (possibly unrelated) spin-offs from this intervention?

10. Would you like to continue your Creative and Problem Solving journey next year? (Possibly also discovering strategies for successful teaching using, Sternberg's Triarchic Theory of Intelligence or de Bono's CoRT programme.)

11. What advice would you like to share with to the researcher?

12. Any other comments?

Thank you for your valuable input and contribution to my research.

H A Erlangsen-2016

Addendum 6 (Chap 3.3)

Semi Structured Focus Group Interview

Schedule for the follow up interview with four grade six teachers after the intervention programme of creative and critical thinking skills and their individual feedback questionnaires.

- *Thank the teachers for their time and dedication to this research.*
- *I would rather go-with-the-flow that doggedly press on with these structured questions, however, I would will guide the conversation to include a broad area of reflection.*

Creative Problem Solving (CPS) Generating Tools

Brain storming	Brain writing	SCAMPER	Forced fittings	Visual relationships	Word dance	Attribute listing	Morphological matrix

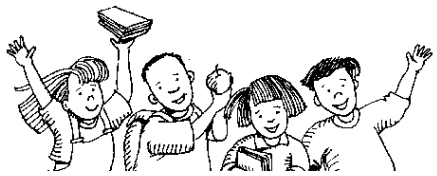
Problems and ideas raised in the questionnaire responses:

1. Teachers suggested that a *Friday afternoon* after school was not the best time to take in new information. What suggestions do you have for staff development time?
2. The PLC consisted of both *passive and active* learning sessions. Which did you prefer?
3. If you were to design 5 PLC sessions for 2017, to *continue* on the creative and critical thinking journey, what would you include?
4. Many of you suggested *consolidating* CPS before moving on to new thinking programme. Any suggestion on how you would like this done?
5. Many teachers think that they already teach children to think creatively in their everyday lessons. How important is it to *purposely plan* for teaching creative and critical thinking skills with a programme like CPS?
6. Many of you stated the value of CPS is that it teachers children to “think for themselves”, “to think more creatively and to challenge information” and that it allows them to “release their own potential”. Are these descriptions synonymous with your ideals of *successful learning*?
7. Would you prefer to *blend* creative and critical thinking skills into your syllabus content or would you prefer to use *standalone*, ready-made lessons, like de Bono’s Thinking Hats.

8. How would you *compare* the CPS generating tool box that you have been introduced to against programmes like de Bono's, Thinking Hats and David Hyerle's Mind Maps?

Hats & Maps	1	2	3	4	5
CPS	1	2	3	4	5

9. What support would you like in order for you to teach critical thinking skills in the future?



Addendum 7 (Chap 4.1)

Pre Intervention – Quantitative Survey Data - Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
(I am a teacher at heart and although I deserve far more remuneration), I am happy in my post at this school.	4	3	5	4.25	.957
Do you feel that your teacher training prepared you well academically and practically?	4	3	4	3.50	.577
Does 'teaching' fulfil you as a person and meet your expectations as 'a teacher in the world?"	4	3	5	3.50	1.000
Do you feel empowered to express your own teaching style and change systems that limit your success as a teacher?	4	3	5	3.75	.957
Are you treated as a respected, professional adult, valued by your principal and the Department of Education? (DoE)	4	3	5	4.00	.816
Do the teachers in your school meet as a whole staff to discuss ways to improve teaching and learning?	4	4	5	4.50	.577
Are teachers provided with opportunities and training to gain a deeper understanding of the subjects they teach?	4	3	5	4.25	.957
Is teacher-learning supported through outside workshops, conferences, peer sharing and whole staff training?	4	4	5	4.25	.500
Do you have the tools, resources and support to implement new teaching strategies?	4	3	5	4.00	.816
Are the DoE supervisors (your management) helpful in providing training courses to keep you up to date on current trends and new teaching strategies?	4	3	4	3.75	.500
Are you consciously aware of the general curriculum aim: "to identify and solve problems", to "use critical and creative thinking" & "analyse, organise and critically evaluate information?"	4	3	5	3.75	.957
Do you purposely encourage open discussions where pupils' personal opinions and ideas are shared and encouraged?	4	4	4	4.00	.000
Do you consider your classroom environment, that is how supported the students feel in your classroom, as important as academic success?	4	3	5	4.25	.957
Is your classroom pupil-centred, accommodating individual needs and where knowledge grows out of group-work, research and discussion?	4	3	4	3.50	.577
Is your classroom teacher-centred where you decide on and deliver content according to textbooks / syllabi?	4	2	5	3.75	1.258
Do you use 'thinking' programmes by de Bona or Habits of Mind and Thinking Maps in your teaching?	4	2	3	2.25	.500
Does the volume of the content that you are required to teach in any way limit your teaching strategies?	4	4	5	4.50	.577

Are you motivated by a new trend that sees the teaching of critical thinking skills essential for a successful life in the 21st century?	4	4	5	4.50	.577
Do you purposely plan for teaching critical thinking skills, dispositions and traits?	4	2	2	2.00	.000
Realistically and seriously, would you be prepared to undergo training to learn new, innovative ways of blending critical thinking skills into your everyday teaching?	4	4	5	4.50	.577
Valid N (listwise)	4				

Addendum 8 (Chap 4.2)

Post Intervention- Qualitative Teacher's Questionnaire Data

PART 1: Rating your experience of the Professional leaning Community (PLC)?

18 questions in total

13. How important were the initial three PLC sessions to your overall understanding of critical and creative thinking? *(They introduced the concepts of: Thinking School Vision, Multiple Intelligences and hearing what other schools are doing in this field?)*

Qual1A I know that we are supposed to know all the theory, but I like to get to the chase. Foe me it was too much theory. I want practical ideas.
Qual2B They gave a good background and understanding of where we are going.
Qual3C Overwhelming. Too much information, too quickly.
Qual4I I do suppose they are building blocks. To be honest I didn't find it to be interesting. However when tasks got practical then I was able to understand all.

14. How would you compare the thinking tools commonly used in South African schools with the Creative Problem Solving Process (CPS)? (de Bono's Thinking Hats or CoRT lessons, Bloom's Taxonomy, Habits of Mind and Thinking Maps)

Qual1A I think that they are more creative, but some ideas are very similar.
Qual2B I had not used any, nor had I fully understood them. I had never trained with them, however I feel that that they are all things to achieve similar outcomes.
Qual3C Currently most school are far from thinking. Current strategies are designed for control in the classroom. CPS would risk losing some of that perceived control. (off topic)
Qual4I I think the new tools certainly allow for flexibility and creativity in the way learners think. Also allows for learners to find their own "solutions". (off topic)

15. In your experience is a PLC, which aims to assist teachers to critically interrogate their own practice in a reflective and collaborative manner, a successful manner to shift the teaching-style (habitus) of teachers?

Qual1A It does make you think about how you teach, and to try to think of different ways to present a lesson.
Qual2B Yes. It provides support ideas and encouragement to discuss ideas, successes and failures with others in a "safe" environment, without judgement.

Qual3C If done correctly it can be successful, however it can be overwhelming and create a negative feeling in the beginning.
Qual4I It does make one think – about our role and how it can change. Also feel a bit guilty that there are so many other ways of doing things that allow for creativity.

16. How important was the PLC style of collaborative, bottom-up support to you as compared to the usual manner in which new knowledge is imparted to teachers at meetings.

Qual1A We enjoyed the third presentation, (actually 4th and 5th) where we got to implement some of the practical ideas. It made it more tangible.
Qual2B Fantastic. It allowed us all to experiment with the process the learners would go through. It was fun and exciting and motivated me to share/ try the experience with the learners.
Qual3C In the beginning too much of a paradigm shift, but as things were better explained and interpreted a more comfortable experience was had.
Qual4I It was interesting to hear different people's viewpoints and ideas. As mentioned before the practical sessions really worked for me. Good to hear from people "on the ground" what works and what doesn't.

PART 2: The Creative Problem Solving (CPS) Process

17. Describe your experience with the CPS process from the following viewpoints:

5.1 Do you think that the CPS model is credible and useful? Does it have tools that can help you teach in a more critically reflective manner?
Qual1A I have often taught with a critically reflective manner and not just downloaded facts. However I still need to put some of the new techniques into practice.
Qual2B Yes! It provides a fun manner which grabs the learners' attention in the beginning, and guides their thinking process. When they reflect on the work, they are surprised by the outcome and are motivated to use the same process in other tasks. (own decision)
Qual3C Yes. It is important for children to think more independently and yes there are helpful tools and ideas.
Qual4I Certainly is useful. I do think as a teacher it needs to be explained well to kids otherwise it will lose affect.

5.2 How would you describe (rate) the two interactive PLC sessions where the 8 generating tools were taught in a hands-on, practical, interactive manner?
Qual1A This is how all new concepts should be taught, Teachers want quick practical ways to implement ideas. It was easier to understand.

Qual2B Excellent. It gave me a good idea of how the process is used, as well as, what to expect in the classroom when using it.
Qual3C As a visual / tactile / learner I found them very helpful. I am not so much into listen(ing) but more experiencing.
Qual4I I thought they were great. I enjoy practical, hands on method.

5.2.b How would you describe the eight 'generating tools' of CPS to someone who has never heard of them before?
Qual1A Fun, creative ways to enhance your teaching.
Qual2B FUN , EXCITING, CREATIVE, VALUABLE, HANDS ON, PRODUCTIVE LEARNING AND THINKING
Qual3C Ways to think about and explore problems and ideas in a more effective manner.
Qual4I I would have done it practically (as you did). Most effective, gets the point across and allows the mind time to breathe. I wouldn't say there's one more important than the other. Each can be used individually.

5.3 Which of the tools did you like and think that you would use (or have used) in your classroom teaching? *Please support with lesson-note feedback worksheet.*
Qual1A Brainstorming. Morphological matrix. We use brainstorming and then discussion with partners in many areas. Then we share ideas. The matrix is to create a fun different fairy tale. Thinking out of the box.
Qual2B I have tried to incorporate as many as possible, with slight changes to suit the leaning outcomes of each lesson.
Qual3C Morphological matrix & Attribute listing
Qual4I I enjoyed using the morphological mix whilst doing fairy tales. The kids loved it to choose their own topics, setting etc. Imagery trek and forced fittings look interesting but I haven't used them yet.

5.4 Can you think of a specific content area in the Gr6 curriculum where you might be able to use any of these tools in the future? Would you purposely plan for CPS in the future?
Qual1A Yes, in English and Afrikaans – for all aspects of the writing process. Yes – we will start to plan to use different tools.
Qual2B Yes, we are planning to use them. We are using them throughout the curriculum (Eng, Afr, NS,SS)
Qual3C Natural science – Global warming. Eng / Afr – essays / written pieces. Maths – problem solving
Qual4I Creative writing – diary entry, fairy tale, descriptive piece. SWB – class discussions – bulling, self-imagery, peer pressure

5.5 Do you think that the pupil-centred, thinking skills teaching strategy which involves group work and open ended class discussions is worth the extra effort ?
Qual1A Yes, most definitely. The discussion part is vital. They must be taught to think about what they say and what other say.
Qual2B Absolutely. The 'top' learners challenge each other, while providing 'vocabulary' to the weaker leaners, so everybody is involved and benefitting.
Qual3C If taken seriously yes. Maturity is a big factor in the effectiveness of proper group work. (off topic /personal, generalized opinion)
Qual4I Yes but like anything too much of it could create a free for all classroom environment. So a balanced approach would be best.

5.6 Are open-ended, class-discussion-type lessons, with deep student engagement and brainstorming ideals, more difficult to control or discipline?
Qual1A Not if you have a system that works – a bell, clap of the hands, to gain control again. Also give specific time periods.
Qual2B Yes and No. The learners are fully engaged, however, the time is a factor. We need to allow for more time to discuss.
Qual3C No, if done correctly. Topics can also play a role of how effective group work/ discuss can be.
Qual4I Yes, as a teacher you are handing 'over' control to the kids. Strong boundaries and buy in from everyone is important. I guess children also will be doing something enjoyable so therefore less boredom.

PART 3: Your personal journey

18. How would you describe the intervention (all 5 PLC's) to a colleague at another school?

Qual1A It is a new journey that we are embarking on to make the teachers think more creatively and to challenge ideas in a constructive manner.
Qual2B A way to get learners to realise their own potential when thinking about problems/ tacking problems, to think creatively and critically about their answers.
Qual3C It is a way of making your learners better understand and question why things are why they are or shouldn't be. Creating smarter children.
Qual4I An interesting way of making children think critically but for allowing creativity. Children also allowed to think for themselves.

19. Has there been a shift in your habitus? (Your teaching style.)

Qual1A Yes – far more pupil centred – More discussion and freedom of ideas.

Qual2B Yes. Before each topic we THINK about what we already know and would like to know, as well as the process in between. (confusing)
Qual3C An effective teacher's style will constantly morph, has the CPS experience changed mine? – Yes!
Qual4I To be honest, not consciously. I think I do some of this subconsciously in the classroom environment. (This was) a busy term too, so (I) have not really tried anything too new.

20. Do you feel that you have access to resources and support to continue teaching critical thinking skills? What suggestions would you make?

Qual1A Hopefully, we will get (continued) support. I would like one or two ideas to be shared every 6 weeks or so, so we can plan new lessons.
Qual2B Yes. Helen has provided us with everything, she has left us with no 'work' to do regarding finding ideas / resources.
Qual3C Yes we have sufficient resources to do CPS, but then all critical thinking requires, is a teacher willing to change their mind-set and a class to go with them.
Qual4I Yes

21. Were there any other (possibly unrelated) spin-offs from this intervention?

Qual1A The learners are enjoying being heard and love sharing their opinions.
Qual2B A motivation to try CPS in more lessons (and open-ended discussions)
Qual3C A better understanding of what education really is.
Qual4I Children thinking for themselves. Expanding creatively.

22. Would you like to continue your Creative and Problem Solving journey next year? (Possibly also discovering strategies for successful teaching using, Sternberg's Triarchic Theory of Intelligence or de Bono's CoRT programme.)

Qual1A I wish to first use and consolidate what we have shown already.
Qual2B Yes, however I would like time to consolidate and use the CPS skills first.
Qual3C Yes
Qual4I Yes, if time allows.

23. What advice would you like to share with to the researcher?

Qual1A Go slowly – let us use these 8 tools first – it takes time to plan new lessons and to see what works and what does not work. This should be done over.

Qual2B Thank you for providing me with these exciting tools and resources. I feel that they are improving my teaching and I am able to grow and teach the learners better.
Qual3C More visual experiences. More tactics to use in the classroom. (Suggests generic answer: But needs to use what he has first??)
Qual4I No comment

24. Any other comments?

Qual1A A period of 2-4 years where we learn new techniques. There has to be time given for teachers to share with one another what has worked and what benefits they found. We need to also remember that we have to work with a curriculum and vast numbers of assessments which takes away from the fun of teaching.
Qual2B No comment.
Qual3C Thank you for opening the door. Hopefully I have what it takes to walk through it.
Qual4I *As per conversation with researching when script handed in to her:* The practical demo of PLC 4 and 5 were brilliant. Staff 'actively' participated. The work became real and concrete. Friday meetings are problematic. One is tired and can't really focus on new, important content. WHEN? Evenings? Saturdays? Perhaps just make the PLC session more fun with eats and drinks. Red bull to energize the teachers.

H A Erlangsen-2016

Addendum 9 (Chap 4.3)

Teachers Perceptions of a Professional Learning Community (PLC)				
PLC	**Q1**	**Q2**	**Q3**	**Q4**
Response	theory	Compare CPS	PLC successful?	PLC collaboration, style
1A	supposed to know get to the chase too much theory want practical	more creative some similar ideas	makes you think about your teaching try diff ways	enjoyed implement practical ideas tangible
2B	good background good understanding	similar outcomes	provides support provides ideas safe environment without judgement	Fantastic allow experimentation fun exciting motivating to experiment
3C	overwhelming too much, too quickly		successful overwhelming negative feeling	big paradigm shift comfortable
4D	are building blocks didn't find interesting	flexibility creativity learners to think learners own solution	think about role how to change guilty so many other ways allows for creativity	different viewpoints really worked for me people 'on the ground'
essence	**too much theory**	**CPS & other all similar**	**yes - PLC**	**yes - colab style**

Addendum 10 (Chap 4.4)

Teachers Perceptions of a Creative Problem Solving (CPS) Intervention							
CPS	Q5.1	Q5.2	Q5.2b	Q5.3	Q5.4	Q5.5	Q5.6
Response	credible & useful?	hands-on prac PLC	describe 8 gen tools	select best tools	best used/blended ?	group work: effort?	discipline issues?
1A	use new techniques	how all new concepts should be taught quick prac ways easy to understand	fun creative method enhance teaching	brainstorming morphological matrix =fun	Eng - creative writing Afr	yes, most definitely discussion is vital	no - bell for control specific instructions
2B	yes fun grabs attention guides thinking process successful outcome motivated to use again	excellent understood process know what to expect	fun exciting creative valuable hands-on productive learning	brainstorming brain writing SCAMPER attribute listing morphological matrix	Eng - creative writing Afr - *diere gedigte* potential in NS & SS	absolutely top learners are challenged vocab provided for weaker everybody benefits	yes & no if fully engaged - yes
3C	yes promotes indep thinking helpful tools helpful ideas	very helpful like experiencing dislike listening	thinking method explore problems method effective	attribute listing morphological matrix	NS - Global warming Eng - creative writing Afr Maths problem solving	yes	no executed correctly
4D	useful	great enjoy practical, hands-on	most effective practical effective all equally important engages mind	morphological matrix - fairy tales other look interesting	Eng - creative writing Afr SWB class discussions e.g. bullying, peer pressure	yes balance required too much = free-for-all	yes handing over control requires strong boundaries BUT is enjoyable= kids less bored
	YES	GREAT	FUN & EFFECTIVE	MATRIX	LANUAGE, SS, NS	YES	NOT REALLY

Addendum 11 (Chap 4.5)

Teachers perceptions of their habitus change							
JOURNEY	**Q6**	**Q7**	**Q8**	**Q9**	**Q10**	**Q11**	**Q12**
Response	DESCRIBE	HABITUS SHIFT	RESOURCES	SPIN-OFFS	CONTINUE?	ADVICE	OTHER
1A	New make teachers think more creatively. challenges old teaching styles	Yes more pupil-centred more discussion freedom of ideas	Hopefully continued support new ideas each term	pupils enjoy being heard love sharing their opinions	first consolidate	Go slowly use tool first plan new lessons repeats	long term project need time to consolidate consider vast assessments required (-fun)
2B	Allows learners to realise own potential. think about problems to think creatively & critically in answers	Yes more thinking	yes well provided for little work for ideas	motivated to try more CPS love open ended discussions	yes time to consolidate use current skills	Appreciation for exciting tool s& resources. Have improved my teaching. am able to grow & teach learners better	no comment
3C	better understand better question why creates smarter children	Yes an effective teaching style.	Yes sufficient CPS resources. Actually just need a teachers willing change their mind-set.	I have a better understanding of 'education' (CAPS expectations)	yes time to consolidate use current skills	More practical ideas for classroom use	a door opened. I need to walk through
4D	interesting method making children think critically allowing for creativity think for themselves	Not consciously perhaps unconsciously		Children think for themselves. expanding creativity	yes if time allows	No comment	Loved the practical PLC's real & concrete. tired on Fridays
	THINKING	**X3 YES**	**X3 YES**	**MOTIVATED**	**CONSOLIDATE**	**APRECIATION**	

Addendum 12 (Chap 4.6)

Semi Structured Focus Group Interview Data

Creative Problem Solving (CPS) Generating Tools

Brain storming	Brain writing	SCAMPER	Forced fittings	Visual relationships	Word dance	Attribute listing	Morphological matrix

Reflection on questionnaire responses:

1. Teachers suggested that a *Friday afternoon* after school was not the best time to take in new information. What suggestions do you have for staff development time?

They debated hymn practise time (30 min) in the morning. Some said, “if we can umpire on a Saturday, we can have a conference”. Treats to reward and wake staff up for the session’. Red bull and vodka! As this was a termly planning session (explained below), they could use this time slot for professional development but when do they do their greater term plan of lessons and tests.

Each grade is given *one day off per term,* where students and relief teachers take their classes, while they plan ahead for the next term. A planning day for CPS and creative thinking.

2. The PLC consisted of both *passive and active* learning sessions. Which did you prefer?

Although they acknowledge a staff member who hates participating workshops, all four Gr6 teachers unanimously agreed that they much preferred the “practical application of knowledge” than passive listening, “you lose me”. They prefer the “visual and tactile” appeal of an active participatory work shop.

3. If you were to design 5 PLC sessions for 2017, to *continue* on the creative and critical thinking journey, what would you include?

More “strategies for implementing creative and critical thinking skills”. No new programmes. Rather focus and consolidate the 8 generating tools. Give them time to experiment with these new tools. Just to brainstorm more would be good. They would like time to infuse the 8 tools into lesson (syllabus).

END-EXTRA TIME: Reward is an essential element for effort. Those teachers, who have actively tried to use CPS after the intervention, should be acknowledged, even just verbally.

They wanted a report back session in the 4th term where all staff could share CPS lessons that they had attempted. Teacher 4B would handle – Attribute listing and teacher 4A, English, Matrix lesson. Teacher 4C & 4D were quite passive. They asked me to revise 'Forced Fittings'.

4. Many of you suggested *consolidating* CPS before moving on to new thinking programme. Any suggestion on how you would like this done?

They would love to incorporate the 8 tools during their next **planning day** (with the aid of a knowledgeable facilitator). They could brainstorm together how and where each tool best fitted into the Gr6 syllabus esp. Natural Science and Social Science.

(This was an idea from one person that was developed upon by all and then decided upon as a good idea.)

5. Many teachers think that they already teach children to think creatively in their everyday lessons. How important is it to *purposely plan* for teaching creative and critical thinking skills with a programme like CPS?

Lesson must be purposely planned.

Researcher: What about teachers who state that their, "chalk and talk lessons" encourage 'great discussions?"

Response: This is not necessarily creative. One needs tools to provoke 'out-the-box thinking.

Researcher: What about, "clever questioning?"

Response: Yes, this is important if you have a classroom climate where different opinions are honoured and encouraged. The teachers 'attitude' towards new ideas is vital for successful learning.

6. Many of you stated the value of CPS is that it teachers children to "think for themselves", "to think more creatively and to challenge information" and that it allows them to "release their own potential". Are these descriptions synonymous with your ideals of *successful learning*?

Old school pedagogy of teacher-centred and content delivery need to be balanced with the news CAPS ideology of “releasing their unique potential” and “to make them think for themselves”.

Three teachers said ‘NO” to old-school content type lesson and ‘YES’ to actively involving pupils in their own learning. In passive, content-delivery-type lessons pupils lose concentration, or become ‘naughty’. One felt there was still a place for content, chalk and talk, power-point presentation-type lessons.

7. Would you prefer to *blend* creative and critical thinking skills into your syllabus content or would you prefer to use *standalone*, ready-made lessons, like de Bono’s Thinking Hats.

Unanimous decision (all 4 Gr6 teachers) stated that they preferred the blended method where tools are used to teach syllabus content. They discussed that the climate of CPS lessons is different – more pupil-centred and each tools takes on a different angle, that is, approach to the content.

8. How would you *compare* the CPS generating tool box that you have been introduced to against programmes like de Bono’s, Thinking Hats and David Hyerle’s Mind Maps?

All preferred CPS. (Researcher: Perhaps a bit biased, as this was taught in the PLC.)

Reasons:

- It allowed for variety was not a fixed, rigid, structured lesson. They could manipulate the tool to suit the content, the time, and the pupils.
- The 8 tools provided many different strategies for teaching the content.
- They had all experienced “great success” in the matrix lesson for essay writing complied by one of the teachers.
- They pupils loved sharing ideas and feeding-off each other’s answers.
- Teachers reported that they “got more out of the kids” with CPS
- It ‘fitted in with the Big-Write” concept. A language programme, recently provided at a workshop, that one of them recently attended.
- They students were engaged in meaningful communication
- The students challenged each other.

- Symbiotic. The brighter kids loved the opportunity to shine and the weaker students were encouraged by their ideas and could “lean on” the thoughts and vocabulary of the language-able kids.
- A child who is lacks language skills benefited hugely from this CPS Matrix session.
- Teachers were encouraged by the benefits seen in Matrix lesson. Kids loved the freedom to think freely.

Hats & Maps	1	2	3	4	5
CPS	1	2	3	4	5

9. What support would you like in order for you to teach critical thinking skills in the future?

They suggested that I sit with them as a grade and add CPS tools to every subject wherever possible.

Lesson themselves do take more time, as children’s ideas are incorporated into class discussions. This all takes time which the content rich syllabus can ill afford, but it is proving to be worth it.

They suggested shaving the syllabus to create time for critical and creative thinking. “Let other things go.” Leave out repetitive work, like re-teaching ‘conjunction’ every year. Redefine the syllabus.

It boiled down to a simple equation of : TIME = ACCESSMENT vs DISCUSSION-TYPE lessons.

Basically they could teach a section of content in TWO hours and think “job done” or they could use FOUR hours and “get fabulous results” and think, ”job well done”.

Addendum 13 (Chap 4.7)

Themes arising from the data during the FGI and INTERGREATION process

	QUALITTAIVE FOCUS GROUP INTERVIEW - PART 1		
	QUESTION TYPE	**QUESTION SUBJECT**	**RESPONSE**
Q1	PLC	FRIDAY AFTERNOON?	use term planner time make Friday PLC's more fun
Q2	PLC	ACTIVE VS PASSIVE	active: unanimous
Q3	PLC	CONTINUE	new strategies for C&CT consolidate 8 tools time to experiment more brainstorming blend into syllabus reward CPS effort report back session to share new, CPS ideas can I revise forced-fittings
Q8	CPS	COMPARE CPS : OTHER	x4 preferred CPC allowed variety - not fixed tools are malleable experienced great success with matrix - essay teachers 'get more out of kids' worked well with Big Write concept students meaningfully engaged pupils challenge each other symbiotic - weaker kids feed off bright, shared ideas language skills shared kids loved the freedom to think for themselves

	QUALITTAIVE FOCUS GROUP INTERVIEW - PART 2		
	QUESTION TYPE	**QUESTION SUBJECT**	**RESPONSE**
Q4	HABITUS	CONSOLIDATE	knowledgeable facilitator to help plan & blend into Gr.6 curriculum.
Q5	HABITUS	PURPOSELY PLAN	must be purposely planned for to be creative. Need tools to provoke 'out-the-box thinking' clever questioning is important - teacher's attitude is vital to success.
Q6	HABITUS	SUCCESSFUL LEARNING?	need balance " teacher-centred content' with 'pupil-centred' discussion' pupils-think for themselves. X3 active participation vs X1 place for 'chalk&talk'
Q7	HABITUS	BLEND VS STAND ALONE	Blend X4 - unanimous
Q9	HABITUS	FUTURE SUPPORT	Facilitate blended CPS lessons for Gr.6 curriculum shave the syllabus as too content rich with assessments leave out repetitive work - ??re teach conjunctions each year C&CT takes time - discussion 2 hours = job done vs 4 hours = job well done Choice : TIME = ASSESSMENT VS DISCUSSION
Q10	HABITUS	HABITUS CHANGE RATING	x2 Girls 8/10 - excited about new ideas - experiment X2 Boys 6/10 - change is difficult, but not to change is fatal (-) considering CPS (-) scared of change, difficult (+) realised one needs to 'keep pace' (-) needs time to become comfortable - nervous

Addendum 14 (WCED Consent form Dr Wyngaard)

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REFERENCE: 20160510-174

ENQUIRIES: Dr A T Wyngaard

Mrs Helen Erlangsen
12 Constantia Close
Marina da Gama
7945

Dear Mrs Helen Erlangsen

RESEARCH PROPOSAL: THE EFFECTIVENESS OF A PROFESSIONAL LEARNING COMMUNITY (PLC) INTERVENTION TO PROMOTE THE TEACHING OF CRITICAL THINKING SKILLS AMONG GRADE 6 TEACHERS

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. Educators' programmes are not to be interrupted.
5. The Study is to be conducted from **16 May 2016 till 30 September 2016**
6. No research can be conducted during the fourth term as schools are preparing and finalizing syllabi for examinations (October to December).
7. 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?
8. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
9. Your research will be limited to the list of schools as forwarded to the Western Cape Education Department.
10. A brief summary of the content, findings and recommendations is provided to the Director: Research Services.
11. The Department receives a copy of the completed report/dissertation/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: 10 May 2016

Addendum 15 (CPUT Faculty of Education: Ethical Clearance)

Dr Chivimbiso Kwenda)

Cape Peninsula University of Technology

***For office use only	
Date submitted	**10 May 2016**
Meeting date	**n/a**
Approval	**P/Y√/N**
Ethical Clearance number	**EFEC 6-5/2016**

FACULTY OF EDUCATION

RESEARCH ETHICS APPLICATION FORM