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Improving feedback through unpacking,
engaging with and challenging teachers' theories of
practice

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Abstract

Teacher professional learning and development has long been seen as an effective way to change teacher practice, and many theorists highlight the importance of engaging with teachers' theories of practice during the process. A teacher's theories of practice consist of the ideas, beliefs and attitudes that drive his or her teaching practice. There is a paucity of research however, into how professional development providers can successfully unpack, engage with and, if necessary, challenge, teachers' theories of practice in ways that lead to pedagogical changes in teachers' classroom practice.

The context of professional learning and development in this research was coaching. Participating coaches were either external or in-school facilitators who worked with teachers in cycles of observation and feedback/feed forward. The research focussed on discussions between coaches and teachers throughout the observation process. Coaches and teachers were volunteers drawn from secondary or area schools.

The research comprised three studies. Study 1 was a small interpretivist study that set out to investigate coaches' levels of feedback that were effective in changing teacher practice. Post-observation discussions between coaches and teachers were audio taped and transcribed and semi-structured interviews were undertaken with teachers. Findings indicated that teachers remembered and acted on very little feedback. A proposed explanation was that coaches' failure to unpack, engage with or challenge teachers' theories of practice led to the feedback having little salience for the teachers.

As a result of the findings from Study 1, Study 2 aimed to help coaches engage with teachers' theories of practice through developing a tool, the Engaging with Teachers' Theories of Practice (ETTOP) rubric (Version 1). Study 2 consisted of three phases. In phase 1, data were collected to determine coaches' skills prior to training in the use of the tool. In Phase 2 the ETTOP rubric (Version 1) was developed and coaches were trained. In Phase 3, phase one data collection was repeated to identify shifts in the practice of coaches and teachers. As with Study 1, feedback/ feed forward discussions were audio taped and transcribed and teachers interviewed. At the beginning of their interviews teachers completed a questionnaire. Findings indicated that although training in the ETTOP rubric

(Version 1) helped coaches unpack and engage with teachers' theories of practice, most teachers did not report pedagogical shifts in their practice. An explanation for this finding explored in Study 3 was that while coaches surfaced the teachers' beliefs and ideas at a superficial level, they failed to develop a discussion in which these ideas were explored and, if necessary, challenged. Findings also led to the revision of the ETTOP rubric, the coaches' training and the data gathering instruments.

Study 3 was a quasi-experimental study with a one-group pre-test/post-test, involving a greater number of coaches and teachers than Study 2. Procedures were the same as for Study 2, with one addition. As well as teachers, coaches were interviewed at Time 1 and 2 to investigate their perceptions of changes in their practice. Study 3 found that when coaches engaged with teachers' theories of practice at a deep level, teachers reported pedagogical changes in their practice. Even with training, however, many coaches struggled to unpack, engage with and challenge teachers' theories of practice.

There were two major findings across the three studies. The effectiveness of using a tool was enhanced when coaches developed routines around its use. Even with the aid of a tool, however, coaches struggled to create dissonance with teachers' current position and thereby begin the process of conceptual change. Further research is warranted in refining both the ETTOP rubric and training for coaches and teachers to effect pedagogical changes in teacher practice. This research provides some direction for schools and external providers of teacher professional development that a stronger focus on engaging with teachers' theories of practice may lead to teachers improving their practice through implementing pedagogical changes.

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Dedication

This thesis is dedicated to my mother, Mary Helen Andersen (1925-2009), who taught me to love learning.

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Chapter 1: Introduction and Overview

The most significant influence on improving student achievement is the classroom teacher (Cuttance, 1998; Highfield, 2010). Teachers' actions in the classroom affect student outcomes and are driven by the teachers' conceptions of learning and teaching (Hattie, 2009). "Conceptions" include the beliefs, assumptions, values, knowledge and emotions that shape a teacher's actions in the classroom; together these elements comprise a teacher's theories of practice (Ministry of Education [MOE], 2008; Timperley, Wilson, Barrar & Fung, 2007). While teachers constantly make decisions based on their theories of practice, they are not necessarily able to articulate the beliefs, assumptions, values, knowledge and emotions that underpin their teaching practice (Brown & McIntyre, 1993; Clark & Peterson, 1986).

Professional development and learning has traditionally been seen as the major vehicle for improving teachers' practice (Guskey, 2002), yet the significance of teachers' theories of practice in this process has been largely unexplored. Timperley et al. (2007) state that little is understood about the link between teachers' thinking processes during their participation in professional learning opportunities and their subsequent classroom practice. The link is important because one way of improving student outcomes is through challenging teachers' problematic theories of practice (Timperley et al., 2007). Before these theories of practice can be challenged, however, they must be discussed with the teacher. This thesis investigated how to help professional development providers and coaches unpack, engage with and challenge teachers' theories of practice in ways that help teachers understand how to make changes in their practice that have the potential to impact positively on student achievement.

The overview begins by outlining recent findings in teacher professional learning and development. The next section addresses the processes through which teachers learn and the importance of unpacking, engaging with and challenging teachers' theories of practice through these processes. The researcher makes a personal statement about her position in relation to this research, and a description follows of the context of the three studies that comprise the research. The final section explains how the thesis is organised.

Changing Views on Teacher Professional Development and Learning

Although professional learning and development has been seen as the primary mechanism for developing effective teachers, there is a paucity of evidence to justify this assumption (Fullan, 2007, Guskey, 2002). Evaluations of teacher professional development and learning have typically used self reports by teachers as the sole measure of effectiveness (Guskey, 1998). An international environment of increasing accountability has exposed this form of evaluation as insufficient. As Guskey (1998) explains: “we live in an age of accountability. Students are expected to meet higher standards, teachers are held accountable for student results, and professional developers are asked to show that what they do really matters” (p. 3). Governments have also become increasingly accountable for targeting educational expenditure on professional development that research has shown to be effective in raising student achievement. For example, the New Zealand government stated that its investment in more than \$70 million in teacher professional learning and development (in 2013) was focussed on initiatives that demonstrated they could accelerate student progress, especially for underperforming students (MOE, 2010).

Fullan (2007) reinforces this shift in focus when he states that traditional professional development is a “major obstacle to progress in teacher learning” (p. 35) because activities such as workshops and courses do not substantially change the way teachers teach in their classrooms. This view was supported by evaluations of two New Zealand projects (Bishop, O’Sullivan, & Berryman, 2010), with teachers reporting that the most effective professional development for them was not one-off sessions provided by outside experts, but ongoing opportunities to learn. The teachers valued in-class support and on-going reflection and feedback as they implemented and practised new learning in their classrooms. These evaluations were influential in the development of Te Kotahitanga, a project that aimed to improve the achievement of Māori students in secondary schools.

In line with the emphasis on an evidence-based approach to professional development, Guskey (2005) advocates that professional development is evaluated at five levels. Level 1 is the participants’ reactions; Level 2 is the participants’ learning; Level 3, the organisational support and change; Level 4, the participants’ use of new knowledge and skills; and Level 5, student learning outcomes. When planning professional learning, the order of the levels must be reversed so that the professional learning begins with the desired student outcomes, then the instructional practices that will achieve these outcomes (Level

4), the organisational support required (Level 3), the knowledge and skills needed by the participants (Level 2) and lastly, the types of professional learning that will best achieve the outcomes (Level 1). Guskey (2005) asserts that when improved student outcomes become the overarching aim of professional development and learning, the focus of teacher learning sharpens to identify and embed teaching and learning practices that improve student achievement.

How Teachers Learn

Central to the concerns of the researchers discussed above is the question “Under what conditions do teachers learn in ways that impact on student achievement?” In the Best Evidence Synthesis: Teacher Professional Learning and Development, Timperley et al. (2007) aimed to unpack the ‘black box’ that sits between participation in professional development and learning and its subsequent impact on the teacher’s practice through analysing and synthesising evidence from both international and New Zealand research into teacher professional development that resulted in positive outcomes for student achievement. A theoretical framework was used for analysing the effectiveness of professional learning and development. Its structure included the wider socio-cultural environment, the professional learning environment, the content of professional learning opportunities, activities constructed to promote learning, four iterative learning processes, the responses of diverse teacher learners/communities and the impact on diverse student learners (Timperley & Alton-Lee, 2008. p.15). Three components of the framework, *Content of professional learning opportunities, Activities constructed to promote learning and (Iterative) learning processes*, are discussed because they directly relate to exploring the significance of teachers’ theories of practice.

The content component highlights a teacher’s conceptual understandings and skills. Timperley and Alton-Lee (2008) identify eight areas of understandings and skills that could be deepened through professional learning activities. Teachers’ theories of practice impact on what they learn in each of the eight areas because theories of practice comprise the lens through which teachers make sense of new information (MOE, 2008). Nevertheless, the final two areas: *own practice and new possibilities in relation to a standard*; and *how own practice impacts on diverse student learners and new possibilities* specifically address the teacher’s theories of practice. These areas require the teacher not only to examine his or her own practice, but to consider alternative approaches, which may be based on different

theories of practice from those held by the teacher. Many teachers need to be supported through this process by, for example, a coach (Timperley, Parr & Hulsbosch, 2008). The discussion between the coach and teacher, in which the teacher's theories of practice are surfaced and challenged and an alternative approach examined, may be a critical factor in effecting change in teacher practice.

An example of the danger of failing to unpack and challenge teachers' theories of practice in the content of teacher professional learning and development was seen in a programme of literacy reform in San Diego. All teachers in the district underwent professional learning and development in literacy instruction to address widespread student underachievement. Many high school teachers, however, believed that their job was to teach disciplinary knowledge, not literacy. Because their beliefs did not appear to be addressed or challenged in the content of the professional learning and development, these teachers resisted the professional learning and development, and this is likely to have contributed to the failure of the reform to raise literacy levels in high school students (Hubbard, Mehan, & Stein, 2006).

In a situation such as the San Diego reform, activities need to be carefully selected that are appropriate for the content of the professional learning and development and the teachers' expressed or implicit theories of practice. It is possible to engage with and challenge teachers' theories of practice through any of the *Activities Constructed To Promote Learning* in the theoretical framework, but the activity itself will not ensure that this occurs. For example, a teacher who is resistant to teaching literacy may be observed and given feedback/feed forward. If the feedback/feed forward focuses on a lack of literacy strategies employed during the lesson instead of engaging with and challenging the teacher's theory of practice there is unlikely to be any change in the teacher's incorporation of a literacy approach.

Principles of learning and learning processes.

The content and activities in professional learning and development lead into four iterative learning processes, in which a teacher must be engaged for new learning and skills to be developed (Timperley & Alton-Lee, 2008). These learning processes are aligned with an influential synthesis of learning processes (Bransford, Brown & Cocking, 2000). Comparing the findings of both syntheses enables a strong understanding of teachers' learning processes to emerge.

Process 1: cueing and retrieving prior knowledge acknowledges that teachers come to professional learning and development opportunities with existing theories of practice, which must be surfaced, and if necessary, challenged before new learning can take place. This process aligns with the first finding of Bransford et al. (2000) that people approach new learning with preconceptions about how the world works. If their existing understandings are not engaged, they may fail to understand new concepts and information. Helping teachers to access their prior knowledge, beliefs and ideas, is not sufficient, however, to create new learning. If the professional learning and development does not challenge their theories of practice, teachers are likely to affirm that they already knew the new learning, or they will learn new concepts superficially. The result is little change in the teachers' practice and beliefs (Spillane, Reiser, & Reimer, 2002).

Process 2: becoming aware of new information/skills may involve superficial or deep knowledge. Superficial learning is likely in contexts such as one-off workshops or conferences, but can also take place in extended opportunities to learn, such as cycles of observation and feedback. For deep learning to occur, Process 2 must involve new information that is consistent with the teachers' beliefs and practices. Bransford et al. (2000) suggest that for new knowledge to be adopted or adapted, the learner must develop a conceptual framework and be able to organise new ideas for retrieval and application. A conceptual framework is "a complex knowledge system consisting of presuppositions, beliefs and mental models organised in theory-like structures that provide explanation and prediction" (Vosniadou, Vamvakoussi & Skopeliti, 2008, p. 22). Process 2 poses two challenges for teacher professional learning and development. If teachers' conceptual frameworks are founded on prior learning that is not conducive to improving student achievement, teachers may reject the new learning because it is not consistent with their beliefs. Alternatively, teachers may assimilate the new learning by classifying it as congruent with what they already know without developing a deep understanding of the principles involved. When professional learning and development providers assume that new learning will automatically replace teachers' existing theories of practice, the result is likely to be superficial learning. Deep learning, on the other hand, requires an examination of how new concepts fit with teachers' existing theories of practice. This process may lead to dissonance with the teachers' current beliefs and ideas.

Process 3: creating dissonance with current position means that the teachers' theories of practice are challenged, and this process creates philosophical tension when

teachers' knowledge, beliefs and ideas are reconstructed within their conceptual frameworks. Creating dissonance, however, does not ensure that teachers' conceptual frameworks are changed. Chinn and Brewer (1993) point out that dissonance may elicit a range of responses, only one of which leads to changes in teachers' theories of practice.

Coaches and professional development providers often struggle to create dissonance with teachers' current knowledge, beliefs and ideas (Timperley & Parr, 2008). Timperley and Earl (2008) assert that educators involved in professional learning conversations are more likely to be respectful of participants' viewpoints and offer support, than challenge others' interpretations and actions, yet "it is this element of challenge that moves conversations beyond superficial talk to exploring deeper meanings for the purpose of improvement" (p. 124). They suggest educators such as coaches may be reluctant to challenge due to a lack of skill and experience in this aspect of professional learning conversations.

Process 4: enhanced co - and self-regulation emphasises that the ultimate aim of professional learning and development is that teachers are not dependent on others to create dissonance with their current practice (Hammerness, Darling-Hammond, & Bransford, 2005). Self-regulating teachers constantly monitor their own practice and seek to make changes when their instruction is not having the desired effect on student achievement (Butler & Winne, 1995). The processes involved in self-regulation align with the third finding of Bransford et al. (2000) that a meta-cognitive approach can help learners develop control of their own learning by setting learning goals and monitoring their progress towards achieving them. A meta-cognitive approach involves a teacher understanding the goals of his or her instruction, engaging in an internal conversation that evaluates the impact of his or her teaching actions and decisions, and changing his or her approach when necessary.

There is evidence that many teachers do not monitor their meta-cognitive processes. Brown and McIntyre (1993) interviewed experienced teachers about the decisions they made in their classrooms and found that while teachers could give coherent accounts of the situations in their classrooms and the reasons for acting the way they did, they were unable to articulate the thinking processes that led them to make on the spot decisions about learning and teaching. The researchers concluded that the teachers did not routinely

monitor their own mental activities but they could be supported to do so when treated respectfully in a reflective situation such as during the observation process.

Unpacking, Engaging with and Challenging Teachers' Theories of Practice

Although teachers' theories of practice are critical in the process of developing new learning that leads to changed practice, they are not always easy to activate during professional learning. This section addresses two issues involved in engaging with and challenging teachers' theories of practice; when teachers are unaware of the theories of practice that drive their teaching decisions, and when teachers articulate theories of practice that are not reflected in their actions in the classroom.

Unawareness of the theories of practice they hold means that teachers often draw on tacit knowledge and non-logical kinds of thinking based on experience to make decisions about what is appropriate in a specific context (Schön, 1987). When the teacher's thinking is intuitive rather than based on logical analysis, it is difficult to unpack the cognitive and affective processes that lie behind decisions and actions in the classroom. An example of a teacher who was unaware of the implications of one of his theories of practice was Derek, a secondary teacher who participated in professional learning and development in assessment for learning (Black, Harrison, Lee, Marshall, & Wiliam, 2003). Prior to the professional learning and development Derek had structured his lessons by asking lots of quick-fire questions that needed minimal student response. He clearly held a theory of practice that constant talk equalled learning. After participating in professional learning and development on questioning, Derek described "how dangerous it felt to leave empty time for the students to think of an answer to his questions" (p. 83). The use of the word "dangerous" indicates that Derek's underlying theory of practice was being challenged in the new learning, rather than merely his approach to questioning.

Other teachers may be able to articulate theories of practice that do not govern their actions in the classroom. This disjunction may reveal either a conscious or unconscious response to professional learning and development that is incompatible with the teachers' beliefs and ideas. Argyris and Schön (1974) labelled the theory a teacher articulates as an espoused theory, and the theory that actually governs their actions as a theory-in-use. When the espoused theory is not reflected in the teacher's classroom practice it may be helpful to reflect back to the teacher the disparity between their espoused theory and theory-in-use.

Differences between a teacher's espoused and theory-in-use may occur when they misunderstand the professional learning because they filter the new learning through their deep-seated beliefs and ideas about effective practice. In their study of the application of teachers' professional development in Mathematics in the United States, Franke, Carpenter, Fennema and Behrend (1998) found that one teacher, Ms Carroll, had an espoused theory that supported the principles taught in the professional development, that she should build students' learning around their thinking. In the classroom, although Ms Carroll thought she was faithfully implementing the new learning, the researchers found she did not change her practice in the way intended by the professional development. When students' thinking differed from her expectations, she guided students towards her way of thinking. Ms Carroll's theory of practice was clearly incongruent with the espoused theory she adopted as a result of the professional development. Her theory-in-use was governed by her theory of practice and until this theory of practice was surfaced she was unlikely to change her practice. The researchers understood the need to address the discrepancy between some teachers' espoused and theories-in-use when they reflected that their professional development programme needed to engage teachers in "challenging both their own notions and the research notions about how (students') thinking develops" (p. 79).

Engaging with and challenging theories of practice.

Coaches and professional development providers need to be able to unpack and engage with teachers' tacit and espoused theories of practice. There is evidence that those who support teachers in their professional learning and development are often not comfortable with "making tacit knowledge visible and open to scrutiny" (Timperley & Earl, 2008, p. 124). When a coach suppresses raising an issue with the teacher because he or she fears the teacher's reaction, the coach may use a range of strategies that are not conducive to learning, such as being vague rather than specific (Argyris & Schön, 1996). For example, Strong and Baron (2004) analysed coaches' interviews with beginning teachers and found that only 10 out of 206 suggestions by the coaches were direct. The rest used vague terms such as *might*, *perhaps*, *could*, *wonder*. The teachers elaborated on only a third of these suggestions, which may indicate that they did not find the suggestions useful.

To address some of the deficiencies in learning conversations between, for example, coaches and teachers Timperley (2014) developed a framework called practice analysis, which has three components. In the pre-observation conversation the coach and teacher

discuss the purpose of and procedures involved in the observation process, what student learning will be observed and how it is to be achieved, what students will be the focus of the observation, and what has been the impact of the teacher's practice so far. They then co-construct the teacher's goal for the observation, the criteria that demonstrate effective practice towards achieving the goal, and what the criteria look like in a lesson. The second component, analysis of practice, takes place after the observation. The criteria for effective practice are revisited, and the teacher and coach together analyse appropriate parts of the lesson with the coach using probing questions to understand the reasons for the teacher's actions. The third component is co-constructing new practice. The coach and teacher use the analysis of practice to jointly establish the next steps for the teacher. This process involves exploring reasons for implementing the new practice, the teacher's understanding of the new practice, and its likely impact on student achievement. Criteria are established so the teacher can monitor his or her implementation and new professional learning goals are set for the teacher.

Practice analysis is structured so that unpacking, engaging with and challenging the teacher's theories of practice has a central role in the three components. Timperley (2014) stresses four aspects that are integral to each component. Firstly, the coach's questions include a reason for asking them. This ensures that the coach's theories of practice are also surfaced and discussed. Secondly, the teacher and coach's thinking are revealed and checked, which means an engagement with each person's theories of practice. Thirdly, when the coach asks a probing question, the teacher's response leads to further discussion, (rather than the coach working through a set list of questions) thus promoting in-depth and detailed discussions of the teacher's theories of practice. Fourthly, the coach constantly checks for agreement and understanding, which ensures that the ideas of the coach and teacher are aligned.

It is not easy for many coaches to enact these aspects. As Hubbard et al. (2006) explained:

the process requires that the coach ... analyse and make meaning of the interaction as it is occurring and be able to construct appropriate questions and make teaching points explicit to the teacher. This is difficult work that cannot be scripted and that requires sustained effort over time (p. 124).

It is surprising therefore that many researchers seem to assume that the process of coaching will automatically change teachers' beliefs and practices (e.g. Adey, 2004; Joyce & Showers, 1988; Costa & Garmston 1994). This gap in the research is neatly summed up by Kinnucan-Welsch (2005):

We need to be able to identify what coaching processes support teachers in becoming aware of what they know, what they can do well and how to improve what they do not do well (p. 375).

Personal statement

The issue of supporting coaches to help teachers make changes in their practice had particular significance for me because at the start of this thesis, I was a facilitator working in a contract that provided professional learning and development to teachers. Much of my job involved observing teachers in their classrooms and then giving them feedback and feed forward about how to improve their practice. Over time I noticed that most teachers did not appear to implement my advice or they made only superficial changes in their teaching. Other facilitators reported similar experiences.

I concur with Adey (2004) that coaching through cycles of observation and feedback/feed forward is a valuable part of teachers' professional development because it potentially enables teachers to be supported on a one-to-one basis as they try out and embed new learning. For the coaching process to be effective, however, coaches must possess a range of skills. They need to listen carefully and be able to conduct learning conversations. They must be able to extrapolate from the teacher's discussion the teachers' beliefs and ideas, and be courageous enough to challenge those theories of practice which impede student learning. At the same time the coach must be able to maintain a respectful relationship with the teacher.

Since I have been a coach who struggled to develop my skills without much training, I was strongly motivated to help coaches improve the effectiveness of their feedback and feed forward. This led to the development of three studies that progressively clarified my understanding and that of others of how coaches could work with teachers to improve their practice through unpacking, engaging with and challenging teachers' theories of practice.

The Context of the Research Project

The three studies that comprised this research were situated primarily in secondary schools because the secondary context is most familiar to the researcher and also because the secondary sector is less researched than the primary sector. In New Zealand, the usual age range for students in secondary schools is 13–18 years, and in primary schools 5–12. Two schools across the three studies were area schools that included students from 5–18 years. One school was integrated, which means it has a special character but receives state funding and is therefore subject to the requirements of a state school. The other schools were state schools.

The schools were selected because they had either an internal or external facilitator involved in coaching teachers. “Coaching” means the facilitator conducted cycles of observation and feedback with a number of teachers. Internal facilitator/coaches participating in this research were heads of department, literacy specialists, specialist classroom teachers or Te Kotahitanga facilitators. The specialist classroom teacher is a role funded by the Ministry of Education in secondary schools to provide professional learning support to other teachers, particularly mentoring and supporting beginning teachers (MOE website www.minedu.govt.nz/NZEducation). Te Kotahitanga was a New Zealand initiative aimed at improving the participation and achievement of Māori secondary students. The in-class facilitator helped teachers to implement changes in their teaching practices, through cycles of observation and feedback (Bishop & Berryman, 2010). External facilitators were professional development providers who were contracted by the Ministry of Education to work with teachers in schools with the aim of improving student achievement.

Organisation of the Thesis

This chapter briefly explored recent changes in the understanding of teachers’ professional development and learning and discussed the significance of teachers’ theories of practice in relation to how teachers enact new learning. The difficulties involved in engaging with and challenging teachers’ theories of practice were discussed, and how these difficulties highlighted the need for further research into how coaches can successfully engage with and challenge teachers’ theories of practice.

Chapter 2 reviews the literature relevant to this thesis. It begins with discussing how teachers’ theories of practice are established and how conceptual change can be effected. Since coaching was the context in the research studies through which teachers’ theories of

practice were explored, the chapter then moves to a discussion of coaching. Different coaching models are discussed and evaluated in relation to how they facilitate conceptual change through unpacking, engaging with and challenging teachers' theories of practice. Feedback and feed forward are a central part of many coaching models, therefore the chapter then reviews research around models of effective feedback and feed forward, and frameworks in which feedback and feed forward can be co-constructed with teachers. The chapter next examines what training is required to help coaches facilitate the kind of feedback and feed forward that unpacks, engages with, and challenges teachers' theories of practice, thus beginning the process of conceptual change. The final section describes gaps in current research and how this thesis aims to address these gaps.

Chapter 3 outlines the methodological approach employed for the three studies that comprise this thesis. The study design is described and a rationale provided for the design. Differences in the designs of Studies 1, 2 and 3 are highlighted, along with how Studies 2 and 3 were developed out of the preceding studies. An overview is given of data instruments and methods of data analysis common to the three studies. A more detailed description of the methods specific to each study is discussed in the chapters dedicated to Study 1 (Chapter 4), Study 2 (Chapter 6) and Study 3 (Chapter 7).

Chapter 4 discusses Study 1, a small interpretive study that aimed to investigate levels of feedback that were effective in changing teachers' practice. Chapter 4 outlines methods used, participants, procedures, data gathering instruments and methods of data analysis. Because Study 1 found that coaches' feedback and feed forward appeared to have a minimal effect on teacher practice, the discussion explores possible reasons for this lack of change and explains a shift in the research focus to helping coaches access teachers' theories of practice.

Chapter 5 focuses on the Engaging with Teachers' Theories of Practice (ETTOP) rubric, which was designed to help coaches unpack, engage with and challenge teachers' theories of practice. The theoretical basis of the rubric is discussed and its development is described. The chapter then positions the rubric within Study 2 by explaining how the Study 2 coaches were trained in its use and provided feedback about its effectiveness. The chapter concludes with discussing subsequent improvements made to the rubric to increase its effectiveness in Study 3.

Chapter 6 describes Study 2, a three phase interpretive study. The chapter details methods used, participants, procedures, data gathering instruments and methods of data analysis. Major findings are described by triangulating data from the coaches' discussions with teachers, follow-up interviews with teachers and the teachers' questionnaires. The discussion centres on how to improve coaches' engagement with teachers' theories of practice and how Study 2, led to the refinement of the ETTOP rubric, data gathering instruments and the coaches' training.

Chapter 7 focuses on Study 3, which was larger than Study 2. The chapter describes its design, a quasi-experimental study with a one-group pre-test/post-test. As with the previous studies, the chapter outlines methods used, participants, procedures, data gathering instruments and methods of data analysis. Findings are reported by triangulating data, as with Study 2, but additional data were collected by interviewing the coaches. The chapter concludes with a discussion about the extent to which the ETTOP rubric (Version 2) was successful in helping coaches access teachers' theories of practice, with the result that teachers made pedagogical changes in their practice.

Chapter 8 summarises the results of Studies 1, 2 and 3, discusses the contribution of this thesis to the body of knowledge, and offers directions for further research.

Chapter 2:

Literature Review: Situating Theories of Practice in Changing Teacher Practice

This chapter examines and discusses relevant literature for the purpose of situating the thesis in current research. It begins with defining the key concept underpinning the thesis, that is, *theories of practice*, and reviews how teachers' theories of practice are established and changed. Because theories of practice are developed and changed at a conceptual level, different approaches to conceptual change are explored and evaluated in relation to their effectiveness in changing teachers' theories of practice. The focus then moves to the context of this study: the discussion between the teacher and coach around a classroom observation. The literature around coaching, observations and feedback is examined. The chapter concludes with a discussion of gaps in the research that this thesis aims to address.

Theories of Practice

The term *theories of practice* is used differently in different literature. These differences are examined and definitions of theories of action and theories of practice are explored to clarify the relationship between the terms in this thesis and to explain the choice of the definition below.

The definition of theories of practice used in this thesis was constructed by merging two definitions (MOE, 2008; Timperley et al., 2007). The Ministry of Education (2008) states that theories of practice:

comprise the implicit beliefs, assumptions, values, knowledge and emotions that individual educators bring to their practice. They include their personal theories – the judgements and evaluations they make about themselves, others, and the world around them – and their understanding of general theories. They are the lens through which educators view their practice, guiding the decisions they make about the actions they will take, the ways in which they make sense of new information, and what they view as useful knowledge (p. 106).

This definition suggests that theories of practice are both complex and multi-faceted through listing five interweaving components of a person's theories of practice: beliefs, assumptions, values, knowledge and emotions. The metaphor of "the lens through which

educators view their practice” creates a powerful image of how a teacher’s theories of practice influence the way he or she perceives, processes and uses new information.

Timperley et al. (2007) list many of the same components as the Ministry of Education (2008) definition. Theories of practice are “personal theories that consist of particular beliefs and values; related knowledge, skills and practices; and desired outcomes” (p. 197). There are two main differences between the definitions. Firstly, Timperley et al. (2007) explicitly link a teacher’s theories of practice to his or her actions by including *practices* in a teacher’s personal theories, whereas the Ministry of Education (2008) definition only suggests an indirect connection by using the phrase “bring to their practice” (p. 106). This phrase conveys the idea that several elements combine to influence a teacher’s practice, rather than situating a teacher’s practice as part of his or her theories of practice. Secondly, the Ministry of Education (2008) definition uses the word *implicit* when describing the five components, which suggests that all theories of practice are tacit. This is not necessarily so; a teacher may be able to clearly articulate his or her theories of practice. Timperley et al. (2007) do not include any notion of implicitness in their definition.

Theories of practice:

consist of particular beliefs and values; related knowledge, skills and practices; and desired outcomes. They are the lens through which educators view their practice, guiding the decisions they make about the actions they will take, the ways in which they make sense of new information, and what they view as useful knowledge.

Some researchers use the term *theories of action* and the distinction between *theories of action* and *theories of practice* is often subtle in the literature. For example Robinson (1993) defines a theory of action as “a theory we attribute to ourselves or others that purports to explain or predict, on the basis of relevant values, beliefs and motives why people act as they do in a given situation” (p. vii). Robinson’s definition has some similarity to the definition of theories of practice above. Both address the importance of beliefs and values to explain people’s actions. The definition chosen for this thesis, however, is wider in scope because it also includes the place of knowledge, skills, practices and desired outcomes in people’s theories of practice.

Theories of action are discussed first because they comprise a smaller unit than theories of practice. Argyris and Schön (1974) define a theory of action as “a theory of

deliberate human behaviour, which is for the agent a theory of control but which, when attributed to the agent, also serves to explain or predict his (sic) behaviour” (p. 6). A theory of action, therefore, propels a person to act the way he or she does in any given situation. For example, a teacher exhibits a theory of action when, faced with a disruptive class, he or she decides that the students will spend a significant part of the lesson individually copying from the whiteboard. The teacher’s theory of action is to control student behaviour through keeping the students “busy” and supposedly learning. Robinson’s definition (1993) highlights the significance of a person’s values, beliefs and motives in his or her theory of action. Using the example of the teacher above, he or she may believe that when students are quiet and occupied with a task they are learning. This belief influences the way the teacher plans and delivers teaching and learning in a classroom situation.

There is a distinction between a person’s espoused theory of action and his or her theory-in-use (Argyris & Schön, 1974). An espoused theory is what a person states about how he or she would act in a given situation, whereas a person’s theory-in-use is how he or she actually behaves. Knowledge of a person’s theory-in-use can only be derived from firsthand observations (Robinson & Lai, 2006). The teacher who has students copying from the board may state that co-constructing learning with the students underpins all his or her planning and classroom teaching. Observation in the classroom, however, reveals that the teacher does not involve students in discussing and co-constructing the learning. Instead, the teacher tells the students what they will be learning and cuts short any discussion about the learning because of a subsequent increase in noise as the students talk. The teacher’s espoused theory does not match his or her theory-in-use as other aspects of the teacher’s theory of action, such as his or her beliefs, are powerful drivers of the teacher’s actions.

When a teacher’s theory-in-use differs from his or her espoused theory, the teacher may be unaware of the difference between the two because the theory-in-use may be tacit. As Bruner (1996) states, teachers’ interactions with students are “deeply affected by our everyday intuitive theories about how other minds work” (p. 45). Sometimes teachers are not conscious of the intuitive theories that drive their decisions and actions in the classrooms. The teacher in the example above may hold a tacit belief that a quiet classroom is necessary for learning to take place. Unless this tacit belief is unpacked and challenged, the teacher is likely to make only minor changes to his or her practice. This thesis primarily focuses on teachers’ theories-in-use because its context is the discussion around observations of what teachers actually did in their classroom teaching, rather than what they

stated they believed was good practice. Teachers' espoused theories, however, are also of interest, particularly when they differ from the teachers' theories-in-use because conflict between teachers' espoused and theories-in-use may help to explain a lack of pedagogical change in teachers' practice. Pedagogical change involves a change in teachers' pedagogical instruction, whereas a minor change may relate to mechanical or procedural issues.

A theory of practice is formed when interrelated theories of action are organised into a pattern (Argyris & Schön, 1974), which constitutes a theoretical conceptual framework developed by a teacher. Like theories of action, a teacher may espouse theories of practice that are different from their theories-in-use. Just as with theories of action, a teacher's theories of practice may be tacit and the teacher may need support to unpack and discuss his or her theories of practice. A teacher's theories of practice form the unit of study in this thesis rather than his or her theory of action because addressing a teacher's theories of practice has the potential to effect change at a pedagogical level, rather than addressing the theory of action alone. For example, in relation to the teacher discussed above, a coach could lead the teacher to articulate and investigate what constitutes effective learning, including interviewing his or her students about how they believe they learn best. Unless the theory of practice is unpacked, discussed and challenged as a whole, there is likely to be little substantive change in the teacher's practice.

Implications for professional learning.

This section explains why teachers' theories of practice need to be engaged during professional learning and discusses some implications for professional development providers. It is important to engage teachers' theories of practice because they can influence the way teachers understand new learning and cause teachers to misunderstand and misinterpret professional learning and development (Spillane et al., 2002). As discussed in Chapter 1, teachers may over-assimilate the new learning by classifying it as congruent with what they already know. As a result they may not develop a deep understanding of the principles involved or expose their existing theories of practice to discussion and challenge.

The issue is illustrated in a study of changing ideas in reading instruction in California from 1983 to 1999. In this context, Coburn (2004) examined why some teachers changed their concepts about teaching reading, while others did not. Teachers who did not change their concepts assimilated the new learning about reading into their existing theories

of practice, instead of allowing their theories of practice to be challenged by the new learning. One teacher, Sharon, provided an example of assimilation. She believed that learning to read consisted of mastery of a sequence of skills that developed in complexity. Therefore when she taught reading she focussed on group teaching of skills, followed up with practice from worksheets. Sharon participated in professional development that used a thematic approach to literacy instruction in which a holistic approach to reading was stressed through making connections across subjects. The philosophy of the thematic approach was the opposite of her theory of practice, which was informed by the basic skills approach. After the professional development, Sharon believed she had embraced the thematic approach but did not fundamentally change her theory of practice about reading instruction. She now used worksheets related to a theme that was often linked to a story studied in the reading group rather than across subjects. Sharon's story illustrates how bypassing teachers' theories of practice can lead to a misinterpreted adoption of the new learning.

Engaging teachers' theories of practice is often not an easy process. Teachers such as Sharon may not be aware of discrepancies between their espoused theories (Sharon believed she had embraced the thematic approach) and theories-in-use (she believed that reading instruction consisted of mastery of a sequence of skills because the theories of practice that drive teachers' theories-in-use are tacit. A coach needs to help teachers surface the difference between their espoused and theories-in-use because when theories of practice are unconscious, they remain unexamined. When unconscious theories are made explicit teachers may be challenged to think more critically about them (Bransford, Derry, Berliner, Hammerness, & Beckett, 2005). This process may create dissonance with teachers' current positions and begin the process of changing problematic theories of practice.

Bishop et al. (2010) conducted a study, Te Kotahitanga, which demonstrated how to successfully surface and change teachers' unconscious theories of practice through providing teachers with an alternative concept to what they believed. Te Kotahitanga was a New Zealand project aimed at improving the participation and achievement of Māori secondary students. During scoping of the project Bishop et al. (2010) found that the majority of teachers believed they had little power to improve the achievement of Māori students due to deficiencies in the students, their families, schools, the education system and society. These theories of practice were surfaced through initially involving

participating teachers in a problem-solving activity in which they firstly identified their beliefs about Māori student achievement. These beliefs sometimes centred on perceived deficiencies in the students, such as lack of motivation, skills, abilities or their home environments. The teachers then studied Māori students' narratives about the students' experiences at school, which revealed an alternative to the teachers' prior concepts about the causes of low student achievement. For example, the students placed their relationships with teachers as a central factor in their participation and achievement. Next, teachers were encouraged to reposition their thinking along the lines of " 'Maybe I can't do anything about this child's home circumstances but in my classroom I can do ...' " (Bishop & Berryman, 2010, p. 180). The professional development programme also continued to surface and discuss teachers' theories of practice through coaching and the establishment of professional learning communities. The Te Kotahitanga approach was successful because changing teachers' theories of practice contributed to improved student outcomes for Māori students (Bishop & Berryman, 2010).

Conceptual Change

Given a central theme of this thesis is about changing teachers' theories of practice, the focus now turns to the literature on conceptual change. This research helps to explain how teachers' theories of practice are formed and how they may be changed. The field has its origins in the work of Piaget (1971) on assimilation and accommodation. Assimilation occurs when a person fits new learning into his or her pre-existing knowledge structures. Accommodation is when a person modifies his or her pre-existing knowledge structures to accommodate new learning. If the person fails to assimilate or accommodate the new learning, dissonance is the result. A person may experience disappointment or surprise that the new learning is not congruent with his or her pre-existing knowledge structures, but the ensuing dissonance potentially opens the path to new learning because of a person's urge to resolve dissonance and restore equilibrium (von Glaserfeld, 1996). Dissonance may be resolved when a person's prior concepts are changed or when a person constructs alternative concepts, through exposure to new ideas, to accommodate the new learning. However, dissonance can also result in a person rejecting the new learning. The process whereby a person assimilates or accommodates new learning is the focus of the research on conceptual change.

Some definitions of conceptual change reflect that much of the work in this area has related to students' knowledge acquisition in science that was focussed on misconceptions. Therefore definitions emphasise correcting knowledge. For example Chi (2008) defines conceptual change as "changing prior misconceived knowledge to correct knowledge" (p. 61). This emphasis is too narrow when considering conceptual change of a teacher's theories of practice because the definition does not incorporate beliefs and values that are an important part of misconceptions. Vosniadou et al. (2008) offer a wider definition which positions conceptual change within a wider definition of knowledge. Conceptual change is situated within "a complex knowledge system consisting of presuppositions, beliefs and mental models organised in theory-like structures that provide explanation and prediction" (p. 22). A theory-like structure is a coherent body of domain specific knowledge that has a distinct ontology (Vosniadou, 2008). Vosniadou theorised, based on studies of conceptual change in children, that changing these theory-like structures is a gradual and continuous process. It involves systematically changing the beliefs and presuppositions of the initial theory that are in conflict with the new information (Vosniadou, 2007). One way to effect change is to narrow the gap between a person's framework theories and the new to-be-acquired information, thus making the process of change more manageable.

The significance of people's theory-like structures in relation to new learning can be seen in a study of Coburn (2004) who investigated the relationship between changing ideas in reading instruction in California and teachers' classroom practice. Like Sharon who was discussed above, another of her participants, Deanna, was trained in a basic-skills approach to reading which emphasised a phonic approach. Deanna appeared, as a result of her training and early teaching experience, to develop theory-like structures about how to teach reading because, when she later encountered literature-based approaches to reading that conflicted with her coherent body of knowledge, Deanna found these approaches difficult to understand and enact in her teaching. Consequently, she did not substantially change her teaching from the basic skills approach. However, unlike Sharon, when Deanna participated in a literature-based approach several years later, she changed her concepts about reading through participating in professional development that supported her to experiment with new approaches, discuss her experiences with colleagues and receive ongoing feedback about her classroom practice. Slowly her coherent body of domain specific knowledge about reading changed and she developed new theory-like structures.

The definition of conceptual change by Vosniadou et al. (2008) aligns with three principles identified by Bransford et al. (2000) of how people learn. Both emphasise that learning must consider people's existing beliefs and ideas and that learning takes place within a conceptual framework. The first principle of Bransford et al. (2000) is that people come to learning with preconceptions about how the world works. If their initial understanding is not engaged, they may fail to understand the new concepts and information that are taught, or they may learn them superficially and return to their preconceptions outside the professional learning context. This principle relates to the presuppositions, beliefs and mental models that together form theory-like structures (Vosniadou et al., 2008) and it demonstrates the importance of engaging with a teacher's preconceptions in order to bring about conceptual change.

The second principle is that to develop competence in an area of inquiry, learners must have a deep foundation of factual knowledge, understand facts and ideas in the context of a conceptual framework and organise knowledge in ways that allow for retrieval and application. Situating teachers' theories of practice as part of a theory-like structure, a conceptual framework, underlines the need to engage with and challenge these theories of practice as a coherent whole, rather than what is immediately evident in the teacher's behaviour or action (Bransford et al., 2000).

The third principle stresses that a metacognitive approach to instruction can help people take control of their own learning by defining goals and then monitoring their progress towards achieving them (Bransford et al., 2000). As described in Chapter 1, a meta-cognitive approach includes a teacher engaging in an internal conversation that evaluates the impact of his or her teaching actions and decisions, and changing his or her approach when necessary. A metacognitive approach, however, does not in itself ensure conceptual change. For conceptual change to occur, a teacher's internal conversations need to result in him or her systematically changing the beliefs and suppositions of his or her initial theory (Vosniadou et al., 2008). Because a teacher is often isolated in his or her classroom, he or she may need support to become metacognitive in a way that leads to conceptual change. Two approaches to conceptual change, cognitive and socio-cultural, that a coach could use, are discussed in the next sections.

A cognitive approach to conceptual change.

Cognitive psychology focuses on the “internal mental processes and the knowledge structures that underline human behaviour” (de Corte, 2010, p. 38). Conceptual change is concerned with how internal mental processes are engaged in changing a person’s knowledge structures. Vosniadou et al. (2008) address this aspect by exploring mechanisms that may change a person’s knowledge system. One such mechanism is dissonance. In this section dissonance is discussed as a mechanism for effecting conceptual change and its limitations are explored.

Creating dissonance may be a part of teacher professional development and learning when new learning is discrepant with teachers’ existing theories of practice. It is one of the four iterative learning processes, discussed in Chapter 1, for developing new understandings or skills (Timperley & Alton-Lee, 2008). After teachers have cued and retrieved prior knowledge, and become aware of new information, they may experience dissonance in relation to their current beliefs, values, knowledge, skills, practices and desired outcomes.

Presenting an alternative theory is one approach to creating dissonance in order to bring about conceptual change (Chinn & Brewer, 1993; Inagaki & Hatano, 2008) because, if teachers cannot think of an alternative, they may hold fast to existing theories of practice, even when these are shown to be inadequate or inappropriate (Inagaki & Hatano, 2008). An alternative theory was used in Te Kotahitanga (Bishop & Berryman, 2010), described earlier in this chapter. Teachers’ concepts of their role in developing Māori student potential began to change through a three-step process. Firstly, teachers articulated their beliefs about Māori achievement. Secondly, they studied student narratives that offered an alternative view. Thirdly, teachers were invited to critically reflect on the differences between their beliefs and the alternative concepts expressed through the students’ narratives.

Using videotapes can be effective in showing teachers an alternative concept. Carpenter, Fennema, Peterson, Chiang and Loeff (1989) employed this mechanism in their professional development with mathematics teachers. They wanted teachers to think about students’ conceptual thinking when solving mathematics problems, rather than the teacher providing and drilling specific problem-solving strategies. The videotapes exemplified students successfully using the alternative approach. Before viewing the videotape one

teacher did not believe her students could solve mathematical problems without explicit instruction. After studying the videotapes of students the same age as hers explaining their mathematical thinking, her initial reaction was to describe the students as exceptional. Nevertheless she tried the approach, using the same problem, with her own students. The alternative concept shown in the videotape example created sufficient dissonance in the teacher that she tested the alternative on her own students and she found they could also solve the problem.

Another approach to creating dissonance is through discrepant events. Clement (2008) states that dissonance may be created through interactions in which learners are exposed to information that allows them to discover a conflict with their current knowledge and beliefs. The information is often in the form of discrepant events, such as data summaries or demonstrations, which allow the learner to discover a conflict with his or her current concepts. After dissonance is created, the learner discards the misconception and replaces it with another conception, or he or she suppresses the misconception in certain circumstances. An example of an interaction in a professional learning situation could involve creating dissonance through the discrepant event of examining student achievement data with a teacher. The teacher may believe that students have been placed in his or her literacy class at Year 11 because the students are not capable of achieving assessments used with the majority of students at this level. When shown nationally normed reading data from the end of Year 10, the teacher realises that several students are reading at a level consistent with national expectations and these students have been placed in the literacy class because of behavioural rather than learning issues. The discrepant event, an analysis of the student achievement data, may create dissonance for the teacher because he or she has designed a programme targeted at struggling students.

However, a discrepant event does not guarantee that dissonance will result in conceptual change and a change in teachers' theories of practice because there are multiple ways teachers may resolve dissonance. Chinn and Brewer (1993) describe seven possible responses a person may have to anomalous data triggered by a discrepant event: they may ignore the anomalous data, reject it, exclude the data from their beliefs, hold the data in abeyance, reinterpret the data while retaining their beliefs, reinterpret the data and make peripheral changes, or accept the data and change their beliefs. Several factors influence which of the seven responses is enacted, including the person's prior knowledge and beliefs, the credibility or ambiguity of the anomalous data, and the individual's strategies

for processing the data. The teacher in the example above could respond in a number of ways to the new information that some students are not struggling. He or she may resolve the dissonance without threatening his or her beliefs about how to teach the students by rejecting the data as invalid, or lobbying to have some students removed from the class. These options may not, however, maximise student achievement. Alternatively, the teacher may use the discrepant event (the data) to revise his or her beliefs about how to best meet the needs of the students by, for example, differentiating the instruction to cater for the range of reading levels in the class.

Spillane et al. (2002) stress that it usually takes more than a single discrepant event to bring about conceptual change. When faced with dissonance, learners may work to conserve existing conceptual frameworks because transforming them is difficult. What is required is “a sustained engagement with a sequence of problematic ideas and an explicit goal of making sense of them” (p. 398).

Creating dissonance has been criticised as a strategy for bringing about conceptual change (Gregoire, 2003) and three limitations that have relevance for teachers in a professional learning situation are discussed in this section. One criticism is that while dissonance helps learners question their existing concepts, and related theories of practice, it does not offer a mechanism for creating new concepts and modifying theories of practice (Gregoire, 2003). This criticism is justified if the strategy only creates dissonance. The examples discussed above show that the mechanism of providing an alternative approach can help teachers create new concepts and modify their theories of practice (Bishop & Berryman, 2010; Carpenter et al., 1989).

A second criticism of using an approach that deliberately creates dissonance is that there may be affective consequences for some learners. Dreyfus, Jungwirth and Elovitch (1990) found that more successful students responded enthusiastically to cognitive conflict, whereas unsuccessful students became anxious, felt unsafe and threatened, and tried to avoid conflicts. In fact, the unsuccessful students seemed to equate cognitive conflict with failure, rather than as an interesting challenge. It is not known whether successful and unsuccessful teachers approach cognitive conflict differently, but Spillane et al. (2002) point out that teachers generally want to believe that what they have done in the past is successful and therefore are hesitant to believe that their efforts have failed. Embracing

dissonance, therefore, may affect a teacher's self-image, with the result that the teacher may cling to their existing theories of practice as a form of self-preservation.

A third criticism is that using a cognitive approach to conceptual change privileges learning and cognition as taking place within the learner's mind without taking into consideration the context of the learner (Hakkarainen, Palonen, Paavola, & Lehtinen, 2004). Consider the mathematics teacher discussed earlier who saw a videotape of students solving mathematical problems. She did not view the videotape on her own (Fennema, Franke, Carpenter & Carey, 1993). She saw and discussed it among a group of teachers, some of whom contributed their beliefs and ideas about student mathematical thinking. In a context like this, conceptual change may take place as a result of a blend of individual cognition and a socio-cultural approach.

A socio-cultural approach to conceptual change.

Socio-cultural theory emphasises the centrality of a learner's participation and interaction in the social and cultural contexts in relation to his or her intellectual development (Hakkarainen et al., 2004). This theory owes much to Vygotsky, (1978) who asserted that all learning is socially constructed. Although Vygotsky's claim is contested in relation to student learning (e.g. Hatano, 1993), there is evidence to suggest that social learning plays an important role in promoting conceptual change in teachers. The mechanisms for effecting conceptual change in a socio-cultural approach are similar to those used in a cognitive approach: creating dissonance and providing an alternative approach. In a socio-cultural approach, however, the mechanisms are employed to develop a shared experience of conceptual change, rather than focussing solely on individual cognition. Two contexts in which these mechanisms are commonly used are professional learning communities and modelling; each context is discussed in relation to its effectiveness in facilitating conceptual change.

Characteristics of professional learning communities that promote teacher and student learning are those that include "a focus on opportunities to process new understandings and their implications for teaching, the introduction of new perspectives and challenging of problematic beliefs, and an unrelenting focus on the impact of teaching on student learning (p. 205)." The characteristics are intertwined but three invite discussion because they have particular relevance for this thesis: processing new understandings, the introduction of new perspectives, and challenging of problematic beliefs.

When professional learning communities are focussed on processing new understandings, there is evidence that they are effective in changing teachers' beliefs and practice. In a study of mathematics teachers Spillane (1999) found that teachers who fundamentally changed their practice in implementing a reform had engaged in frequent discussions with other teachers and experts related to the professional learning and development, whereas teachers who made only superficial changes to their practice had few discussions with colleagues and their discussions were at the level of types of activities for students to work on. The discussions of the teachers who changed had three characteristics. They included both colleagues and external experts who focussed the conversations on the reform. The conversations simultaneously addressed the reform ideas and teachers' efforts to make sense of the ideas. Some discussions were centred on resources that showed an alternative approach, such as observing teachers or watching videotapes. Teachers then discussed changes they would make in their classrooms as a result of viewing the videotape or observation.

A second characteristic of an effective professional learning community is that it introduces new perspectives. The example above achieved this through introducing outside experts and exposing teachers to alternative approaches. Professional learning communities need to be refreshed with new perspectives that provide a catalyst for conceptual change through challenging participants' previously held interpretations, opinions or beliefs. The importance of introducing new perspectives is illustrated in a study of the social interactions of scientists working in six laboratories in North America. Dunbar (1995) found that the researchers in one laboratory did not make as much progress as the others. The scientists in this laboratory came from the same backgrounds and drew from a similar knowledge base; they had developed similar conceptual frameworks and they did not challenge one another's ideas. In the other laboratories the scientists were more diverse and they posed questions that encouraged their colleagues to think at a different conceptual level. They also challenged each other's interpretation of findings and these challenges prompted the scientists to look at the data through a different lens.

A third characteristic is that an effective professional learning community challenges problematic beliefs. Every teacher has theories of practice, which may be tacitly held. Because of the individualistic nature of teaching, these theories of practice may never have been discussed with others or challenged. Spillane et al. (2002) suggest that within professional learning communities teachers may share their previously unspoken opinions

and ideas. Once articulated, the ideas become visible and open to discussion and debate. Weaknesses and inconsistencies in arguments can be explored as the group works together to resolve differences. A professional learning community acting in this way becomes a catalyst for supporting conceptual change in its participants.

Modelling is another context that can potentially incorporate the same characteristics that promote conceptual change as professional learning communities (Timperley et al., 2007). Loughran (1997) stresses that the purpose of modelling in teaching is not so that the observer(s) mimic the person modelling. Rather it is making explicit “the processes, thoughts and knowledge of an experienced teacher in a way that demonstrates the ‘why’ or the purpose of teaching” (p. 62). Therefore modelling that potentially leads to conceptual change involves not only demonstrating, but also discussion in which there is a shared unpacking of the experience so that the observer(s) gain access to the pedagogical decisions of the person modelling (Loughran, 2006). In this sense, modelling provides a space in which social actors make sense of and negotiate meanings about the nature of teaching and learning (Spillane et al., 2002).

As with professional learning communities, new understandings may be processed as the observer and person modelling discuss the reason why the person modelling acted as he or she did at specific times during the modelling process. Modelling offers the potential for an introduction of new perspectives, because the modelling often takes place in a context familiar to observer, his or her classroom. The observer potentially has the opportunity to see different ways of promoting student learning from those he or she currently employs. Problematic beliefs may be challenged and this process can be reciprocal. The observer may challenge decisions the person modelling made or he or she may discuss differences in pedagogy that were demonstrated throughout the modelled lesson. This process may lead to the exposure of tacit theories of practices, which can then be discussed.

Limitations of knowledge of conceptual change.

Some issues in the field of conceptual change include limited knowledge about how conceptual change occurs (Gregoire, 2003) and a lack of knowledge about exactly what mechanisms promote conceptual change (Vosniadou, 2008). On the basis of empirical evidence, theorists seem to agree that conceptual change is difficult and that it is often a gradual process (Chinn & Brewer, 1993; diSessa, 2008; Inagaki & Hatano, 2008).

Timperley et al. (2007) note that teacher professional learning and development that has improved student achievement outcomes usually takes place over an extended period of time, especially when complex change is required. Therefore, changing teachers' theories of practice is likely to be neither a speedy nor a simple process.

The Context for the Study: Coaching

One approach that has been shown to be effective in facilitating conceptual change is coaching (Timperley et al., 2008). When working with teachers, coaching often involves cycles of observation and feedback, which in their simplest form consist of a coach observing a teacher in his or her classroom and then giving the teacher feedback. Observing teachers putting what they have learned into practice is an essential part of the professional learning and development process because, as Argyris and Schön (1974) state, observation is the only reliable way to discern differences between a person's espoused theories and theories-in-use. Observation allows coaches to see what teachers are actually implementing, rather than what they say they are doing. When there are differences between teachers' espoused theories and theories-in-use, the coach can lead a discussion about the discrepancies during the feedback discussion. Because of its potential to effect conceptual change, coaching through cycles of observation and feedback is the focus of this thesis. In this section, coaching is defined and models of coaching are examined and critiqued. The challenge of effecting conceptual change through coaching is then illustrated with two studies.

Defining coaching.

Differences between the terms "coaching" and "mentoring" need to be clarified. Veenman, Denessen, Gerrits and Kenter (2001) define mentoring as "the development of a personal, collegial and supportive relationship with a colleague who is a novice" (p. 319). They believe that mentoring precedes coaching, which is "a form of in-class support to enhance teaching competence through systematic reflection on professional practice" (p. 322). This definition indicates that, like Cochrane-Smith and Paris (1995), Veenman et al. (2001) position the boundaries between coaching and mentoring as overlapping. Others consider that coaching is distinct from mentoring because they have different purposes. As Clutterbuck (2007) states, "coaching answers the question: 'What do you want to improve in?' Mentoring answers the question: 'What (or who) do you want to become?'" (p. 18). In this thesis coaching is seen as different from mentoring because coaching is a vehicle for

improving teacher capability, rather than supporting teachers who may be novices or at key transition points in their career (Forde, 2011).

Because coaching is related to improving teacher capability, it needs to be defined in terms of improvement in practice. Robertson (2005) addresses improvement when she states that coaching involves at least two people working together to set and achieve professional goals. Her definition, however, does not do justice to the complex processes involved between setting goals and achieving them. The definition of coaching chosen for this thesis is: “building capacity using a framework based on systematic assessment, feedback and inquiry” (Reeves & Allison, 2009, p. 23). This definition incorporates improvement (building capacity) and also defines the process of coaching as involving (cycles of) assessment, feedback and inquiry.

The development of coaching models.

Numerous models of coaching abound. Clutterbuck (2007) describes a spectrum with traditional coaching at one end and developmental coaching at the other. In a traditional coaching model the coach’s style is directive: he or she helps the person being coached clarify a goal, and then works with him or her to achieve the goal through instruction, demonstration, observation, monitoring and giving feedback. Developmental coaching is non-directive. The coach uses skilful questioning to help the coached person develop an understanding of the internal and external forces that are restricting the achievement of his or her goals. Out of this questioning comes a goal or goals chosen by the coached person. The coach then helps the coached person build and sustain motivation to achieve their goals and is available for further stimulation and to support reflection. Key actions in this model are questioning, self-management of the coached person’s experimentation, observation and self-feedback. Clutterbuck (2007) notes that many hybrids exist between directive and non-directive models. He suggests that skilled coaches are able to move between models, depending on the needs and motivation of the coached person. Someone with low motivation, for example, may suit a directive model. Whatever the model, its measurement of success should be related to deep changes in teacher practice and few coaching models provide evidence of this. Two models developed by Joyce and Showers (1988) and Costa and Garmston (1994) are discussed in detail for two reasons. Both claim that their models led to an increase in teacher effectiveness and both models have been influential in the development of more recent models of coaching (e.g. Knight,

2007; Toll, 2009). One recent model of coaching, Knight (2007), is then examined because it demonstrates how coaching has developed since Joyce and Showers (1988) and Costa and Garmston's (1994) work. Each model is discussed and the evidence of effectiveness is evaluated.

Joyce and Showers (1988) described coaching as a means to improve teachers' implementation of skills and strategies learned in professional development sessions, particularly when the professional learning required teachers to change their practice significantly. They believed that poor integration of professional development into the classrooms was not because of a lack in the teachers' capability to learn, but because the way schools were organised generally did not support such implementation.

The model began as traditional coaching but it developed into peer coaching which initially involved teachers learning new skills, seeing them modelled, practising the skills and learning to give other participants feedback. Subsequently, the researchers recommended that feedback be omitted from peer coaching. Although coaches were trained in giving feedback that was specifically related to the new skills teachers had learned during professional development, they tended to make evaluative comments during feedback. Teachers were also pressuring coaches into providing evaluative feedback because teachers' previous experiences with feedback had led them to expect judgements about their practice, consisting of "first the good news, then the bad" (Showers & Joyce, p.15). Showers and Joyce (1996) were influenced in their decision to eliminate feedback because omitting feedback had no effect on either teacher implementation or student achievement and it simplified the model, which changed towards collaborative planning and problem solving. Although teachers continued to observe one another, there was only a brief post observation discussion along the lines of "Thanks for letting me watch you work. I picked up some good ideas on how to work with my students" (Showers & Joyce, 1996, p. 15).

Two aspects of this model invite discussion. Firstly, there is a question as to whether the process actually involves coaching; given the definition chosen for this thesis that coaching entails "building capacity using a framework based on systematic assessment, feedback and inquiry" (Reeves & Allison, 2009). Peer coaching is certainly aimed at building capacity but the elements of assessment and feedback are deliberately omitted. The main reason given for excluding feedback was that coaches did not give feedback as

they were trained to. It is interesting that Joyce and Showers chose to omit feedback rather than adapt the training for coaches and teachers. If they had used a conceptual change approach, the training could have involved showing coaches and teachers an alternative way to give and receive feedback. At the same time the coaches and teachers could be supported to examine and resolve any dissonance between their current beliefs about feedback and the alternative approach.

Secondly, questions arise around the evidence for the depth of improvement in teacher practice and student achievement. A description of the data collection was not given but data appears to have been collected through interviews, lesson plans, and classroom observations. The evidence provided focused on changes in teacher practice as a result of the coaching process. Joyce and Showers (1988) claimed that coached teachers practised new strategies more, used the strategies more appropriately and retained the knowledge and skills for longer than teachers who did not participate. Coached teachers were also more likely to teach new models of teaching and they demonstrated a clearer understanding of the purposes of the new strategies than the teachers who did not participate. It is not clear, however, whether the strategies resulted in conceptual change in teachers or improved achievement in students.

Cognitive Coaching (Costa & Garmston, 1994) shows the progression among coaching researchers from focusing on what teachers are doing in their classrooms to the internal thought processes that guide teacher decisions. This model is built around a planning conference, a lesson observation and a reflecting conference. In the planning conference, the teacher and coach clarify the lesson goals and objectives, the teaching strategies, evidence of student achievement, and the coach's data gathering process. During the observation the coach gathers data on student achievement and the teacher's strategies and decisions. The reflective conference involves the coach supporting the teacher to make causal links between his or her actions and student achievement through asking questions. Finally the coach encourages the teacher to synthesise his or her learning in relation to how he or she will change his or her teaching. The teacher also reflects on the coaching process and suggests improvements.

A key facet of Cognitive Coaching is that, like Joyce and Showers (1988), the coach is non-judgemental, since it is believed that this is necessary for the teacher to trust the coach, and to feel safe to take risks and experiment. Therefore the coach acknowledges

what is said, clarifies, probes and summarises, but does not evaluate the teacher's performance or offer advice. It is not easy for a coach to adhere to the model. For example, Strong and Baron (2004) analysed the interviews of coaches who had participated in professional learning in cognitive coaching. They found that although some coaches were at pains to emphasise that they were not making suggestions, it was clear that they were, in fact, indirectly giving advice:

Coach: ““Right, so it might be, given your focus is organization, is there an introduction? OK, an intro, the main body, and a conclusion. Would you be as specific as to say, like this: introduction, and then having them say what they used? *I'm not suggesting, I'm just asking.*”” (p. 54).

It is difficult to establish the effectiveness of these indirect suggestions. Teachers accepted the coaches' responses 80% of the time, but only one third of teachers elaborated or offered an alternative suggestion. The authors cautioned against seeing agreement by the teachers as a commitment to change and noted that classroom observations are needed to ensure whether the advice is acted upon. These were not part of the evidence base provided by Costa and Garmston (1994) in their claims of effectiveness.

Another study by Edwards and Green (1999) examined changes in coaching practices and teachers' reflective thinking over three years of participation in cognitive coaching. In this study, participants taped their planning and reflective conversations at the beginning and towards the end of the three years. The tapes were transcribed and analysed for the length of each conference and for changes in language used. Conferences became longer but the language used did not significantly change to include more “reflective” terminology. Teachers' self-reports indicated that most teachers perceived they had changed their approach to teaching in small ways but some teachers reported little growth. Coaches had changed from adopting a sometimes stilted and formulaic style at the beginning of the study to allowing a more fluid dialogue in which the teacher sometimes led the discussion. The lack of growth in the coach's use of reflective language is consistent with the findings of Strong and Baron (2004). Edwards and Green (1999) did not challenge the cognitive coaching model but rather suggested that coaches needed not only training, but support in practising the skills they learn, particularly around the time needed to implement this model. It is also possible, however, that the training was flawed and resulted

in the coaches developing a limited or inadequate range of skills to create substantive change in teachers' thinking and practice.

How successful is cognitive coaching? After several coaching sessions Garmston et al. (1993) declared cognitive coaching was successful in changing teachers' practice because the teachers "became better thinkers, and therefore, better teachers" (p. 60). The measurement tool used was self-reported reflections in each teacher's journal. Self-reports are problematic because they are reliable in describing quantity (what content is taught and for how long), but not as reliable in describing quality of teaching (Porter, 2006). A study involving writing with primary teachers by Timperley and Parr (2009) provided some empirical evidence for this claim with New Zealand teachers. They found that teachers self-reported confidence ratings in their ability to use a range of formative assessment strategies bore little relationship to their use of such strategies or students' understanding of the learning. Some of those who gave high ratings showed little evidence of the strategies in the observations. Others who gave low ratings used the strategies effectively with evidence of high levels of student understanding. Because of the reliance on self-reports, it is not possible to draw strong conclusions about the effectiveness of cognitive coaching.

Knight (2007) developed a model called instructional coaching which is built on principles of equality, choice, voice, dialogue, reflection, praxis and reciprocity. Underpinning each principle is the concept of an equal partnership between the coach and teacher. In this model, the coach is not an expert who identifies problems in the teacher's practice and then advises the teacher of changes he or she should make. Rather, the coach and teacher work together to determine the next steps in the teacher's learning. Like cognitive coaching, the coach may observe the teacher in his or her classroom, which is followed up with a discussion that is a collaborative exploration of data. Unlike cognitive coaching, the discussion involves both the coach and teacher sharing their perspectives. Initially the coach gives direct, specific but non-evaluative feedback based on data collected in the observation. Knight (2007) gives an example of this type of feedback as, "you waited 10 seconds for Alison to give her answer, and when she got it right she lit up like a Christmas tree" instead of "you're very patient" (p. 125). The teacher and coach then discuss the feedback, both sharing their perspectives and coming to a consensus about what the next steps will be for the teacher.

A collaborative exploration of data requires the coach to develop a range of skills in leading dialogue, including learning to respect the teacher's ideas and opinions, balancing advocacy and inquiry, and asking questions that surface the coach's and teacher's assumptions. Before the coach can respect the teacher's ideas, he or she must be able to surface them. Knight (2007) describes this as helping teachers find their voice. He states that coaches may need to help teachers find their voices through listening with care, empathising and creating an environment where teachers feel they can talk honestly and openly. Balancing advocacy and inquiry means that coaches do not withhold their perspectives, but explain them so that their beliefs and assumptions can be examined. Throughout this process, coaches must embrace inquiry, which requires them to be open to changing their points of view as a result of discussion with teachers.

As well as observing teachers, instructional coaches may also model lessons while the teacher observes. Modelling begins with a discussion between the coach and teacher about the purpose of the modelled lesson. The teacher and coach co-construct an observation template to focus the teacher while he or she observes the modelled lesson. The coach and teacher then discuss the lesson, addressing aspects that require clarification, or that the teacher disagreed with while he or she was observing. When Knight (2007) surveyed teachers about the perceived impact of model lessons on their practice, teachers reported that model lessons helped them implement research-based practices, increased their confidence with new practices, made it easier to implement new practices and provided an opportunity for them to learn from other teaching practices. Teachers also reported, however, that for model lessons to be effective, the coach needed to have a deep knowledge of the subject matter they modelled.

Evaluations of the effectiveness of instructional coaching have included teacher self-reports and coaches' reports of teacher practice. One study trained teachers using instructional coaching methods as an experimental group and a traditional approach as a control. Teachers who were trained in instructional coaching methods were more likely to self-report that they planned to implement the content they learned (Knight, 2008). In a second study coaches observed teachers who had received instructional coaching three months earlier to establish the extent to which teachers were implementing practices they had learned. The coaches reported that 85% of teachers they observed were implementing new practices in their classroom (Knight, 2008). Both of these evaluations have problematic elements because they either involved self-reports or reports by coaches, who

had been directly involved in the coaching and so were possibly not objective. Knight (2008) acknowledges that more robust data is needed to establish the effectiveness of instructional coaching on teacher practice and student achievement

Coaching models and conceptual change.

In this section, the models adopted by Joyce and Showers (1988), Knight (2007), and Costa and Garmston (1994) are evaluated in relation to how effectively they incorporate mechanisms that are likely to promote conceptual change.

The model of Joyce and Showers (1988) and Showers and Joyce (1996) privileges collaborative planning and problem solving over creating dissonance that may lead to conceptual change. An example is the decision to omit feedback because “when teachers try to give one another feedback, collaborative activity tends to disintegrate” (p. 15). It is possible that teachers participating in peer coaching may change their concepts about teaching as a result of shared discussions and observing an alternative approach, but there was no evidence in this model that teachers were encouraged to unpack, engage with, or challenge one another’s theories of practice.

Instructional coaching (Knight, 2007) is more likely to lead to conceptual change than Showers and Joyce (1996) because this model moves beyond reflecting the teacher’s thoughts back to the teacher to engaging in a discussion about them. Instructional coaches give direct, specific and non-evaluative feedback, express their own theories of practice and encourage teachers to identify and discuss differences and similarities with the coaches’ theories of practice. These processes may not be sufficient, however, to create conditions for cognitive change if coaches are not trained *how* to unpack, engage with and challenge teachers’ theories of practice. Instructional coaching trains coaches to listen carefully, empathise and create an environment where teachers feel they can talk honestly and openly. However, the research of Timperley et al. (2008) indicates that coaches need to be taught specific skills to be able to begin the process of effecting conceptual change whereby teachers make pedagogical shifts in their practice.

Modelling is another way that instructional coaching may facilitate conceptual change because modelling can be effective in creating dissonance (Chinn & Brewer, 1993; Inagaki & Hatano, 2008). If a teacher’s practices are fixed in ways that do not improve student achievement, modelling can demonstrate an alternative approach. As discussed

earlier, whether modelling results in conceptual change may depend on extent to which the subsequent discussion between the teacher and coach focuses on processing new understandings, new perspectives and/or the challenging of problematic beliefs (Timperley et al, 2007).

There is no mechanism in cognitive coaching (Costa & Garmston, 1994) for the coach to activate dissonance in the teacher, which may lead to conceptual change. The coach was expected to develop an understanding of the teacher's theory of practice by being aware that each person perceives the world in a unique way that is influenced by personal history and belief systems. The coach was instructed to meet the teacher in his or her own model of the world, but he or she was not expected to remain in the teacher's world throughout the coaching process. Rather, the coach's skilled questioning aimed to help the teacher access resources within him or herself that he or she needed to develop an aspect of his or her teaching (Principle 5).

The literature on conceptual change suggests that people do not always have the resources they need within their own personal histories to effect the desired changes in practice. The example of Sharon (Coburn, 2004), which was discussed in Chapter 2, illustrates how teachers' existing theories of practice, developed through their teacher education, can be a barrier to developing new practice. If Sharon had been a participant in a cognitive coaching approach it is possible that her theory of practice about literacy would have been surfaced, but unlikely that it would have been challenged. Therefore, regardless of how skilfully the coach questioned, Sharon was not likely to have made substantial changes in her practice.

A major aim of cognitive coaching is for participants to grow as self-directed, self-monitoring and self-modifying learners within an interpersonal context (Costa & Garmston, 1994). In keeping with this aim, methods employed support teachers to give themselves feedback. Butler and Winne (1995) affirm this as one characteristic of a self-regulated learner, but they add that external feedback can also contribute to developing self-regulation through confirming, adding to or conflicting with the learner's interpretation. In cognitive coaching coaches do not give feedback as they are required to be non-judgemental and resist giving advice. The next section discusses the important role of feedback and feed forward in the coaching process and what types of feedback are likely to be effective in changing teachers' practice.

Feedback and Feed Forward

The skills involved in giving and receiving feedback are central in the coaching process. In this section feedback is defined and the features of effective feedback are summarised. Two models of feedback are then critiqued. Tunstall and Gipps' (1996) typology of teacher feedback is examined because their categories of feedback facilitate a discussion of the issues in giving feedback highlighted by Showers and Joyce (1996) and Costa and Garmston (1994) above. The second model of feedback (Hattie & Timperley, 2007) identifies the effectiveness of different levels of feedback, which are useful in considering coaches' feedback to teachers. Each model is also examined through the lens of unpacking, engaging with and challenging teachers' theories of practice. The discussion then moves to the type of framework that facilitates productive feedback and feed forward between the coach and teacher.

Hattie and Timperley (2007) define feedback as information provided by, for example, a teacher, peer, book, parent or self "regarding aspects of one's performance or understanding" (p. 81). This definition highlights that feedback can be generated both externally (from teachers, peers, books, parents) and internally (from one's self). These authors distinguish between *feedback* describing information regarding past performance or understanding and *feed forward* describing information about the next steps in learning.

Effective feedback.

Feedback is a pivotal part of learning and teaching. Much of the research around feedback has involved student learners. However, since the principles of adult learning are consistent with the way students learn (Donovan, Bransford, & Pellegrino, 1999), it is reasonable to assume that these findings have some resonance for feedback to teachers. According to Hattie's synthesis of more than 800 meta-analyses, feedback is among the 10 strongest factors in improving student achievement (Hattie, 1999). As part of formative assessment, feedback contributes to raising student achievement, particularly for low attaining students (Black & Wiliam, 1998). There are several features of effective feedback. It is specific, timely, positive and responsive (Alton-Lee, 2003) and provides information for how to improve (Hattie & Timperley, 2007). Butler and Winne (1995) claim that feedback is especially effective when it addresses the learner's next steps and leads to self-directed learning. In the following section, features of effective feedback are examined in relation to the models of feedback and the framework for giving and receiving feedback.

A typology of evaluative and descriptive feedback.

Tunstall and Gipps (1996) developed their typology of teacher feedback through observing teacher feedback to students in eight classrooms of year one and two students. They identified two broad types of feedback: evaluative and descriptive. Evaluative feedback is judgemental and includes four categories. *Rewarding feedback* may consist of giving students stickers or allowing some to go to lunch first. *Punishing feedback* may be shown through destroying students' work or depriving students of something they enjoy. *Approving feedback* includes positive affirmations such as "Well done!" *Disapproving feedback* is negative, as when a teacher crosses out student work. Their definition of descriptive feedback also consists of four categories. *Specifying attainment* is linked with the use of models and/or criteria and identifies student progress towards achieving the desired aspects of learning. *Specifying improvement* is when teachers point out to students what needs to be improved. *Constructing achievement* involves students in self-assessing to some extent. In *constructing the way forward*, students have a role in deciding how to progress their learning.

A significant issue with this typology is that it does not include any evaluation of the effectiveness of the different categories of feedback because Tunstall and Gipps (1996) did not measure the impact of the different types of feedback on student learning. In spite of this, they assert, "the judicious combination of both evaluative and descriptive types of feedback by the teacher creates the most powerful support for learning" (p. 403). This statement is at odds with the findings of other researchers (Kluger & deNisi, 1996, Hattie, 1999) who generally found evaluative feedback to be less effective than descriptive feedback.

In their meta-analysis of types of feedback, Kluger and DeNisi (1996) discuss the effects of feedback interventions on performance. A feedback intervention is defined as "actions taken by (an) external agent(s) to provide information regarding some aspect(s) of one's task performance" (p. 255). Overall, feedback interventions improved performance but over one third decreased performance. The authors suggested this uneven pattern occurred because feedback decreased in effectiveness when it moved away from a focus on the task towards a focus on the self. For example, feedback that involved threats to self-esteem, and praise feedback about the task elicited small effect sizes whereas feedback about incorrect responses and low task complexity showed high effect sizes. These findings

are consistent with Hattie's meta-analysis (1999), which found that feedback focussed on extrinsic rewards and punishment had effect sizes below the average effectiveness.

The research of Kluger and deNisi (1996) and Hattie (1999) is relevant to coaching because it appears that many coaches and teachers lack an understanding about what constitutes effective feedback and they may have developed theories of practice around giving and receiving feedback that do not reflect research findings. For example Edwards and Green (1999) found that coaches trained in cognitive coaching frequently gave evaluative feedback such as the frequent use of "right" and "good" although a key aspect of the model was that this kind of feedback was not appropriate. In other studies teachers pressured coaches for evaluative feedback because they had received evaluative feedback in the past with clinical supervision (Showers & Joyce, 1996). Situations such as these can be overcome in at least two ways. Setting up a clear framework for the coaching process may help to reduce the likelihood of evaluative feedback, especially when the framework is constructed to unpack, engage with and challenge teachers' theories of practice. Such a framework is discussed in detail later in this section. Secondly, given the power of feedback in promoting learning, instead of removing feedback from a coaching model as recommended by Showers and Joyce (1996), both coaches and teachers engage in interactions that surface their beliefs about feedback and help them understand the types of feedback that improve achievement. One such model of feedback is discussed in the next section.

A model of effective feedback.

Hattie and Timperley (2007) have developed a model of feedback centred round answering three questions: "Where am I going in relation to my goals?" "How am I going in relation to my goals?" "Where to next?" They contend that when a person gives feedback in relation to these three questions, the effectiveness of the feedback is also influenced by the level of feedback. Three levels of feedback have been identified as highly effective in creating change for students and are likely to be as effective in changing teachers' practice. They include feedback about the task, feedback about the process and feedback that leads to self-regulation. A fourth level, feedback about the self has been shown to be problematic in terms of its effectiveness. Table 1 shows the four levels of feedback.

Table 1
A Model of Feedback: The Four Levels (Hattie & Timperley, 2007)

Level of feedback	Type of feedback	Description of feedback
Level 1	Feedback about the task	Corrects the learner's misunderstandings and may include directions to acquire more, different or correct information
Level 2	Feedback about process	Directs the learner to the learning processes involved
Level 3	Feedback that leads to self-regulation	Involves the learner being able to evaluate their learning accurately so they can continue to engage in the task
Level 4	Feedback about the self	Involves personal, evaluative comments

In this section, each of the four levels is discussed and then each level of feedback is analysed in relation to its potential to engage teachers' theories of practice through creating dissonance that leads to conceptual change. Figure 1 shows the links between feedback and conceptual change. Firstly feedback needs to engage with teachers' theories of practice. Secondly, if the teachers' theories of practice are discrepant with the feedback, dissonance is the result. Thirdly, for the dissonance to lead to conceptual change, the coach needs to be able to help the teacher resolve the dissonance through beginning the process of changing the teacher's conceptual frameworks.

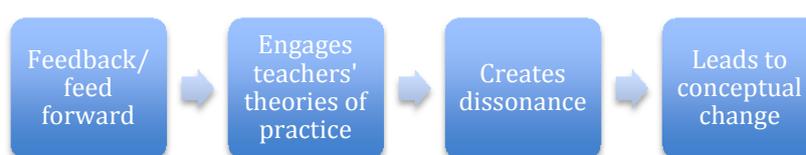


Figure 1. Links between feedback/feed forward and conceptual change.

Feedback about the task corrects the learner's misunderstandings and may include directions to acquire more, different or correct information. It can be powerful, especially when it focuses on faulty interpretation and not lack of information. Simple, rather than complex feedback about the task is more effective and too much feedback may overwhelm learners in the early acquisition phases of learning, resulting in them failing to apply the feedback (Kluger & deNisi, 1996). An example of feedback about the task is when a coach

helps the teacher to understand that his or her learning intentions for a lesson did not match the learning opportunities in the activities the teacher provided. The teacher may have been confused about what learning he or she intended students to gain during the lesson, or the teacher may not have considered the extent to which the planned activities supported the learning. Hopefully, the feedback discussion would result in a clearer shared understanding between the teacher and coach of how to align learning intentions to lesson activities.

The teacher's response to the feedback, however, will also be also mediated by his or her theories of practice because, whether tacit or known, theories of practice drive all the teacher's classroom decisions. If the teacher above believed that sharing the learning aims with students was an unnecessary imposition, no feedback about the quality of the learning intentions is likely to change his or her practice. Therefore when a coach gives feedback about the task he or she needs to consider, unpack and engage the theories of practice that may underpin the teacher's actions. For example, if the discussion revealed the teacher had a theory of practice that learning intentions were unnecessary, the coach may use strategies for creating dissonance such as discussing with the teacher relevant research on the effects of sharing the learning. Another strategy may be to demonstrate to the teacher an alternative approach by organising the teacher to observe colleagues where sharing the learning has improved student engagement and achievement.

Feedback about process directs the learner to the learning processes involved, including the concepts underlying the task and seeing relationships between kinds of learning. This level of feedback relates to the learner's strategies for error detection. Feedback about the process appears to be more effective than feedback about the task in promoting deep learning (Earley, Northcraft, Lee, & Lituchy, 1990) because of the more complex meta-cognitive strategies required. In the example above about learning intentions, the coach might initiate feedback about the process through engaging the teacher in a discussion about how he or she decided on the learning intentions and how he or she planned the activities. In developing an understanding of the teacher's thinking, the coach may be able to unpack, engage with and challenge the teacher's theories of practice that impacted on the teacher's decisions. For example, the teacher may reveal that he or she planned the activities first and the major driver was to engage the students because the lesson was the last period of the day and the class was often disruptive. The coach's discussion can then consider both the expressed constraints and the teacher's possible theory of practice that occupying students with interesting activities equalled successful

teaching and helping the teacher to resolve the tensions between sharing the learning and occupying students.

Hattie and Timperley (2007) state that feedback that moves the learner from the task to processing and from processing to self-regulation is most effective. Self-regulating learners are aware of the qualities of their own knowledge, beliefs, motivation and cognitive processing and they monitor how well their cognitive engagement matches the standards they set for successful learning (Butler & Winne, 1995). These learners are able to create internal feedback (whereas less effective learners depend on external agents such as coaches), and discern how and when to seek and receive feedback. A self-regulated teacher may begin the feedback discussion with a reflection of his or her progress in relation to the goal set for the observation and evaluate the extent to which he or she met that goal. The teacher may be aware not only of his or her actions, but the underlying theories of practice that led to the actions.

The hypothetical teacher in the example above gave him or herself feedback in relation to the goal and monitored his or her actions. He or she understood the theories of practice that underpinned his or her classroom practice. Because the teacher has already created dissonance in relation to his or her practice, the coach's role is to help the teacher resolve the dissonance in a way that begins the process of conceptual change. Self-regulation such as this does not, however, appear to be common. Brown and McIntyre (1993) found that although experienced teachers were able to give coherent accounts of their actions in the classroom, they could not describe what was in their minds as they made decisions. The researchers concluded that teachers do not generally monitor their own mental activities. Monitoring, according to Butler and Winne (1995) is the hub of self-regulated learning. It may be affected by the learner's choice of goals, by misjudging his or her progress towards the goals, by the learner becoming overwhelmed by cognitive demands during monitoring, or by motivational factors, such as setting performance rather than learning goals that undermine self-regulation. Each of these potential issues with monitoring may be addressed within a coaching model if the framework for the coaching process is carefully established and co-constructed with the teacher.

Feedback about self is not particularly effective because it does not provide the learner with answers to the three critical questions related to feedback: Where am I going? How am I going? Where to next? There is some debate about whether feedback about self

is actually feedback. In a recent article on feedback, Hattie (2012) omits it, discussing three, not four levels of feedback.

A coaching framework for feedback and feed forward.

A well-constructed framework for cycles of observation and feedback/ feed forward can help address many issues related to giving and receiving feedback and feed forward. This section discusses in detail one framework, practice analysis (Timperley, 2014), because its structure facilitates unpacking, engaging with and challenging teachers' theories of practice, bringing about conceptual change and creating dissonance throughout the observation process.

Practice analysis involves three stages. Firstly, there is a pre-observation conversation between the coach and teacher, in which the teacher's learning goals are set for the observation and criteria for success are co-constructed. Following the observation is an analysis of the teacher's practice, which is based on the goals and criteria established in the pre-observation meeting. Finally, new practices are identified, along with ways for the teacher to monitor the effectiveness of these practices. In each of these stages, teachers' theories of practice are unpacked, engaged and challenged.

During the pre-observation meeting, teachers may want to set performance goals rather than learning goals (Dweck & Leggett, 1988). A teacher focussed on performance goals typically selects goals in which they know they already have proficiency because they view the practice analysis as a form of appraisal of their teaching, rather than as a learning opportunity. The coach needs to be able to unpack the theory of practice underlying a decision like this, rather than rejecting the goal for a more challenging one, because the teacher is likely to subvert the process if he or she perceives it as an appraisal exercise. Once goals have been agreed between the coach and teacher, another significant aspect of the pre-observation discussion is developing success criteria for what the goals look like in the teacher's practice. Co-constructing success criteria may reveal differences between the coach's and teacher's theories of practice. Suppose a teacher's goal is to model how to write a literature response. The teacher suggests success criteria that indicate he or she views modelling as solely providing an exemplar for students to unpack. The coach, on the other hand believes that successful modelling in this context should involve the teacher "thinking aloud" the process of writing the response. When dissonance such as this is created, a discussion needs to take place in which both the coach and teacher state their

beliefs about what constitutes effective modelling, which may involve studying relevant research. As a result of the discussion the teacher and/or coach should have greater clarity and a shared understanding about the role of modelling in the lesson. Additionally, either the coach or teacher may have been challenged to change their theories of practice around what modelling entails.

The second stage of practice analysis takes place after the observation and involves an analysis of the teacher's practice. During this stage the coach should be focussing on the teacher's theories of practice, especially when the observation data indicates a difference between the goals and criteria and what was actually observed. For example, if the teacher in the example above did not model in ways consistent with the success criteria, there would once again be a discussion in which dissonance was created. The coach may seek to find out whether the teacher understood the criteria that had been developed, or whether there were reasons why the teacher deviated from the goals and the agreed criteria for success.

Developing new practice is the third stage of practice analysis. The teacher and coach co-construct new practice and establish criteria for the teacher to monitor how effectively he or she is instituting the new practice. In the example above, this stage may entail further discussion about what modelling looks like in the teacher's learning area and how he or she could enact it with the class. The new practice could involve the teacher observing a colleague modelling a similar topic or studying a video involving modelling. The teacher then creates dissonance by reflecting on how what was observed or viewed was more effective in improving student achievement than his or her previous practice. The teacher also devises on ways to monitor the effectiveness of his or her own future practice. This stage of practice analysis is crucial for developing self-regulated learners because it involves the teacher monitoring his or her progress in developing new practice when the coach is not present.

Practice analysis is informed by research on how people learn (Bransford et al., 2000) and interpersonal effectiveness (Argyris & Schön, 1974). There are similarities between practice analysis and open to learning conversations (Robinson & Le Fevre, 2011). Six skills provide a framework for open to learning conversations. The first skill is providing one's own point of view, along with supporting reasons. In a practice analysis this may involve the coach explaining what he or she saw during the observation. The

second skill is careful listening to the other person's viewpoint. Here, the coach asks probing questions to elicit the teacher's theory of practice that lies beneath the observed practice. The third skill involves checking one's understanding of the other's point of view, through the coach clarifying and summarising what the teacher has said. The fourth skill entails helping the other person to consider alternative points of view and the fifth skill is openly examining one's own assumptions. These two belong together because the coach expresses his or her own theories of practice as alternatives are discussed. This enables the teacher to understand why the coach has suggested the alternative practice. The sixth skill is to reach an agreement of the next steps. In a practice analysis, these steps may be iterative, rather than linear, depending on a range of factors, including how tacit the teacher's (and coach's) theories of practice are and the level of dissonance created. How well the coach explains his or her point of view, probes, clarifies and summarises before suggesting an alternative point of view and establishing next steps determines the effects of the process on teacher practice.

Training coaches to facilitate conceptual change.

Even with a framework such as practice analysis, a high level of skill is needed to unpack, engage with and challenge teachers' theories of practice. Two studies are discussed because they provide contrasting illustrations of the importance of training if coaches are to be able to facilitate conceptual change in teachers. The San Diego literacy reform (Hubbard et al., 2006) employed a coaching model but provided the coaches with insufficient training, with the result that the reform failed in the secondary school sector. In contrast, the study of Timperley et al. (2008) gives some direction of how to train coaches so that they can effect conceptual change in teachers.

The San Diego literacy reform aimed to make substantial changes in the way teachers taught literacy across both elementary and high schools in a large district that included around 150 schools. Teachers needed to make conceptual changes to be able to implement the reforms, yet many of the conditions that promote conceptual change were not embedded in the reform. The professional development and learning opportunities were not designed to unpack, engage with and challenge teachers' theories of practice. Teachers were exposed to readings and research that could have resulted in dissonance but there was little follow up with individual teachers and as a result teachers and principals "listened

respectfully, did the activities required of them during these sessions, and then returned to their sites to continue doing much as they had always done” (Hubbard et al., 2006, p. 130).

Developing a culture of the teachers as a learning community was also lacking. This happened partly because of the pace of the reform; all teachers were inducted into the new literacy approach simultaneously. Therefore when teachers underwent professional learning and development, they did not return to schools in which the reform messages were uniformly valued or reinforced in classroom practice. A peer-coaching model, which potentially could have helped teachers develop the required specialised skills, was employed. The peer coaches were trained in the instructional strategies the implementers wanted teachers to use, but the training did not provide the coaches with the theory and practice regarding when and how to apply particular coaching techniques in the complexity of a school environment. Some coaches struggled to make on-the-spot analyses in their discussions with teachers that could trigger conceptual change. Some coaches challenged aspects of a teacher’s practice and encountered hostility, which they did not know how to manage. The researchers concluded that the teaching and learning that occurs between the coach and teacher is difficult and skilled work but they did not suggest how the reformers could have structured this important part of the implementation to achieve a greater depth of change in the teachers’ practice.

Timperley et al. (2008) also describe the challenges involved in helping coaches to effect conceptual change. Their study focussed on how to work with coaches of primary school teachers to develop the necessary skills. Like the San Diego reform, the coaches were originally trained in literacy instruction, rather than in how to analyse teacher practice and provide feedback. Baseline data from transcripts of audio taped discussions between coaches and teachers were analysed according to a theoretical framework that emphasised engaging with the teachers’ current theories of practice, jointly deconstructing practice and co-constructing new practice and developing a self-regulated approach to learning. Analysis of the transcripts showed that most coaches were making indirect suggestions that were having a minimal impact on subsequent teacher practice.

Coaches were then required to record a feedback conversation with one of the teachers and they participated in professional learning around analysing the feedback conversation using the theoretical framework outlined above. Co-construction during each part of the feedback discussion was emphasised and with coaches being encouraged to give

a reason for any questions asked so that teachers understood the purpose of the question, rather than experiencing an inquisition.

The theoretical framework was refined to include two additional categories: linking suggestions about alternative practice to theory and the explicit development of self-regulation. As a result of the training, coaches implemented the new learning but many found it challenging to engage with the teachers' theories of practice, which suggests "this was a difficult skill to enact" (Timperley et al., 2008, p. 10). Nevertheless, teachers rated post-training discussions as very useful and said they intended to change their practice as a result.

A second phase of training for the coaches included further refinement of the theoretical framework, explicit training in theories of learning and how to engage teachers' theories of practice during the pre and post observation discussion. Subsequently an analysis of 60 transcripts and questionnaires showed that the coaches improved in their engagement of teachers' theories of practice. Teachers continued to rate the usefulness of the discussions highly and reported changes they intended to make in their practice as a result of the discussions (Timperley, 2014).

This study demonstrates that specific and detailed training is needed for coaches to be able to unpack, engage with and challenge teachers' theories of practice to effect changes in teacher practice. The training employed both a cognitive and socio-cultural approach to conceptual change. The coaches were shown a discrepant event (the data that teachers did not intend to change their practice or were unable to do so), which created dissonance in relation to the impact of their coaching on teachers' practice. Coaches were then introduced to an alternative way of working in the form of the practice analysis framework. Equally importantly, the coaches' training emphasised the importance of collaborative learning between the coach and teacher at every stage of the process. This embedded all the learning in a socio-cultural context.

Gaps in the research

Two gaps in the research informed the development of this thesis. Firstly, although practice analysis (Timperley, 2014; Timperley et al., 2008) and open to learning conversations (Robinson & Le Fevre, 2011) provided frameworks for coaches to use in their discussions with teachers, the frameworks did not provide coaches with the kinds of

questions and statements that could help them unpack, engage with and challenge teachers' theories of practice. Additionally, the research of Timperley et al. (2008) did not include teachers or coaches in the secondary education sector. This thesis set out to determine whether coaches of secondary teachers faced similar issues as those in the primary sector in unpacking, engaging with and challenging teachers' theories of practice. To address these gaps in the research, Study 1 was a small study that aimed to investigate the types of feedback and feed forward coaches gave secondary teachers and what changes the teachers made as a result. For Study 2 a tool, a rubric, was developed to help coaches unpack, engage with and challenge teachers' theories of practice. The tool was trialled with a small group of coaches who were trained in its use, and it was evaluated in terms of its effectiveness in shifting both coaches' and teachers' practice. In Study 3 the tool was refined, employed with and evaluated using a larger group of coaches and teachers. Chapter 3 addresses the methodology used for each of the three studies and gives a rationale for why these methods were selected.

Chapter 3: Methodology

This chapter describes the methodological approach to the three studies that comprise the thesis. It examines which methods would be successful in addressing the key question: “How can coaches improve feedback and feed forward to teachers through unpacking, engaging and challenging teachers’ theories of practice?” Two interrelated methodological issues arose in relation to this question. The first issue concerned how to measure improvement in the coaches’ feedback and feed forward. Incorporated in this issue were how to classify coaches’ feedback and feed forward that accessed teachers’ theories of practice, and what improvement looked like in the coaches’ practice. The second issue was how to access the teachers’ thinking about the feedback and feed forward they received from the coaches, specifically the way coaches unpacked, engaged with and challenged the teachers’ theories of practice. Also important was the teachers’ description of the impact of their coaches’ feedback and feed forward on their subsequent classroom practice. How these issues were addressed in the methodology and design across and within the three studies is discussed, along with reasons as to why the design was appropriate to address the research questions. Ethical considerations are included. Methods used to collect and analyse the data are also described and a rationale for using these methods is provided.

Study Design

The overall design was a multi-phase study. Creswell (2014) identifies four characteristics of this type of study: it consists of several projects that build on one another over a period of time to address a common objective. The design of this thesis met each of these characteristics. It consisted of three separate but related studies; the findings from Study 1 informed the design of Study 2 and Study 2 informed the design of Study 3. Together, the three studies spanned five years. An overarching objective for all three studies was to investigate how to help coaches improve their feedback and feed forward to teachers so that the feedback and feed forward impacted on teachers’ practice. A multi-phase study was appropriate to address the research question because there is little existing research into the kinds of feedback and feed forward that are effective in shifting the practice of secondary teachers. This study design allowed the researcher to systematically explore the effectiveness of coaches’ feedback and feed forward. Study 1 explored the levels of feedback and feed forward coaches were currently giving teachers and the effects on teachers’ practice. Study 2 was constructed from the findings from Study 1 and explored

the extent to which a tool, and training in its use, would improve coaches' feedback and feed forward and consequently teachers' practice. Study 3 built on the findings from Study 2 and explored the effect of improvements to the tool and training on coaches' feedback and feed forward and teacher practice.

Although many multi-phase studies employ mixed methods (Creswell, 2014), the study design for this thesis incorporated an interpretivist/constructivist approach within a qualitative design. Each of these terms is defined and discussed. A rationale is provided as to why a qualitative interpretivist/constructivist approach was most appropriate to address the overall research questions.

An interpretivist/constructivist approach.

An interpretivist/constructivist approach to research is concerned with how people construct their experiences and their realities, and the contexts that inform and shape their actions and activity (Holstein & Gubrium, 2011). In an interpretivist/constructivist approach there is no objective reality that can be discovered by researchers and replicated by others (Miles & Huberman, 1994; Walsham, 1993). Rather, both participants and the researcher construct interpretations of meaning as they each bring to the research study "the meaning-making activity of the human mind" (Crotty, 1998, p. 58). An important issue in an interpretivist/constructivist approach is how the researcher establishes interpretive validity. This issue is discussed later in this chapter.

Studies 1, 2 and 3 are interpretivist/constructivist because the actions, understandings and perceptions of the teachers, and in Study 3 the coaches, were interpreted and constructed by the participants and researcher. The teachers interpreted and constructed their perceptions of the feedback and feed forward they had earlier received from their coaches. In Studies 2 and 3 the teachers also interpreted and constructed how their theories of practice were unpacked, engaged with and challenged by their coaches. Additionally, in Study 3 the coaches interpreted and constructed how they had accessed and, if necessary, challenged the teachers' beliefs during the pre and post observation discussions. The researcher also interpreted the actions and understandings of the participants through coding the interactions between the coaches and teachers and through the selection of material from the interview transcripts. These interpretive decisions formed part of the sections on analysis of data for each study in Chapters 4, 6 and 7.

An interpretivist/constructivist approach suited the study design because the studies aimed to understand how the feedback/feed forward discussions between coaches and teachers shaped teachers' perceptions of their beliefs and actions. An interpretivist approach to the data from teachers and coaches enabled the researcher to establish and explain patterns and commonalities within and across the three studies.

A qualitative design.

All three studies employed a qualitative study design. It is difficult to define qualitative research because qualitative inquiry is often complex, drawing from a range of traditions, paradigms and approaches (Denzin & Lincoln, 2011). A qualitative approach may include grounded theory, ethnographic or narrative research as listed by Creswell (2012); equally, a qualitative approach may not fit neatly into any of these designs. Within this complexity, Maxwell (2013) provides a broad definition that qualitative research aims to help people better understand the meanings and perspectives of those who are studied, how these perspectives are shaped by, and shape, people's physical, social and cultural contexts, and the specific processes that are involved in maintaining or altering these phenomena and relationships. A qualitative approach suited this research because each study aimed to understand the meanings and actions that teachers reported they constructed from their coaches' feedback and feed forward. Studies 2 and 3 also aimed to investigate the extent to which an intervention would alter the teachers' meanings and actions. Rather than using a quantitative approach to test an existing theory, (Creswell, 2014), the thesis progressively developed and tested theories about how to improve coaches' feedback and feed forward so that it impacted on teachers' classroom practice.

The progressive nature of the design of the three studies was another reason why a qualitative approach suited this research. Creswell (2014) states that one of the characteristics of qualitative research is that "the initial plan for research cannot be tightly prescribed and some or all phases of the process may change or shift after the researcher enters the field and begins to collect data" (p. 186). This describes what happened during Study 1. The researcher realised that she needed to adapt the research focus for Study 2 when findings from Study 1 indicated that the levels of coaches' feedback and feed forward were less important in changing teachers' practice than the coaches' engagement with teachers' theories of practice.

Although Maxwell's (2013) definition is helpful in clarifying the features of a qualitative approach, it does not give any direction about the methods appropriate in a qualitative study. Denzin and Lincoln (2011) claim that qualitative research does not have a set of methods or practices that is distinctly its own but it draws from a range of methods and approaches, often employing more than one, to gain a better understanding of the subject matter. A qualitative researcher may be described as a bricoleur, a maker of quilts, who weaves together a sometimes unusual mixture of methods and approaches as necessary to address the research question (Denzin & Lincoln, 2011). When existing tools and techniques are inadequate for the research study, the bricoleur invents new ones.

Bricolage is an apt description for the designs of Studies 2 and 3. At times the researcher employed designs and methods that are more common in quantitative studies. For example, Study 3 was quasi-experimental; a rationale for choosing this design is detailed below. Interviews, a feature of all three studies, were analysed both qualitatively and quantitatively and teacher questionnaires were included in Studies 2 and 3. Bricolage was a suitable approach to address the research issues in the three studies because, as Brown and McIntyre (1993) demonstrated, it is not easy to access teachers' thinking about their practice. To try to gain an understanding into teachers' thinking, an unusual mixture of methods and approaches was employed.

A bricolage study by Timperley et al. (2008) was successful in gaining some insight into why teachers did or did not change their practice as a result of the coaching process. Therefore this study informed methods used in Studies 2 and 3. Timperley et al. (2008) used both qualitative methods such as analysing transcripts of discussions between coaches and teachers, and quantitative methods in the form of teacher questionnaires. The data from the questionnaires were used to interrogate the transcripts with a new lens to seek more information that might explain the teachers' responses. This study showed that different methods could be successfully woven together to create a "pieced-together set of representations that are fitted to the specifics of a complex situation" (Denzin & Lincoln, 2011, p.4).

Table 2: Study Design summarises the aims, participants, phases and data collection procedures of each study. The arrows are intended to convey that the findings from Study 1 informed the design of Study 2, and the findings from Study 2 informed the design of Study 3

Table 2
Study Design



Study	Study 1	Study 2	Study 3
Aims	<ul style="list-style-type: none"> To determine whether some levels of feedback were more effective than others in changing teachers' practice To develop an understanding of how teachers changed their concepts about teaching and learning as a result of feedback 	<ul style="list-style-type: none"> To help coaches unpack, engage with and challenge teachers theories of practice with the result that teachers made changes in their practice To develop a tool to help coaches access teachers' theories of practice 	To help coaches develop a discussion with teachers in which coaches' and teachers' theories of practice were explored and discussed with the result that teachers made pedagogical changes in their practice
Participants	2 coaches 4 teachers	4 coaches 8 teachers	6 coaches 18 teachers
Phases	One phase of data collection to ascertain types of feedback and feed forward coaches used and their reported effect on teachers' practice. No training of coaches involved.	Phase 1: data collection to ascertain coaches' current practice in giving feedback and feed forward and the reported effects on teachers' thinking and practice.	Phase 1: <ul style="list-style-type: none"> Data collection to ascertain coaches' current practice in giving feedback and feed forward and the reported effects on teachers' thinking and practice. Involves new participant coaches and teachers
		Phase 2: <ul style="list-style-type: none"> Development of tool (rubric) Training for coaches in use of rubric 	Phase 2: <ul style="list-style-type: none"> Training for coaches in use of rubric and practice analysis
		Phase 3: <ul style="list-style-type: none"> Data collection to identify changes in coaches' and reported changes in teachers' thinking and practice Refinement of tool (rubric) 	Phase 3: <ul style="list-style-type: none"> Data collection to identify changes in coaches' and reported changes in teachers' thinking and practice

Procedures	<ul style="list-style-type: none"> • Audio taped a total of 4 post-observation feedback discussions between coaches and teachers • Interviewed 4 teachers about their feedback discussion with coach 	<ul style="list-style-type: none"> • Audio taped a total of 8 post-observation feedback discussions between coaches and teachers (Time 1) • Interviewed 8 teachers about their feedback discussion with coach and administered questionnaire (Time 1) • Developed rubric • Trained coaches in use of rubric • Audio taped a total of 6 post-observation feedback discussions between coaches and teachers (Time 2) • Interviewed 4 teachers about their feedback discussion with coach and administered questionnaire (Time 2) • Revised rubric 	<ul style="list-style-type: none"> • Audio taped a total of 18 observation feedback discussions between coaches and teachers (Time 1) • Interviewed 18 teachers about their feedback discussion with coach and administered questionnaire (Time 1) • Interviewed 6 coaches about their feedback discussions with teachers (Time 1) • Trained coaches in use of revised rubric and practice analysis • Audio taped a total of 18 observation feedback discussions between coaches and teachers (Time 2) • Interviewed 16 teachers about their feedback discussion with coach and administered questionnaire (Time 2) • Interviewed 6 coaches about their feedback discussions with teachers (Time 2)
Data collection	<ul style="list-style-type: none"> • Audiotape of post-observation discussion between coaches and teachers • Audiotape of interviews with teachers 	<ul style="list-style-type: none"> • Audiotape of post-observation discussion between coaches and teachers (Time 1 and Time 2) • Audiotape of interviews with teachers (Time 1 and Time 2) • Teacher questionnaires (Time 1 and Time 2) • Audiotape of coaches' training 	<ul style="list-style-type: none"> • Audiotape of observation discussion between coaches and teachers (Time 1 and Time 2) • Audiotape of interviews with teachers (Time 1 and Time 2) • Teacher questionnaires (Time 1 and Time 2) • Audiotape of interviews with coaches (Time 1 and Time 2) • Audiotape of coaches' training

Design features of each study.

Because all three studies shared the same methodology, this section addresses only the specific design features of each study. A rationale is provided for the choice of each design. The advantages and challenges of each design are discussed along with how Study 1 shaped the design of Study 2 and how Study 2 shaped the design of Study 3.

Design of Study 1.

The aim of Study 1 was to investigate what feedback from coaches was effective in changing teachers' practice. Study 1 was small; at its centre was data collection of audiotapes of four post-observation feedback discussions between coaches and teachers. After the audiotapes had been transcribed the researcher conducted semi-structured face-to-face interviews with the teachers participating in each feedback discussion to try to establish what feedback the teachers perceived had been effective in changing their practice. This design was appropriate for the aim of the study because it consisted of verbatim naturally occurring feedback discussions between teachers and coaches that were part of a normal cycle of observation and feedback. The audiotapes allowed the researcher direct access to the aspect being investigated (Perakyla & Ruusuvuori, 2011). Naturally occurring is a contestable concept, however, because the very act of taping may have affected the content and style of the discussions. This issue was partially mitigated through questioning teachers about what kinds of feedback motivated them to change. If a coach changed his or her style as a result of audio taping the discussion, teachers had the opportunity to describe these differences in relation to effective or ineffective feedback. No teacher referred to any changes in a coach's style or content.

Interviewing teachers face-to-face was another advantage because face-to-face interviews yield higher response rates and allow for longer responses than other surveying methods (Neuman, 2003, p. 290). It was hoped that as teachers elaborated on their responses during the interviews, they would unpack their thinking about the feedback they had received. Using semi-structured interviews allowed the researcher to ask supplementary questions that probed teachers' thinking. Theoretical assumptions and issues involved in using interviews are detailed in the section on data gathering instruments and procedures.

Challenges involved in using this design included the small number of participants in the study, how to access teachers' thinking and the use in this design of teachers'

perceptions of their recall and how they used the feedback. Study 1 was small, involving two coaches and four teachers, because the researcher originally intended that Study 1 would be a pilot study that would shape the aims and designs of the main study. In the initial plan, if some levels of feedback were more effective than others in changing teachers' practice, the main study would focus on providing professional development to coaches on using the most effective levels of feedback. Additionally, methods used in Study 1, such as the interview questions, would be refined for the design of the main study. In spite of its size, the findings from Study 1 were consistent with findings from a larger study (Timperley et al., 2008). The challenges involved in accessing teachers' thinking about the feedback they had received are discussed later in this chapter in the section on interviews in data gathering instruments and procedures.

The third challenge in this study was the use of teachers' perceptions. Teachers may have recalled more feedback and they may have used more or less feedback than they stated in their interviews. One way to mitigate this challenge was to use an artefact (the transcript of the post-observation discussion) as a guide for the interview. Maxwell (2013) believes that artefacts such as transcripts have a significant role in interviews because they provide "important contextual information, a different perspective from the interviews, and a check on your interview data" (p. 88). In all three studies transcripts were used to improve the interview data in each of these ways. Through questioning teachers about what they were thinking during specific incidents of feedback in the post-observation discussion, teachers provided contextual information by explaining why they reacted to feedback in a certain way. Teachers also sometimes stated that they did not believe in what they had seemingly agreed to during the feedback discussion. In these ways, the transcripts served as anchors in the interviews because they supported the teachers' recall of their perceptions of the feedback and also enabled the researcher to develop a more precise understanding of the teachers' perceptions of how they made meaning from the coaches' feedback.

How Study 1 informed Study 2.

The major way that Study 1 informed Study 2 was that the findings from Study 1 propelled the research into a new direction. Study 1 had aimed to determine whether some levels of feedback were more effective than others in changing teachers' practice but the findings from Study 1 suggested that levels of feedback were not a major factor in relation to whether teachers made changes in their practice. Therefore a new design was needed to

meet the revised aims of Study 2. Nevertheless, data gathering instruments used in Study 1, including the audiotapes of discussions between the coaches and teachers and teacher interviews, yielded valuable information so both instruments and their accompanying procedures were incorporated into Study 2.

Design of Study 2.

The aim of Study 2 was to help coaches improve their feedback /feed forward through engaging with teachers' theories of practice. To achieve this aim, a tool, the Engaging with Teachers' Theories of Practice (ETTOP) rubric was developed and coaches were trained in its use. The development of the rubric is discussed in Chapter 5. This section describes Study 2 as an exploratory three-phase design. A rationale is given as to the suitability of this design for Study 2, the advantages and challenges of the design and how Study 2 informed the design of Study 3.

Given the lack of specific measures or instruments available to address how coaches could improve their feedback and feed forward to teachers, exploration was needed to develop a tool that supported coaches in unpacking, engaging with and challenging teachers' theories of practice. Phase 1 involved an exploration of the types of questions and statements coaches used in their post-observation discussions with teachers that unpacked, engaged with and challenged teachers' theories of practice. These questions and statements were then incorporated into the development of the ETTOP rubric (Phase 2). The researcher tested the rubric by gaining feedback from coaches about its effectiveness. Phase 3 involved analysing a second round of the transcripts of coaches' and teachers' post-observation discussions and comparing the types of questions and statements with the first round of data collection. The ETTOP rubric was then revised.

An advantage of using an exploratory three-phase design is that it allows the researcher to identify measures that arise out of data gathered from participants, rather than using a predetermined set of variables (Creswell, 2012). Because the measures used reflect actual practices or perceptions of the participants, the instrument developed may be more robust. For example when Myers and Oetzel (2003) conducted an exploratory study, they found that assumptions in the literature about how people became assimilated into an organisation were not consistent with the perceptions of their interview participants. This enabled the researchers to develop an instrument (a questionnaire) that more accurately measured the degree to which participants felt assimilated into their organisations.

The research of Myers and Oetzel (2003) demonstrated the importance of gathering and analysing reliable data during Phase 1. It informed the design of Study 2 because the researcher sought a more robust set of data with which to develop the ETTOP rubric than afforded by the transcripts from the four coaches and eight teachers in Study 2. She also studied transcripts from a literacy project that used observation discussions between teachers and coaches from the primary sector (Timperley et al., 2008). Access to these transcripts enabled the researcher to establish some patterns about the types of questions and statements that were likely to be effective in accessing teachers' theories of practice across two contexts.

The challenges of an exploratory three-phase design are the length of time the process takes, and the difficulty of specifying in detail what subsequent phases will look like, because much is predicated on the results of the first phase (Creswell & Plano Clark, 2011). The issue of time is acknowledged; fieldwork for Study 2 spanned six months. The transcripts from the primary literacy project discussed above (Timperley et al., 2008) helped to mitigate the difficulty of understanding what subsequent phases would entail because the researcher was able to note patterns in questions and statements before the first phase of data was collected in Study 2.

An exploratory three-phase design was suitable for addressing the aim of Study 2, which was to develop a tool that helped coaches unpack, engage with and challenge teachers' theories of practice, with the result that teachers made changes in their practice. Prior to the ETTOP rubric there were no specific tools available to support coaches in accessing teachers' theories of practice. The exploratory three-phase design provided a structure in which the tool could be developed and tested.

How Study 2 informed Study 3.

As a result of Study 2 changes were made to instruments, the ETTOP rubric, and some procedures for Study 3. Instrument refinement included altering the kinds of questions asked in interviews with teachers and in the questionnaires. The purpose of these changes is explained in Chapter 7. How the ETTOP rubric (Version 1) was refined is discussed in Chapter 5. Procedures used in Study 3 were similar to Study 2 but the timing was changed to address the problem of participant attrition. Study 2 began halfway through the school year, and one coach did not complete her Time 2 observation discussions with enough time before school closed for the year for the researcher to interview the teachers.

Consequently, Study 3 began at the start of the school year. There were also adaptations to the content of the coaches' training. Because instruments and the coaches' training were different for Studies 2 and 3, these aspects are described in general terms later in this chapter but elaborated on in subsequent chapters.

Design of Study 3.

Study 3 was quasi-experimental, a one-group pretest-posttest design. In this design the group of participants is pretested, then they experience the treatment, and finally they are posttested on the same measure to examine whether the treatment effected any changes. In Study 3 the pretest consisted of taped discussions between the coach and teachers, an interview with, and a questionnaire from each teacher, and an interview with each coach (Phase 1). The treatment involved training the coaches in the use of the rubric (Phase 2). The posttest (Phase 3) repeated all the elements of the pretest with the same coaches and teachers. Participants were not randomly assigned to receive the treatment, as in a randomised experiment, but self-selected. Threats to validity as a result of self-selection are discussed below along with other threats.

Attributing changes to the treatment is asserting a causal relationship, which means that the cause preceded the effect, was related to the effect and there was no other likely cause for the effect other than the cause (Shadish et al., 2002). It is challenging to establish that there was no other likely cause, because changes in practice could be due to factors other than the treatment. For example, if the posttest data in Study 3 showed that the coaches accessed teachers' theories of practice more than in the pretest data, differences between the pre and posttest could be because the coaches would have improved anyway or they had developed a warmer professional relationship with the teacher over the duration of the intervention rather than as a result of the training the coaches received.

Shadish et al. (2002) suggest, however, that describing whether consequences are attributable to varying a treatment (causal description) is only part of the picture regarding causality. The other part is examining why and how the causal relationship occurs (causal explanation). The authors assert that "what experiments do best is to improve causal descriptions; they do less well at explaining causal relationships." (p.12). Maxwell (2004) believes that qualitative research can produce strong evidence of causal relationships through focussing on causal processes, by which some events influence others, that result in particular outcomes.

In Study 3, causality was strengthened through both causal description and causal explanation. Causal description included investigating whether coaches would have improved naturally over time without training, by comparing the Time 1 data from coaches in Study 2 who began in the middle of the year with Time 1 data from coaches in Study 3, who began at the start of the school year. If coaches were likely to improve naturally over time, the coaches in Study 2 at Time 1 would have out-performed the coaches in Study 3 at Time 1. Another way causal description was strengthened was that pre and posttests were analysed to determine the effects of the treatment, that is, training the coaches.

Causal explanation was investigated through triangulating data from several sources. During the interviews with coaches and teachers, the researcher probed how the coaches and teachers perceived their thinking and practice had changed about how theories of practice were unpacked, engaged with and challenged from Time 1 to 2. This data was compared with an analysis of teachers' questionnaire responses and changes in the coaches' practice between Time 1 and Time 2 to determine whether a causal relationship could be established among the data sources. If there seemed to be a causal relationship, the researcher re-examined the data for possible explanations as to why and how the causal relationship had occurred. Including both causal description and causal explanation in the experiment was important because the aim of Study 3 was not centred around the efficacy of the rubric but how to help coaches improve their feedback to teachers through engaging, unpacking and challenging teachers' theories of practice.

Shadish and Luellen (2006) list a number of threats to internal validity in a quasi-experimental study. Those that are relevant to Study 3 are the selection of participants, attrition, testing and instrumentation. Each of these threats is discussed using the three questions suggested by Shadish and Luellen (2006): how would the threat apply in this case? Is the threat plausible rather than just possible? Does the threat operate in the same direction as the observed effect so it could partially or totally explain that effect? (p. 541). Selection was a threat to validity because all the coaches were volunteers and therefore they may have been more motivated to change their practice than coaches who did not volunteer. This threat is plausible due to the time commitment involved in participating in the research. Some coaches who were invited to participate declined because they stated they did not have time to commit to the research. Therefore, those who did participate were likely to have weighed up the time costs in relation to benefits to their practice. This threat

indicates a limitation of the research: it is not possible to generalise the findings to all coaches working with teachers in schools.

The second threat to validity was attrition. Because the number of participating coaches was small, any loss of participants may have affected the findings. The threat was plausible because the participants were volunteers and there was no compulsion for them to complete the study. To mitigate this threat in Study 3, the intervention was timed to begin at the start of the school year so that coaches did not run out of time to complete the third phase. The third threat was testing. The coaches and teachers knew that their discussion was being audio taped for the purpose of the research. Therefore, the coach, the teacher or both may have acted differently if the discussion had not been audio taped. It is very plausible that taping the discussion did influence the content and style of the coaches' and teachers' interactions. However, this effect was likely to be similar in the pre and posttest, therefore comparisons between the pre and post discussions were valid. The final threat was instrumentation. Each pre and post discussion was coded. Changes in coding to a coach's pre and post discussion were used as one measure to determine the effects of the treatment. Coding for each study was checked using interrater reliability. Details of how the coding was checked for interrater reliability are included in the procedures for each study.

Another threat to validity was confirmation bias. Because the researcher had a vested interest in the success of the intervention, she may have given more weight to data and data sources that confirmed, rather than disconfirmed the desired outcomes (Robinson & Lai, 2006). Confirmation bias was mitigated in four ways. Firstly, multiple sources of data were triangulated, including coaches' feedback, teachers' and coaches' interview responses and teachers' questionnaires. Secondly, each data source was analysed, using a framework that was developed from participants' responses, rather than the researcher's pre-suppositions. Thirdly, the coding of the coaches' feedback was checked using interrater reliability as discussed above. Fourthly, the researcher tested the validity of her conclusions through considering disconfirming evidence such as the possibility that coaches may have improved naturally, also discussed above.

Research Methods

This section discusses methods that were used to collect, analyse and interpret data. It begins with a discussion of triangulation, because the researcher's decision to triangulate the data directed her choices of data gathering instruments. A rationale is provided for

using triangulation in Studies 2 and 3. Triangulation involves using several methods, so the focus of the discussion moves to why the methods used were defined as complementary rather than multiple. Data gathering instruments are described, and a rationale is given for their use. Finally, there is a description of data analysis procedures.

Triangulation

Studies 2 and 3 used triangulation to gain a deeper understanding of the teachers' thinking processes in relation to their theories of practice. Of the four types of triangulation identified by Denzin (1989), the studies used methodological triangulation (between method triangulation) in which two methods are combined, for example an interview and questionnaire. The rationale for methodological triangulation is that the weaknesses of one method are often the strengths of the other method and by combining them researchers can draw together the best of each method and at the same time mitigate their limitations. The purpose of using methodological triangulation in Studies 2 and 3 was not to offset the limitations of each method but to gain more insight into the relationship between how coaches' unpacked, engaged with and challenged teachers' theories of practice and the effects on teachers' thinking and subsequent actions.

This aim is in line with how Flick (2009) defines triangulation as a process whereby researchers examine an issue from different perspectives using several methods and/or theoretical approaches. Triangulation enhances quality in research when it produces knowledge on different levels rather than through one approach alone. In this definition triangulation is not merely a tool for enhancing the accuracy of a study to establish validity (Creswell, 2011) but it is fundamentally an attempt to gain an in-depth understanding of the phenomena being studied (Denzin & Lincoln, 2005). The definition of Flick (2009) aligns with triangulation as complementarity, which is when different research methods address different aspects of a phenomenon (Smith, 2006). Erzberger and Kelle (2003) describe complementarity using the metaphor of a jigsaw puzzle. Each piece of the puzzle provides different information but it is only when the pieces are fitted together that a broader and deeper understanding is generated. The jigsaw puzzle metaphor also reinforces Green, Camilli and Elmore's (2006) statement that complementarity studies the "relationships between two or more phenomena" (p. xvii). Just as pieces in a jigsaw puzzle are fitted together through their spatial relationship, complementarity seeks to explore the relationships between different forms of data.

The metaphor of a jigsaw puzzle is not intended to suggest that complementarity may address different aspects of a phenomenon with only one possible solution. Many researchers assume that confirmation is the only possible reason for triangulation (Mathison, 1988) whereas the purpose of complementarity is to broaden or deepen an understanding of the phenomena studied. Sometimes the findings are inconsistent or contradictory which provides the researcher with an opportunity to revise his or her theoretical assumptions or to interrogate the data at a deeper level. For example, Timperley et al. (2008) used complementary methods to find patterns in the coaches' discussions with the teachers that had been previously overlooked.

Complementary Methods

There is little agreement among researchers about the meaning of the terms complementary methods, mixed methods and multiple methods (e.g. Smith, 2006; Tashakkori & Teddlie, 2003). Green, Camilli and Elmore (2006) ask the question "what relationships need to exist for methods to be defined as complementary, rather than mixed?" (p. xvii). They suggest that complementary methods can be defined as focussing on the concept of relationships between two or more phenomena. In Studies 2 and 3 the relationship between a teacher's responses in the interview and questionnaire was explored to develop a deeper understanding of the extent to which the teacher's theories of practice were engaged during the coach's feedback and feed forward.

However, the definition of multiple methods also suggests a relationship between methods. Smith (2006) states that multiple methods "employ at least one quantitative and one qualitative method to produce knowledge claims" (p. 459). The term "employ" is problematic. For example, does a study employ multiple methods when the researchers include some open-ended survey questions in an otherwise closed items questionnaire? Tashakkori and Teddlie (2003) state that a mixed methods study must include not only quantitative and qualitative data collection but also utilise both quantitative and qualitative data analysis techniques. Although Studies 2 and 3 included statistics, tables, and numbers, there is no attempt at statistical analysis, which is a feature of quantitative research (Creswell, 2011). Therefore Studies 2 and 3 are better suited to the definition of complementary, rather than mixed, or multiple methods.

Complementary methods, including semi-structured interviews and questionnaires, were used in Studies 2 and 3 to create a more complete picture of the teachers' beliefs

about their learning processes than a single method would achieve. As Brown and McIntyre (1993) observed, teachers do not generally carry around already formulated the professional knowledge that guides their day-to-day actions in the classroom. Because teachers' theories of practice are often tacitly held (Bruner, 1996), even a well-constructed interview question may not trigger the beliefs and ideas that lie behind the teacher's actions. The semi-structured interview was designed to draw from the teachers their understandings and feelings about the feedback and feed forward their coaches gave and how this related to their theories of practice. The questionnaire, on the other hand, asked questions about the teachers' beliefs in relation to teaching and learning, their learning processes and responses to professional learning and development and about the coaching process. Because the questionnaire was administered just prior to the interview, the researcher could follow up teachers' responses with further questions when there was an anomalous or extreme response.

Data Gathering Instruments

As outlined above, instruments employed in one or more of the three studies included interviews and questionnaires. These instruments are described and reasons for using the instruments are discussed. Details of how the instruments were used in each study forms part of Chapter 4 (Study 1), Chapter 6 (Study 2) and Chapter 7 (Study 3).

Interviews.

The aim of an open-ended interview is to “understand informants on their own terms and how they make meaning of their own lives, experiences, and cognitive processes” (Brenner, 2006). Two questions emerge from this definition. Firstly to what degree is it possible for an interviewer to understand the informants and the meaning they construct? Secondly, what approaches and processes are most likely to unpack the way informants make meaning of their lives, experiences and cognitive processes?

The relationship between the interviewer and informant is important in addressing these questions. Maxwell (2002) describes the interview as a social situation, involving a relationship between the interviewer and the interviewee. How the interviewer initiates and designs these relationships is complex and “rarely involves any approximation to total access” (Maxwell, 2013, p. 90). Therefore, an interview cannot uncover a complete understanding of the informants and how they make meaning of their lives, experiences and cognitive processes. The reliability of data from interviews depends on how well the

situation and relationship between the interviewer and informant is understood, how the relationship affects what goes on in the interview and an understanding of how the informant's actions and views could differ in other situations.

Not only does the interviewer need to understand that he or she will gain a partial understanding of the informants but that interviews represent a social encounter in which meaning is constructed by both the interviewer and informant. Holstein and Gubrium (2003) describe how understandings have evolved of the ways meaning is constructed in interviews. Traditionally, the informant has been seen as a passive subject whose understandings are being mined and the interviewer as objective; his or her job was to stand apart from the subject and merely collect the data. More recently the interview has been reconceptualised as an event in which both the interviewer and informant construct versions of reality together. Rather than the informant being passive, he or she is seen as an active participant in knowledge construction: someone who not only offers up information but constructively shapes the information throughout the interview process. Similarly, the interviewer is not objective and remote, but he or she is actively engaged in interacting with the informant and therefore participates in the construction of knowledge. Holstein and Gubrium (2003) assert that the value of an interview study is not in uncovering the "truth" of a situation, but in the kinds of meanings that the informants articulate and in how they have constructed these meanings.

The limitations of interviewing described above were partially mitigated in the three studies through using an artefact, which was the transcript of the discussion between the coach and teacher. The purpose of the artefact was to help to focus teachers' thinking about their coaches' feedback and feed forward during the interviews. Specific interactions in the transcripts were used to prompt teachers' thinking. Coburn (2004) provides evidence that using artefacts in interviews may help to unpack teachers' theories of practice, even when those theories of practice are tacitly held. Her study consisted of conducting interviews to investigate the influence of teachers' pre-existing beliefs and practices in relation to professional learning and development. During the interviews Coburn (2004) used artefacts, such as the teachers' written reflections from professional development experiences and their recorded conversations with other teachers, to prompt teachers' thinking. She clearly believed she had gained access to the teachers' tacit knowledge when she concluded that, "deep-seated assumptions about the nature of teaching and learning ...

guide decision making often in preconscious ways, framing the range of appropriate action and guiding what “makes sense” to teachers” (pp. 234–235).

Brenner (2006) explains that for researchers to gain appropriate information during an interview they need to understand the disciplinary framework that is most suited to their purpose because parameters for good interviewing depend on the disciplinary frame adopted by the interviewer. Disciplinary frameworks include cultural anthropology, cognitive anthropology, and developmental psychology but cognitive science is the framework most aligned to this research. Interview techniques used by cognitive scientists focus on the processes of the informants’ thinking rather than on their knowledge. An example of a technique used in cognitive science interviewing is that participants are encouraged to verbalise or “think aloud” as they complete a challenging task so that the interviewer can understand their thinking processes (Brenner, 2006). In all three studies, rather than use a “think aloud” approach, teachers were asked to verbalise their thinking in relation to feedback and feed forward they had received at an earlier date. The purpose was to understand what the teachers’ thinking processes had been as they were given feedback. An example was when teachers were asked, “Tell me what you thought about each feedback point when the coach was giving you feedback.” However, because the teachers were reflecting on an earlier interaction, it was only possible to gain an understanding of the teachers’ *perceptions* of what their thinking processes were at the time.

Interviews were used in Studies 1, 2 and 3 because there is evidence that interviews can access teachers’ thinking more successfully than some other methods (e.g. Brown & McIntyre, 1993; Timperley et al., 2008). When Brown and McIntyre (1993) sought to understand teachers’ thinking about their actions in the classroom, they experimented with getting teachers to write statements, rather than be interviewed, but abandoned this practice because they found that interviews garnered more information and were more likely to offer insight into the teachers’ perceptions of their teaching. The research of Timperley et al. (2008) was influential in the decision to use interviews in the three studies because this study successfully unpacked teachers’ thinking about the feedback and feed forward they received from their coaches. The aim of their research was to find out what teachers had learned as a result of the coaching process and whether they intended to change their practice. Discussions between the coaches and teachers were audio taped and teachers were interviewed. Teachers could explain whether they intended to change their practice as a

result of the coaches' feedback and feed forward and they could give specific reasons for making or not making changes.

Interviews are not the only possible method used to access teachers' thinking about their coaching experiences. Edwards and Green (1999) employed self-reports as part of their qualitative study to examine changes in teachers' thinking as a result of the coaching process. The participating teachers identified whether they perceived their approach to teaching had changed and to what they would attribute the change. There were no details of the construction of the self-report, so it was not clear whether it included categories that the teachers selected from or whether there was a space for open comment. Most teachers reported making small changes to their teaching but 41% stated they had made major changes as a result of coaching. However, possibly due to the design of the self-report, Edwards and Green (1999) did not interrogate why many teachers reported that they made small, rather than major, changes. Consequently, they did not appear to garner detailed information about the teachers' thinking processes in relation to their coaching experiences. This study has relevance for the design of Studies 2 and 3 because its design suggests that using a questionnaire alone may have limitations in relation to accessing teachers' thinking. How this limitation is addressed in Studies 2 and 3 is discussed in the next section.

The questionnaire.

A questionnaire was used in Studies 2 and 3 with the participating teachers. Questionnaires are the most common method of collecting survey data (de Vaus, 2002) because they are an efficient means of collecting data from a large group of people, they can be used to address a range of topic areas, information from questionnaires is easy to analyse, and they can be used in conjunction with other methods to provide a rich and reliable set of information (Mann, 1998). Of these advantages, the final one reflects the primary purpose for using a questionnaire in Studies 2 and 3. The questionnaire and interview together provided information that addressed the aims of Studies 2 and 3, which were to help coaches unpack, engage with and challenge teachers theories of practice (Study 2) and develop a discussion with teachers in which coaches' and teachers' theories of practice were explored and discussed (Study 3) with the result that teachers made changes in their practice. This use of complementary data has been discussed in the section on triangulation. The teachers' responses in the questionnaires at Time 1 also served as baseline data. The questionnaire was administered a second time (at Time 2) after coaches

were trained in the use of the rubric. Differences in responses between the first and second administration of the questionnaire are discussed in Chapters 6 (for Study 2) and 7 (for Study 3).

The questionnaire in Studies 2 and 3 used a six point Likert scale (strongly disagree, disagree, somewhat disagree, somewhat agree, agree, strongly agree). There is little agreement among experts about the ideal number of response categories (Schwartz, Hippler, Deutsch & Strack, 1985), but de Vaus (2002) states that longer scales may allow for greater discrimination. A six point scale was used to force respondents to make a judgement, rather than choosing a middle point.

Issues with administering a questionnaire in Studies 2 and 3 were similar to those that were discussed in relation to the interview. The accuracy of the teachers' responses could have been influenced by social desirability considerations, when a participant gives acceptable, rather than genuine answers (de Vaus, 2002). Two possible ways teachers may have been influenced by social desirability were in relation to the researcher, because teachers completed the questionnaire in her presence, and teachers' loyalty to their coaches. Both aspects were partially mitigated as the researcher used multiple sources of data during the follow-up interviews that included transcripts of the post-observation discussions, the questionnaires and teachers' utterances. For example, if a teacher stated in the follow-up interview that they did not agree with the coach's advice, and then scored the coach highly on a questionnaire item that stated "*I have significantly changed my beliefs about how to promote student learning through feedback given by the coach*", the researcher would probe the teacher's response on the questionnaire to determine whether the response was influenced by social desirability.

Socially desirable responses were also mitigated between the Time 1 and Time 2 administration of the questionnaire in that teachers did not have access to their Time 1 questionnaire when they completed it at Time 2. Therefore they could not score items more highly at Time 2 out of a desire to inflate their own or their coach's improvement. Additionally, items in the questionnaire that appeared to have been influenced by social desirability in Study 2 were identified and eliminated from the revised questionnaire used in Study 3. The rationale for eliminating items is discussed in the findings of Chapter 6.

The limitations of self-reports were discussed in Chapter 2. Teachers have been known to report high confidence ratings, for example, in their ability to write clear learning intentions that showed no relationship with their practice or their students' understanding of the learning (Timperley & Parr, 2009). This issue was partially mitigated because the researcher asked teachers to complete the questionnaires at the beginning of their interviews. She then read the completed questionnaires and at the end of the interviews asked teachers to elaborate on any responses that seemed anomalous with data from the transcripts and interviews.

Overview of Data Analysis

Data analysis for Studies 1, 2 and 3 included interviews, and questionnaires for Studies 2 and 3. An overall approach is outlined to analysing data in the interviews and questionnaires. Details of the data analysis specific to each study forms part of Chapter 4 (Study 1), Chapter 6 (Study 2) and Chapter 7 (Study 3).

Interviews.

Each interview between the coach and teacher, and between the teacher or coach and researcher was audio taped and transcribed by the researcher or a professional transcriber, who signed a transcriber confidentiality agreement. Transcripts constituted a verbatim record of the audiotape but they omitted filler words such as “um” or pauses (Guest, Namey & Mitchell, 2013). A verbatim transcript was needed rather than a paraphrase because of the way the transcripts were coded.

Content analysis was the method used to analyse data from the two types of interviews. Patton (2002) describes content analysis as a “qualitative data reduction and sense-making effort that takes a volume of qualitative material and attempts to identify core consistencies and meanings” (p. 453). In Studies 1, 2 and 3 data reduction was both necessary and challenging: necessary because of the volume of data that was generated in total from 58 discussions between coaches and teachers, 56 interviews with teachers and 12 interviews with coaches. Data reduction was challenging because choices about how the data were analysed were inevitably interpretive. The strengths and issues around content analysis are discussed. Methods of content analysis are identified that were used to make meaning and identify patterns in the interviews in Studies 1, 2 and 3 and a rationale is given for using these methods.

There are many strengths of content analysis. In breaking text into units of analysis, it reduces a mass of data into easily understandable categories. Additionally, the categories tend to be flexible and they can be revised and adapted so coding becomes an iterative process. Another strength is when content analysis is governed by rules. The rules aid consistent implementation and protect against rater drift (Shadish et al., 2002), which is when a rater changes his or her ratings over time. Rater drift may be due to practice effects, fatigue effects and the rater's changing cognitive schema. Another reason for coding rules is to strengthen inter-rater reliability, which is discussed below.

An important issue in relation to content analysis is interpretive validity, which concerns the accuracy of a representation. As Eisenhart (2008) states, "the validity of any research study depends on the trustworthiness of the representations that depict it; thus, worries about representation never go away" (p. 568). Two methods were used to improve interpretive validity across the three studies. One method was using triangulation of the data, which is discussed later in this chapter. A second method was through inter-rater reliability, which is when an external moderator independently codes the transcripts to ensure consistency in the coding. All three studies used an external moderator, who was experienced in coding. For Study 1 the external moderator checked the coding of levels of feedback; for Studies 2 and 3 she checked the coding of the ETTOP rubric (Version 1 and 2 respectively) categories in the discussions between the coaches and teachers. After inducting the external moderator into the coding rules, the external moderator and researcher separately coded one transcript and then compared their coding. The coding needed to achieve 85% reliability (Miles & Huberman, 1994) or they continued to code transcripts until this was achieved. For Studies 2 and 3, interrater reliability was established for both Time 1 and Time 2 data as a protection against rater drift.

Content analysis includes four kinds of procedural methods (Mayring, 2004). The first is summarising content analysis in which the material is reduced so that the essential contents are preserved and represented in a short text. Explicating content analysis involves a systematic collection of explanatory material that helps to make sense of the analysis. Structural content analysis uses criteria for analysing the material that have been determined in advance, based on some theory, and material that does not fit the criteria is filtered out. Structural content analysis requires the development of precise coding rules. Inductive category formation uses summarising to develop categories from some material. These categories are checked for reliability and revised. Although all four methods could be

subject to confirmation bias, as discussed above, the first two are more vulnerable. For example, the researcher may summarise and make explanatory notes based on his or her expected outcomes, rather than allowing disconfirming evidence to emerge. Structural content analysis suited the three studies because at the heart of each study was a framework with a theoretical basis: in Study 1 the levels of feedback (Hattie & Timperley, 2007) and in Studies 2 and 3 the ETTOP rubric (Version 1 and 2 respectively). Inductive category formation was also used in all three studies because it allowed the researcher to organise the teachers' (and coaches' in Studies 2 and 3) thinking about the effectiveness of feedback and feed forward.

Structural content analysis was used for the interviews between teachers and coaches. In all three studies conceptual frameworks were developed to help determine what to code (Miles & Huberman, 1994). In Study 1 the framework consisted of Hattie and Timperley's (2007) levels of feedback because part of the research question was to investigate what levels of feedback were evident in coaches' post-observation discussions with teachers. Details of the framework used in Study 1, along with the rules for coding are included in Chapter 4. The levels of feedback were used because they were developed from extensive research into effective types of feedback.

In Studies 2 and 3 the conceptual framework employed for structural content analysis was the Version 1 and 2 ETTOP rubrics. Using the Version 1 and 2 ETTOP rubrics to code the coaches' attempts to unpack, engage with, and challenge teachers' theories of practice helped to address part of the research question related to identifying aspects of feedback and feed forward that accessed teachers' theories of practice (Study 2) and how to improve coaches' feedback to teachers through engaging and challenging their theories of practice (Studies 2 and 3). One measure of improvement was a comparison of the coding of coaches' pre-training discussions with teachers and their post-training discussions. Details of the rules governing how the rubric was used to code the interviews are included in Chapters 6 (Study 2) and 7 (Study 3). There were two reasons for using the Version 1 and 2 ETTOP rubrics for structural content analysis. Firstly, as described in Chapter 5, it aimed to encompass the characteristics of an effective tool. Secondly, because coaches were trained in the use of the Version 1 or 2 ETTOP rubric, it made sense to measure their shifts using the same instrument.

Inductive category formation was used in interviews with the teachers and coaches. Analysis of these interviews focussed on a different aspect of each research question than the interviews between the teachers and coaches. In Study 1 the focus was investigating levels of feedback that were *effective* in changing teachers' practice; in Study 2 to identify feedback and feed forward that *successfully* accessed teachers' theories of practice and in Study 3 to establish the teachers' experiences of how *successfully* the coaches had improved their feedback through engaging and challenging the teachers' theories of practice. Inductive category formation was more appropriate for these interviews than other approaches because the researcher did not know before the interviews the kinds of ideas and evidence of effectiveness and success the teachers and coaches would articulate. Categories were developed using pattern codes (Miles & Huberman, 1994) to identify themes, causes/explanations, relationships between people, or theoretical constructs. An example of pattern coding: causes/explanations in Study 1 was the amount of feedback given by the coach related to how much feedback the teacher remembered. Details of how categories were developed and revised are included in Chapter 4 (Study 1), Chapter 6 (Study 2) and Chapter 7 (Study 3), along with the rules governing the classification of the categories.

The questionnaire.

There were two purposes in using a questionnaire. Firstly, it provided complementary data about the teachers' beliefs and experiences of professional learning and development and coaching. The first layer of analysis took place directly after a teacher had completed the questionnaire, which was usually just prior to their interview with the researcher, who read through the questionnaire responses and asked for elaboration if an item elicited a response that was "strongly agree" or "strongly disagree". This initial, rough analysis enabled the researcher to gather more information about the teacher's thinking processes that led to a particular response. Secondly, the questionnaire was used as part of a measure to identify teachers' perceived changes in the coaches' approach to the pre and post observation discussion. Therefore, individual teachers' responses between the first and second administration of the questionnaire were compared and analysed. If a teacher scored "strongly agree" on an item at Time 1 and "somewhat agree" at Time 2 the item was coded as a -2 shift. The 2 represents two measures of the Likert scale and - indicates that the response was less positive. These changes were then compared with data from the interviews. The researcher was also interested in how teachers of a specific coach changed,

since the intervention was aimed at improving the coaches' capacity to unpack, engage with and challenge teachers' theories of practice. Therefore she also grouped the teachers of a particular coach together, using the same technique as for individual teachers. Because the questionnaire changed between Study 2 and Study 3, details of how the questionnaires were analysed in each study are included in Chapters 6 and 7.

Ethical Considerations

Ethics approval for Study 1 was granted by The University of Auckland Human Participants Ethics Committee on 13 February, 2008 (reference no 2007/424) and for Studies 2 and 3 on 12 August 2009 (reference no. 2009/359). Examples of the Participation Information Sheets and Consent Forms for Principal/BOT, Coach/Facilitator and Teacher are included in Appendix A. Ethical issues were common to all three studies and included confidentiality, threats to trust between the coaches and teachers and threats to the relationship between the coaches and the researcher.

Confidentiality of the participants was an ethical issue. The original plan was for the participants to be drawn from facilitators employed in a school support service who were working with teachers in secondary schools using a coaching model that included cycles of observation and feedback. School support services were regional organisations attached to universities and funded by the Ministry of Education to provide professional development to teachers in New Zealand. Because these facilitators represented a small, recognizable community, confidentiality could not be guaranteed.

It proved difficult to recruit participants from this pool due to a number of factors. One was that the researcher became a team leader between Study 1 and Study 2 and could not recruit participants from her own team who were engaged in this type of work because the power relationship may have made it difficult for the potential participants to refuse. Secondly, two potential participants abandoned their coaching model due to circumstances within the schools. As a result, across all three studies only four participating coaches were from a school support service. The remaining eight worked in areas within their schools that comprised small recognisable communities, so confidentiality could also not be guaranteed for this group. Confidentiality was also an issue for the teacher participants although they were not drawn from as small a pool as the coaches.

The issue of confidentiality was addressed in two ways. All participants were advised that they would be assigned a pseudonym to protect their identity and principals were assured that the schools would not be identified in the research. Secondly, all consent forms included a statement that the participant understood confidentiality could not be guaranteed. Each prospective participant read the consent form in the presence of the researcher and was invited to ask questions, before he or she signed it.

Another ethical issue was the potential threat to the trust relationship between coaches and teachers because the teachers were invited to comment on aspects of the coaches' practices in giving feedback. This relationship was protected in three ways. Teachers were assured that what they said in the interview would not be related back to the coach, they were given the opportunity to turn the tape off at any time during their meeting with the coach, and they could choose to edit their comments in the transcripts of their interviews with the researcher. This gave teachers an opportunity to edit out disclosures they later regretted. No teachers requested that any comments be edited out of the transcript.

There were also potential threats to the relationship between the coaches and researcher because the researcher gained information about the way the teachers perceived feedback given by the coaches. Coaches were informed of this potential threat so that they gave informed consent when they agreed to participate in the research. The coaches were also given a copy of the possible interview questions for the teachers before they signed the consent form. Like the teachers, coaches had the right to withdraw from the research at any time and to withdraw their data up until the fieldwork was completed. No participant did so.

It was important that a teacher could confidentially decline to take part in the research without it affecting their relationship with the coach. Therefore the researcher met with teachers nominated by the coach to ensure they understood their role in the study and that they were willing to participate. Because the research was embedded in the normal practice of the school, the researcher also met with the principals of the 10 schools and gained their permission to approach the coaches and teachers (two schools participated in more than one study, with different coaches). Two professional transcribers transcribed interviews between the coaches and teachers, teachers and researcher, and coaches and researcher. Both signed a confidentiality agreement.

A supplementary ethics application was submitted in July 2010 and approved on 11 August, 2010. It included two additions to Studies 2 and 3 that had not been part of the original application. The first was training for the coaches. The supplementary ethics application described the content of the coaches' training, who would conduct the training and how the schools of the participating coaches would be recompensed since the coaching would take place in school time. Also included in the supplementary ethics application was provision for a second round of post-observation feedback discussions between the coaches and teachers, and interviews between the teachers and researcher.

The Three Studies

The following chapters describe the three studies that together comprise this research. The studies charted a refinement of the researcher's understanding about how to help coaches improve their feedback and feed forward through unpacking, engaging with and challenging teachers' theories of practice. Because methods used in one study informed the design of subsequent studies, the methods specific to each study are discussed in the appropriate chapters: Chapter 4 (Study 1), Chapter 6 (Study 2) and Chapter 7 (Study 3).

Chapter 4:

Study 1

Study 1 sought to investigate the effectiveness of feedback in changing teachers' practice within a coaching model. Hattie and Timperley (2007) state that for feedback to be effective, it must address three questions: Where am I going? How am I going? Where to next? These questions work together at three levels of feedback: feedback about the task, feedback about the process, feedback that leads to self-regulation. A fourth level, feedback about self, typically does not address these questions. The first aim of Study 1 was to determine whether some levels of feedback seemed to be more effective than others in changing teachers' practice. The second aim was to develop an understanding of how teachers change their concepts about teaching and learning as a result of feedback. The research questions specific to this study asked, "Are some levels of feedback more effective than others in changing teachers' practice?" and "How do teachers change their concepts about teaching and learning as a result of feedback?"

A cognitive approach to conceptual change was explored when one question in the follow-up interviews asked teachers to describe their thinking processes as they engaged or did not engage with the coaches' feedback. As Vosniadou (2008) observed, there is a lack of understanding about specific mechanisms that promote conceptual change in people's pre-suppositions, beliefs and mental models. Mechanisms such as creating dissonance or providing an alternative theory may lead to adjustments in teachers' beliefs and practice without impacting on their conceptual framework (Franke et al., 1998). It was anticipated that the teachers' responses would reveal the kinds of cognitive processing that facilitates or impedes conceptual change within a coaching context.

Methods

Study 1 was a qualitative interpretive study. Each of these terms was discussed, and the design of Study 1 described, in Chapter 3. This section describes the participating coaches and teachers and the selection process, the procedures used to investigate research question, and the approaches to the data analysis.

Participants.

All participants in Study 1 were assigned pseudonyms to protect their identities. The coaches, Nina and Leonie, were facilitators from a school support service. At the time of Study 1, school support services were regional organisations that were attached to universities and funded by the Ministry of Education to provide professional development to teachers in New Zealand. Nina and Leonie were invited to be part of the study because they each led professional development projects in schools that involved coaching individual teachers in cycles of observation and feedback, which typically comprised three parts. Firstly the coach delivered a workshop in some aspect of professional learning and development with all or selected teachers in a school, then he or she observed how teachers incorporated the professional learning into their teaching practices, and conducted a feedback discussion with each teacher. Sometimes the coach used common issues that emerged in the observations and feedback to plan the next professional development workshop. Nina and Leonie both worked in secondary schools (encompassing students from approximately 13 to 18 years old).

Nina was an advisor in an Assessment for Learning initiative, which focussed on changing teachers' beliefs and practices about learning and teaching so that students became more active participants in the learning process. Because part of this initiative addressed teachers' feedback to students, Nina was knowledgeable about the four levels of feedback (Hattie & Timperley, 2007). She had also participated in some training on how to give feedback. Nina had been involved for one year in cycles of observation and feedback with two teacher participants, Wendy, who had been teaching for 12 years, and Sam, who was in his second year of teaching.

Leonie worked in a secondary literacy professional development project that aimed to up-skill teachers in the use of literacy strategies, with the purpose of improving student learning in schools where levels of literacy had been identified as an impediment to student achievement. The school that Leonie's participants worked in was in its first year of literacy professional development. At the time of Study 1 Leonie had completed the first cycle of observation and feedback with the participating teachers, Sarah and John. Sarah was in her fifth year of teaching; John had been teaching for more than 20 years.

Research procedures.

Procedures for this study involved gaining ethics approval and agreement from the participants, then capturing and collecting the post-observation feedback discussions between coaches and teachers through audiotaping. The final procedure involved the researcher conducting interviews with the teachers. Ethics approval was sought from the University of Auckland Human Participants Ethics Committee and granted on 13 February 2008. Ethical issues related to Study 1 are discussed in Chapter 3.

For the research, the post-observation feedback discussion between each coach and the two teachers was audio taped by the coach and subsequently transcribed by the researcher. There was some urgency to transcribe the tape quickly so that the interview with each teacher could take place as closely as possible to the taped discussion. For three teachers, the time between the post-observation discussions and interviews was less than a week. Sarah's interview, however, took place three weeks after the discussion because of illness. Nevertheless, she demonstrated a comparable or clearer recollection of the feedback than other participants.

Prior to the interviews, the researcher noted all incidents of feedback and chunked them for discussion with the teachers. Because of the pressure of time the transcripts were formally coded after the interviews had taken place. The interviews were semi-structured with a list of prepared questions. Supplementary questions were used to clarify or elaborate a teacher's response. The purpose of the interviews was to ascertain how much feedback the teachers had remembered from their discussion with the coach, what kinds of feedback they remembered, how the teachers perceived they had changed their practice as a result, and the teachers' recollections of their thinking processes when they received feedback.

Interview questions.

The first question asked about the focus of the observation. The aim was to establish whether the coach and teacher had a shared understanding of the purpose for the observation. Having a goal for the observation addressed the first of Hattie and Timperley's (2007) three questions. The second and third questions investigated what feedback the teacher remembered, and possible reasons why. As Hattie (2012) pointed out, those giving feedback need to check not only that feedback is given, but also that it is received. Feedback that was recalled was at least received by the teachers and if teachers could explain the feedback, they understood it. These questions also probed the conditions under

which feedback is remembered, such as the level at which the feedback was given (Hattie & Timperley, 2007), or the extent to which the feedback resonated with the teachers' prior understandings (Hattie, 2012). The fourth and fifth questions addressed whether the teachers perceived that the feedback led to any changes in their teaching (Timperley et al., 2008) or their conceptual framework (Vosniadou et al., 2008). The last two questions aimed to establish whether the teachers held consistent ideas as to what kinds of feedback did or did not motivate them to change and the extent to which these ideas aligned with research findings on effective feedback.

Data analysis.

Study 1 used content analysis. Methods of analysis are discussed, and a rationale given for their use, in Chapter 3, so only the analytical frameworks used in Study 1 are described here. Data were analysed using two coding frameworks. The data source for the first coding framework was the post-observation feedback discussion between the teachers and coaches, which were analysed according to the levels of the coaches' feedback. The second coding framework included both the post-observation feedback discussion and the follow-up interviews to analyse the teachers' responses to the feedback.

Coding coaches' feedback to teachers.

The coding of coaches' feedback to the teachers supported the first research question of this study: "Are some levels of feedback more effective than others in changing teachers' practice?" The feedback was coded in two ways. Firstly, every utterance of the coach was coded as feedback or non-feedback through line-by-line coding. An utterance was coded as feedback if it contained information related to an aspect of the teacher's performance or understanding or a suggestion for improvement. Other comments, such as describing events in the lesson, were coded as non-feedback. Every line of feedback and non-feedback was counted and totalled and the percentage of a coach's feedback in each discussion recorded. Secondly, all feedback was chunked and coded using the four levels of feedback (Hattie & Timperley, 2007). Table 3 provides examples of the four levels of feedback from the transcripts.

Table 3
The Four Levels of Feedback (Hattie & Timperley, 2007).

Level of feedback	Type of feedback	Description of feedback	Example of feedback
Level 1	Feedback about the task	Corrects the learner's misunderstandings and may include directions to acquire more, different or correct information	"So maybe when you've got two parts like this, you use them as two separate learning intentions."
Level 2	Feedback about process	Directs the learner to the learning processes involved	"What you could try is that modelling of 'think aloud' where you use 'I' statements."
Level 3	Feedback that leads to self regulation	Involves the learner being able to evaluate their learning accurately so they can continue to engage in the task	"And maybe that's a question that you might want to put to the students, 'What do you need to learn?'"
Level 4	Feedback about the self	Involves personal, evaluative comments	There were no examples of feedback about the self.

An incident of feedback sometimes included a chunk of discussion where the feedback continuously developed the same aspect. An example of chunking was from the discussion between Leonie and Sarah, which began with Sarah stating that she would like to use more self- assessment in her lesson:

Sarah: I could just get them [the students] to quickly jot down three things [they had learnt today]

Leonie: They could do that after their last piece of work, couldn't they?

Sarah: Yes, they could.

Leonie: You could even do it verbally. Turn to the person beside you and tell them three things you learnt today.

Sarah: Yeah, that's a good idea, yeah.

Leonie: It just rounds things off.

This is coded as one incident of feedback about the process, rather than three incidents.

An external moderator, familiar with the levels of feedback, checked the coding. The external moderator and researcher separately coded one transcript and then compared their coding. The coding achieved 83% reliability, when the number of agreements between the two coders (15) was divided by the total number of coding incidents (18), (Miles & Huberman, 1994). Significantly, the disagreements were all related to coding Level 4: feedback about the self. The external moderator did not code any incidents in this category, whereas the researcher coded three incidents. As a result, the researcher reread information on feedback about the self (Hattie & Timperley, 2007; Kluger & DeNisi, 1996) and concurred with the external moderator. All the incidents coded as feedback about the self were reviewed and it was decided that none of them fitted this category. Therefore, no further reference to this category is made.

Coding of teachers' responses to the feedback.

Coding teachers' responses to feedback addressed both research questions. Teachers' responses were used to investigate the effectiveness of levels of feedback in perceived changes in teachers' practice and also to probe how teachers changed their concepts about teaching and learning as a result of feedback.

The researcher coded transcripts of the follow-up interviews, using a process of partially inductive category formation because the interviews were semi-structured and the questions strongly shaped the teachers' responses. Pattern codes (Miles & Huberman, 1994) were assigned to the teachers' responses to reduce the data into manageable units and facilitate the development of a cognitive map that displayed an understanding of the key points in how teachers stated they had reacted to the feedback given by their coaches. The initial pattern codes were *Feedback remembered*, *Feedback not remembered*, *Feedback acted upon*, *Feedback not acted upon*, and *How thinking changed as a result of feedback*. These codes related to the aims of the study and were a strong feature in all four follow-up interviews. Sub-categories were then developed to allow a finer-grained analysis of each category. Firstly, a segment was coded in a category, and then it was assigned to the appropriate sub-category. A segment was attributed to more than one sub-category because each segment was also referenced to the level at which the coach gave the feedback. The

rationale was to establish whether some levels of feedback were remembered and acted upon more than others. The coding framework is shown in Figure 2 below.

<p>Feedback remembered</p> <ul style="list-style-type: none"> • General/specific • Linked/not linked to teacher's theories of practice • Linked with levels of feedback
<p>Feedback not remembered</p> <ul style="list-style-type: none"> • General/specific • Linked/not linked to teacher's theories of practice • Linked with levels of feedback
<p>Feedback acted upon</p> <ul style="list-style-type: none"> • General/specific feedback actions • Linked to specific goal for observation • Linked with levels of feedback
<p>Feedback not acted upon</p> <ul style="list-style-type: none"> • Reason given for lack of action • No reason given for lack of action • Linked with levels of feedback
<p>How thinking changed as a result of feedback</p> <ul style="list-style-type: none"> • Changed linked to feedback • Changed, not linked to feedback • Did not change

Figure 2. Coding framework for interviews with teachers.

When the coding categories were established, a grid was created and examples of each teacher's responses were mapped onto the grid. This process showed which themes were strongest across the four teachers. The grid also served to counter possible confirmation bias because its structure forced a review of all data from the teachers' discussions with their coaches and follow-up interviews. For example, when Sam was asked what he remembered about the feedback from his coach he said, "*It's a real struggle to think of specific things*". Consequently, it was noted that Sam had remembered very little feedback and his transcript was coded accordingly. However, the process of mapping his responses onto the grid revealed that he had actually remembered and acted on two major

aspects of the coach’s feedback, which was initially missed because Sam’s responses to the feedback were contextualised in his discussions about a range of ideas related to teaching and learning.

Findings

This section firstly discusses the results of coding the percentage and three levels of feedback. Secondly, the interviews with teachers are analysed and synthesised with the results from the coaches’ levels of feedback to highlight issues that directed the design of Study 2.

Percentage of feedback and non-feedback.

The percentage of utterances of the coaches that were feedback rather than non-feedback varied between the two coaches, and each teacher. Nina’s transcripts contained a higher percentage of feedback than Leonie’s. Her utterances with Sam were 70% feedback, and with Wendy 58%. Leonie’s utterances with Sarah were 50% feedback, and with John 43%.

Levels of feedback given by the coach.

Feedback from the coaches fitted into three levels in Hattie and Timperley’s model (2007) as shown in Table 4. There was an average of 18 instances of feedback for each teacher; on average 15% were classified as feedback about the task, 75% were feedback about the process, and 10% were feedback that led to self-regulation.

Table 4
Frequency (and Percentages) of Feedback to Teachers by Level

Level	Feedback	Nina				Leonie			
		Wendy		Sam		Sarah		John	
1	About the task	2	(12%)	2	(11%)	6	(38%)	3	(14%)
2	About process	12	(70%)	13	(68%)	10	(62%)	18	(86%)
3	That leads to self-regulation	3	(18%)	4	(21%)	0	(0%)	0	(0%)
Total		17	(100%)	19	(100%)	16	(100%)	21	(100%)

Most instances of “feedback about the task” corrected minor misunderstandings. For example, Wendy used learning goals in the observed lesson but reflected that she had

not achieved them. Nina gave her feedback that Wendy’s learning goals could have been broken down into two learning intentions. Feedback about process represented the greatest number of incidents of feedback across all four teachers. Sam indicated that his next step was to differentiate the learning, because he realised that his students varied widely in their mastery of the skills. He believed he needed to assess the level of each student, but Nina suggested instead that he could empower students to assess themselves. There were only seven incidents of feedback directed at self-regulation, all of which came from Nina. An example was when Wendy stated that she was trying to put too much into her lessons. Nina suggested, “*Maybe you can gauge from the students, am I going too fast, do we need to slow down?*”

Feedback remembered and acted upon by the participants.

The amount of feedback remembered was small compared with the amount of feedback given. Table 5 shows the quantity of feedback remembered by each teacher at each of the three levels. Five out of eight incidents were feedback about process, which was the level at which the majority of feedback was given.

Table 5
Levels of Feedback Remembered by Teachers

Level	Feedback	Nina		Leonie	
		Wendy	Sam	Sarah	John
1	About the task	1	0	1	0
2	About process	1	1	1	2
3	That leads to self-regulation	0	1	0	0
Total		2	2	2	2

Of the eight incidents of feedback that were remembered (three without and five with prompting) five incidents could be identified as having been acted upon and the teachers could state how they changed their practice as a result of the feedback. Three other incidences of feedback may have been acted upon. The teacher had either not taught the class since the feedback or stated that he or she intended to enact the feedback at a later date.

A characteristic of feedback remembered and acted upon was that it resonated with aspects the teachers were already concerned about. Sarah stated that she enacted the feedback about using a more challenging text with her class because she had been

concerned about this aspect prior to the lesson observation. John intended to act on feedback about a vocabulary strategy that he had initially planned to include in the lesson. Sam had been independently reading and discussing with another teacher how to differentiate his teaching and subsequently implemented some differentiation strategies. Wendy acted upon feedback about separating learning intentions into two parts by beginning the next lesson with revising to ensure her students understood the key learning. In her follow-up interview, she stated she had noted while teaching the lesson that some students did not understand the intended learning.

How teachers' thinking changed as a result of feedback.

Teachers' recollections of how their thinking changed suggested that there were minimal changes in their conceptual frameworks (Vosniadou et al., 2008) as a result of feedback from their coaches. Wendy was the only teacher who reported her thinking had changed; she had been reminded that she was still trying to fit too much into the lesson and as a result students were not necessarily learning what was intended. Although Wendy could describe how she addressed this issue in the next lesson, it was not clear how deeply her thinking had changed because her theories of practice around the issue had not been unpacked and discussed. Sam reported that he had changed his thinking, not only as a result of feedback, but also through reflection, reading, and discussion with other teachers. It could not be determined, however, whether Sam's interactions with other teachers changed his thinking, or reinforced his existing concepts. Both John and Sarah said their thinking had not changed.

Teachers' thinking may not have changed substantially because the coaches' feedback was not generally oriented towards engaging their thinking processes, as when Leonie gave feedback to Sarah that she could use a self-assessment strategy with students:

Leonie: You probably needed just a little assessment grid ...

Sarah: Mmm

Leonie: related to what you were doing today

Sarah: Mmm

Leonie: and that's really easy. Write down three things you learned today.

Sarah: Yeah, yeah.

Leonie: That can take five minutes.

Sarah: Yeah

Sarah appeared to engage minimally with Leonie's suggestion. Leonie attempted to "sell" the strategy to Sarah rather than unpack Sarah's thinking about using a self-assessment grid. When the researcher asked Sarah about what feedback she remembered, she did not mention feedback about self-assessment. Prompted, she said she did remember it but she had not actioned that particular feedback because she had been away from school on sick leave for a week. However, Sarah stated that she had already actioned one other incident of feedback, about using a challenging text the next day because she had agreed with what Leonie suggested.

Discussion

In this section two possible explanations are discussed as to why so little feedback was remembered and acted upon. One explanation is offered by Kluger and deNisi (1996) who found that when learners are given too much feedback in the early acquisition phases of learning, they might be overwhelmed and consequently fail to apply the feedback. Each coach gave such a large quantity of feedback that the teachers did not have much opportunity to process. Time spent processing feedback has been shown to have a positive effect on subsequent performance (Lhyle & Kulhavy, 1987).

A second potential explanation was that the coaches' and teachers' thinking was not aligned. Neither coach attempted to engage with the teachers' theories of practice to ascertain the teachers' beliefs and ideas about the issues raised in the feedback. This process is important because, as Bransford et al. (2000) state, everyone brings his or her preconceptions about how the world works to learning opportunities. If a person's prior understandings are not engaged, he or she may fail to understand new concepts and information, or they may learn them superficially and return to their preconceptions. Despite the importance of this process, many opportunities to unpack the teachers' theories of practice were not taken up by the coaches. Instead, much of the feedback was at a surface practice level that addressed the teachers' actions, rather than the processes that shaped their actions. As a result, the coaches gained little insight into the teachers' thinking processes.

A failure to engage with a teacher's theories of practice is seen in John's recount of an exchange with Leonie that occurred during a workshop: "*I was talking about ... in schools like ours, how language-poor generally kids' homes are in English, and that's just a given.*" John revealed a strong theory of practice about the language capabilities of his

students. He reported that Leonie had replied, *“Let’s not get into deficit thinking ...because our whole thing is about strategies for improving things.”* Leonie indicated that she did not accept John’s theory of practice, by using the phrase *“deficit thinking.”* Although she issued an implied challenge to John’s beliefs, her main purpose appeared to be to shut down his line of argument. John said he had taken exception to this statement and it had not prompted him to reconsider his beliefs in any way.

Consequences for coaches who bypass teachers’ theories of practice are that teachers may directly or indirectly question the coaches’ theories of change and coaches may struggle to understand why teachers act the way they do (Robinson, 1993). John’s recount suggested that he had indirectly questioned Leonie’s theories of change. Firstly, he stated that he did not believe the literacy professional development was relevant to him: *“[I] sit there and think this is not so important for me because I have been there and done all this”*. Secondly, when Leonie gave the only piece of feedback in which she suggested a change in John’s practice, he did not indicate that he accepted the advice, and he did not remember this feedback. However, John did reiterate with Leonie his theory of practice about language and in his follow-up interview he remembered feedback about vocabulary.

The second consequence of bypassing teachers’ theories of action is that the coaches have limited information about why teachers did or did not enact the feedback they were given. For example, when Nina asked Sam what his next steps were, he replied that he wanted to differentiate levels in his classroom. She affirmed his focus, and discussed how he could differentiate, but did not probe his theories of practice by asking him to elaborate on what he meant by differentiation or why it was important to him. If she had done so, she may have learned what Sam revealed in his follow-up interview, that he was currently studying research on differentiation and discussing how to implement it with another teacher in the school. Nina may also have developed a clearer understanding as to why Sam enthusiastically enacted the feedback about differentiation.

To summarise the findings, Study 1 showed that teachers remembered and enacted very little of the feedback they were given, regardless of the level of feedback. Two possible explanations are that coaches gave such a volume of feedback that teachers could not process it easily, and coaches did not engage with, unpack or challenge teachers’ theories of practice when giving feedback. The two issues are linked. When coaches engage

with teachers' theories of practice they necessarily invest in focussing on fewer incidents of feedback but the feedback is at a deeper level.

Implications for Study 2

Study 1 influenced the design of Study 2 in two ways. Firstly, methods used in Study 1 were adapted for Study 2. Secondly, as a result of the findings from Study 1, the focus of this thesis shifted from the effectiveness of levels of feedback to exploring how to help coaches engage with, unpack and, if necessary, challenge teachers' theories of practice during the feedback process.

The methods used in Study 1 were evaluated to determine what adaptations were needed for Study 2. A limitation of Study 1 was its size, comprising two coaches and four teachers. Nevertheless, the findings were consistent with larger studies (Franke et al., 1998; Timperley et al., 2008). Study 2 was larger, with four coaches and eight teachers. For the follow-up interviews with teachers, the questions asked were revised, with a stronger emphasis on exploring teachers' thinking about specific feedback incidents. Study 2 again used a coding framework to analyse the coaches' feedback, specifically how the coaches attempted to probe, clarify, summarise and challenge the teachers' theories of practice. Another addition was including a teacher questionnaire to triangulate data about the teachers' thinking in relation to their coaching experience.

An issue that emerged during Study 1 was the importance attached to teachers' memories and perceptions of how they used feedback. The teachers may have enacted some aspects of feedback that they did not remember at the time of the interview. Sam, for example, found it difficult to be specific about how he had used the feedback in his practice. Given the focus of Study 2, teachers' memories of the feedback were less important than how the feedback had surfaced their theories of practice. Therefore teachers were prompted more extensively; passages of the discussion with their coaches were read back to them when necessary to probe their thinking about specific incidents of feedback.

The findings from Study 1 opened up a new direction for this research. The focus shifted to investigating whether helping coaches engage with, unpack and challenge teachers' theories of practice would facilitate changes in teachers' thinking and practice. The results of Study 1 indicated that coaches needed training in this aspect because engaging with teachers' theories of practice was not evident in their practice. It is

significant that Leonie had not participated in any formal training in how to give feedback. Nina had some training, but not in specifically engaging with teachers' theories of practice. A training programme, however, may not be sufficient in helping coaches engage with teachers' theories of practice. Timperley et al. (2008) found that even when coaches participated in training focussed on engaging with teachers' theories of practice, they struggled to develop a discussion in which the teachers' theories of practice were surfaced. Because of the difficulty in engaging, unpacking and challenging teachers' theories of practice, the researcher developed a rubric that aimed to facilitate coaches through this process. Coaches were trained in using the rubric to reflect on their post-observation discussions with teachers.

Chapter 5 describes the development of the Engaging with Teachers' Theories of Practice (ETTOP) rubric, how the rubric was trialled with coaches and subsequently improved for using with coaches in Study 3.

Chapter 5:

Development Of Rubric to Engage Teachers' Theories Of Practice

This chapter describes the development of the Engaging with Teachers' Theories of Practice (ETTOP) rubric. The rubric was designed to support Studies 2 and 3 because coaches needed support to be able to engage with teachers' theories of practice (Timperley et al., 2008). Although there are existing frameworks to help coaches in their discussions with teachers, such as practice analysis (Timperley, 2011) and open to learning conversations (Robinson & Le Fevre, 2011), these frameworks do not include the specifics of the kinds of questions and statements that address how to engage with teachers' theories of practice. This chapter begins with defining and discussing the key terms "tool", and "rubric". A rationale for using a rubric is given and a description of the development of the ETTOP rubric (Version 1), used in Study 2, follows. The rubric is then evaluated using the characteristics of an effective tool. Subsequent refinements to the rubric are demonstrated in the revised ETTOP rubric (Version 2) used in Study 3.

Tools

Tools are defined as externalised representations of ideas that people use in their practice (Spillane, 2006). Robinson, Hohepa and Lloyd (2009) expand on "ideas" as useful knowledge that can help teachers improve their practice without necessarily needing to understand the specialist knowledge underpinning the creation of the tool. A tool may be as simple as a whiteboard or as complex as policy documents (Robinson et al., 2009; Spillane, 2006). An emerging body of research is developing around the significant role of tools in effectively mediating learning (Robinson & Timperley, 2007; Rosemary, 2005; Spillane, 2006; Timperley & Parr, 2009). Robinson et al. (2009) and Timperley and Parr (2009) identify four characteristics of an effective tool. Firstly, the idea in the tool must be based on sound theory, and secondly, the tool should be well designed, easy to understand and use (Robinson et al., 2009). Thirdly, routines around the tool's use require the teacher to examine evidence of his or her own practice and fourthly, the tool contains clear directions for how to improve (Timperley & Parr (2009).

The tool developed for Studies 2 and 3 needed to be based on how people learn and how to effect conceptual change, be easily understandable and straightforward to use, contain clear information for how coaches could improve their practice, and require

coaches to reflect on their practice. There are recognised tools in this field, such as the Teacher Learning Instrument (Rosemary, 2005) and the Assessment for Learning matrix (2005) that meet the four characteristics of an effective tool. However, these tools were not considered appropriate to address the focus of this thesis because they did not include the aspect of engaging with teachers' theories of practice. The tools were focussed on improving teachers' strategies rather than understanding the beliefs and ideas that informed teachers' actions. One type of tool that could potentially meet the four characteristics of an effective tool and address how to engage with teachers' theories of practice is a rubric.

Rubrics.

A rubric is defined as “a criterion-based scoring guide consisting of a fixed measurement scale ... and descriptions of the characteristics from each score point” (Wiggins & McTighe, 2005, p. 173). Wiggins (1998) describes criteria as the conditions that must be met for the performance to be successful, therefore criteria need to be clear and in line with current research (Stiggins, 2001). Criteria typically involve a rating scale, which enables learners to both assess their progress and understand their next steps towards achieving a standard. Several researchers suggest that understanding criteria can be enhanced through using indicative examples of practice at each level (e.g. Jonsson & Svingby, 2007; Wiggins, 1998). There are generally two types of rubric, holistic and analytic (Wiggins & McTighe, 2005). A holistic rubric provides an overall rating, whereas an analytic rubric divides a performance into separate dimensions, which are judged individually. An analytic rubric was used in this research so that coaches could identify and reflect on how they used each dimension or category of questions/statements that unpacked and engaged with teachers' theories of practice.

Rationale for using a rubric.

An analytic rubric can fulfil the four characteristics of an effective tool. Firstly, it can be based on sound theory if the categories and criteria are constructed using current research. Secondly, a rubric can be designed well, which means it is clear, complete and compelling, and practical (Stiggins, 2001). Thirdly, it contains directions for how to improve. For example, Jonsson and Svingby (2007) found that rubrics have the potential to improve learning and be effective in promoting self-assessment because they make expectations and criteria explicit to the learner. Finally, a rubric can be embedded into routines that require coaches to examine their practice. An illustration of this characteristic

is the Assessment for Learning matrix (MOE, 2005), which was used by Assessment for Learning coaches, such as Nina in Study 1. An outline of the Assessment for Learning professional development initiative is provided in Chapter 4. One use of the matrix was that during the post-observation feedback discussion the coach asked teachers to identify where they believed their practice fitted on the rating scale in relation to specific categories of practice, such as *feedback is co-constructed*. The coach and teacher discussed whether there was evidence from the observed lesson or other sources to support the teacher's decision.

Popham (1997) identified three potential problems with the design of rubrics. A rubric may be too task-specific, and therefore limiting. Conversely, it may be too general and not provide enough discrimination. Thirdly, it may include too much detail, resulting in an overly long rubric that is difficult to use. The first and second problems were addressed in the design of the ETTOP rubric (Version 1) because each category was developed from analysing incidents in actual transcripts of discussions between coaches and teachers, in which coaches attempted to unpack, engage with and challenge teachers' theories of practice. A description of how transcripts were obtained, along with the process of developing the categories and levels is provided below. Popham (1997) acknowledged there are implicit challenges in relation to the third problem. While a short rubric may look easier to use than a long one, it may lack precision and clarity that results in widely varying interpretations. The ETTOP Version 1 and Version 2 rubrics illustrate this issue. The Version 1 rubric was shorter than Version 2, partly because the examples, when provided, were brief. As discussed below, when participating coaches in Study 2 requested more clarity and examples, the researcher added indicators and examples for each category and level. As a result, the Version 2 rubric was longer than Version 1. Nevertheless, even with more detail, the ETTOP rubric (Version 2) was only two pages long and in Study 3 no coach described it as too lengthy or cumbersome.

Development of the ETTOP rubric (Version 1)

This section describes how the ETTOP rubric (Version 1) was developed. The rubric is then examined to establish how well it meets the four characteristics of an effective tool. The final area of discussion is how the rubric was changed (Version 2) to increase its effectiveness as a tool. Table 6 shows the ETTOP rubric (Version 1).

Table 6

Engaging with Teachers' Theories of Practice (ETTOP) Rubric (Version 1)

Categories of questions/statements	Basic	Developing	Integrated
Questioning: Probing the teacher's theories of practice	<ul style="list-style-type: none"> • Questions are directed at what the teacher was doing, rather than why e.g. <i>What strategy were you using with these students?</i> 	<ul style="list-style-type: none"> • Asks the teacher to explain his/her beliefs e.g. <i>How do you think this strategy you learned in PD would be useful with these students?</i> 	<ul style="list-style-type: none"> • Asks the teacher to elaborate on his/her expressed theories of practice e.g. <i>Why is it important that we are facilitating rather than ...being the dominant force ...in the conversation?</i>
Clarifying	<ul style="list-style-type: none"> • Assumes an understanding of the teacher's statement and responds without clarifying 	<ul style="list-style-type: none"> • May ask clarifying questions but not about the significant statements e.g. <i>So the aim is to have clean up finished before the bell goes?</i> 	<ul style="list-style-type: none"> • Picks up on significant statements that reflect the teacher's theory of practice e.g. <i>T: They don't have learning strategies</i> <i>C: What makes you say that?</i>
Summarising	<ul style="list-style-type: none"> • Summarises the discussion in terms of what's in the coach's mind e.g. <i>So we've talked about the students asking more open ended questions. In the next observation I'll be measuring students questions to see if this is happening</i> 	<ul style="list-style-type: none"> • Summarises the discussion rather than the teacher's theories of practice e.g. <i>So you're saying that the students contributed well to the discussion</i> 	<ul style="list-style-type: none"> • Reflects the teacher's stated theories of practice back to him/her with the purpose of initiating a deeper discussion on the teacher's Theories of practice e.g. <i>So you believe ... it's more about children collaboratively coming up with meaning rather than coming up with something the teacher's happy with</i>

Challenging	<ul style="list-style-type: none"> • Does not challenge the teacher’s practice. May accept anything the teacher says or may challenge peripheral issues such as the teacher’s use of a worksheet 	<ul style="list-style-type: none"> • Uses a description of the teacher’s actions to suggest changes in practice e.g. <i>When you told the students to find the main idea they became confused. You should have got them to find the clues, then the sub ideas, then the main idea.</i> 	<ul style="list-style-type: none"> • Uses a description of the teacher’s actions with the teacher’s stated theories of practice to suggest changes in practice e.g. <i>Personally I think that going from clues to the minor ideas to the main idea would be more supportive for a reader. Would you agree?</i>
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The ETTOP rubric (Version 1) was initially developed out of anonymous transcripts from another project (Timperley et al., 2008), in which coaches’ feedback was the focus of analysis. Transcripts were examined for examples of coaches’ questions that attempted to unpack teachers’ theories of practice. Out of this process, four categories of questions/statements emerged to form the categories: probing, clarifying, summarising and challenging. Probing questions/statements invited the teacher to give more information. Clarifying questions/statements were used to check that the coach understood the details of the teacher’s explanation. Summarising questions/statements also checked the coach’s understanding, but focussed on a chunk of discussion, rather than a detail. Challenging questions/statements were when a coach confronted differences between the teacher’s and his or her beliefs. As the transcripts from Study 2 became available, the coaches’ questions/statements were compared with the categories already developed. No new categories emerged as a result of this process, but the Study 2 transcripts were used to provide examples of the categories, where possible.

Based on sound theory.

The categories in the rubric were based on sound theory, informed by research on using interview questions (Brenner, 2006; Brown & McIntyre, 1993) and coaching (Ellison & Hayes, 2009; Homan & Miller, 2008; Pask & Joy, 2007). *Probing* enables a coach to elicit the teacher’s opinions and interpretations (Brenner, 2006) and thinking processes. Brown and McIntyre (1993) mainly used probing questions to unpack teachers’ thinking, such as ‘Are there other things you thought were good about your teaching?’ (p. 37). Some teachers in their research reported that the questions and discussion had led them to identify

“specific characteristics of their thinking about their teaching of which they had not previously been conscious” (p. 87). Therefore it appears that the questions were effective in surfacing some teachers’ theories of practice as the teachers reflected on their responses to the questions. Ellison and Hayes (2009) suggest another purpose of probing is to bring focus and clarity to words. For example, if a teacher states, “It’s important to me that my students collaborate” the coach probes the teacher’s concept of collaboration with, “What does collaboration mean to you?” (p. 86).

Clarifying is used to ensure that the coach understands what the teacher is communicating, and to help fill gaps in the coach’s knowledge (Homan & Miller, 2008). *Probing* and *clarifying* are sometimes discussed together because the purpose of probing is often to extend and clarify a person’s statement (Brenner, 2006; Ellison & Hayes, 2009).

Summarising is a “fundamental tool for mediating learning” (Ellison & Hayes, 2009, p. 86) because when teachers’ words are reflected back to them, the teachers may be prompted to examine their thought processes more deeply. Summarising also checks that the other person’s point of view has been understood accurately (Robinson & Le Fevre, 2011). Interestingly, Robinson and Le Fevre (2011) found that participants in open to learning conversations did not often use summarising, although it was not a difficult skill to master. They suggested a possible reason was that participants were often thinking of what they were going to say next rather than carefully listening to the other person’s line of argument.

Pask and Joy (2007) assert that *Challenging* is often needed to stimulate the process of change in the practice of the person being coached. They believe coaches should challenge obstructions to the thinking of people being coached, which inhibit those being coached from taking actions to change their practice. Obstructions may include assumptions held by the person being coached. When a coach challenges these assumptions, it may stimulate difficult introspection in the person being coached that may lead to the person developing new insights (Homan & Miller, 2008).

The rating scale *Basic*, *Developing* and *Integrated* was developed to record and communicate qualitatively the different levels of questions/statements that unpack, engage with and challenge teachers’ theories of practice. A qualitative scale was used to indicate the gradations of expertise for each category. Popham (1997) was influential in the choice

of three levels. He stated that the aim of a rubric was to guide, rather than overwhelm, users. If the rubric contained four levels, coaches may have spent excessive amounts of time trying to discriminate between two middle levels, when the focus of the rubric was how to move to the *integrated* level.

This section illustrates that the ETTOP rubric (Version 1) fulfilled the first characteristic of an effective tool because it was based on a sound theory. The extent to which the rubric met the second and third characteristic, that it was easy to understand and use, and contained directions for how to improve, was tested when the coaches reviewed the rubric during their training sessions and provided feedback on their experience of its use. The process, findings and refinements of the rubric are discussed below.

Second and third characteristics of an effective tool.

The second and third characteristics of an effective tool were interrelated. If, for example, the rubric was not easy to understand and use (the second characteristic), directions for how to improve (the third characteristic) were not likely to be clear to coaches. These two characteristics were tested during the coaches' training sessions (details of the procedures involved in the coaches' training are included in Chapter 6). After studying the rubric and using it to analyse film clips of post-observation discussions, coaches responded to three questions: Do the categories make sense to you? Do the accompanying examples make sense? Any other comments on the rubric? Coaches' responses revealed that they did not find the rubric easy to use and understand. Firstly, they struggled to understand the differences between some categories, particularly clarifying and summarising. They also needed more support to understand the differences between the levels of each category. Secondly, the examples needed to be clearer.

Given these responses it is not surprising that some coaches continued to find the rubric difficult to use after the first training session. Coaches in Study 2 were asked to commit to taping at least one post-observation feedback discussion and use the rubric to analyse their success in unpacking a teacher's theories of practice before the next half-day of training. Between the first and second training session in Study 2 one coach, Kim, emailed the researcher that she found the categories in the ETTOP rubric (Version 1) challenging to use. This communication helped to shape the second training session, which included coaches completing a reflection sheet about their progress to date with the rubric.

Coaches also participated in activities that aimed to give them practice in identifying and using the categories (probing, clarifying, summarising and challenging).

Changes made to the ETTOP rubric (Version 1).

The coaches' feedback indicated that significant revision of the ETTOP rubric (Version 1) was needed to make it easy to use and understand. To make the categories clearer for Version 2 of the ETTOP rubric, used in Study 3, the researcher added information alongside each category to illustrate its meaning. For example, alongside *probing* was "seeking information". Differences between the levels of each category were made clearer through providing examples from Study 2 for each level with the same context used to discriminate between the levels. The following examples were provided for *Summarising-Basic*: "So you need to get off those boys' backs because when you do, they produce the work"; *Developing*: "So you're saying that just taking a step back from those boys worked well because they then got on with their work?"; *Integrating*: "You're giving those boys close attention because you think that's what they need. How do you know that this will help them learn better?"

The researcher noted two additional problems with the design of the rubric while she was coding the transcripts. It was not easy to code questions/statements with *Clarifying-Basic*: "Assumes an understanding of the teacher's statement and responds without clarifying" and *Challenging -Basic*: "Does not challenge the teacher's practice. May accept anything the teacher says or may challenge peripheral issues such as the teacher's use of a worksheet" because both descriptors required an inference of the coach's intention, which could not be gleaned from the transcript. The descriptors were changed respectively to "Clarifies peripheral rather than significant issues related to the teacher's theories of practice" and "Directly or indirectly challenges what the teacher is doing." Additionally, the word *Basic* on the rating scale was an inaccurate descriptor because it suggested that the questions/statements began to engage with teachers' theories of practice, whereas most indicators and examples for this level described questions/statements that did not unpack teachers' theories of practice. Therefore the level was changed to *Not unpacking teachers' theories of practice*.

As a result of the findings from Study 2, another category was added to the rubric for Study 3. Study 2 showed that three out of four coaches did not openly discuss their own beliefs and ideas when engaging with the teachers' theories of practice. Although the

coaches' ideas and beliefs were implicit in the aspects they highlighted for discussion, they were not examined and compared with the teachers' ideas and beliefs. The aim of the new category: *Expressing your own theories of practice (to help clarify the teachers' theories)* was to focus coaches on revealing and discussing their own theories of practice during the observation process.

Table 7 shows the revised ETTOP rubric (Version 2).

Table 7
Engaging with Teachers' Theories of Practice (ETTOP) Rubric (Version 2)

Categories of questions/statements	Not unpacking teachers' theories of practice	Developing	Integrated
Probing the teacher's theories of practice (seeking information)	<ul style="list-style-type: none"> Directed at what the teacher was doing, rather than why e.g. <i>What strategy were you using with these students?</i> 	<ul style="list-style-type: none"> Asks/invites the teacher to explain his/her beliefs e.g. <i>"To what extent would you be getting students to critique each other's work if it wasn't a department requirement to do this?"</i> 	<ul style="list-style-type: none"> Asks/invites the teacher to elaborate on his/her expressed theories of practice e.g. <i>"I need to know more about why you set up the peer assessment the way you did so I can understand what was happening."</i>
Clarifying (checking understanding - details)	<ul style="list-style-type: none"> Clarifies peripheral rather than significant issues related to the teacher's theories of practice e.g. <i>So is the aim to have clean up finished before the bell goes?</i> 	<ul style="list-style-type: none"> Clarifies significant issues which indirectly relate to the teacher's theories of practice e.g. T: <i>"...on the whole they're a very sensible class..."</i> C: <i>"And how much do you think that's because that's who (the students) are or because that's what you expect and they know that?"</i> 	<ul style="list-style-type: none"> Directly clarifies the teacher's theories of practice e.g. T: <i>"...on the whole they're a very sensible class..."</i> C: <i>"We may have different ideas about what "sensible" means. Can you elaborate on what "sensible" means to you?"</i>

Categories of questions/statements	Not unpacking teachers' theories of practice	Developing	Integrated
Summarising: (checking understanding – big picture)	<ul style="list-style-type: none"> Summarises the discussion in terms of what's in the coach's mind. e.g. <i>The coach and teacher discuss that when the teacher hovered over the students, they produced very little work, but later in the lesson the boys had completed the work. The coach's summary of the discussion:</i> "So you're saying that just taking a step back from those boys works quite well, doesn't it?" reflects the coach's evaluation of why the boys produced the work in the end. 	<ul style="list-style-type: none"> Summarises the discussion rather than the teacher's theories of practice e.g. "So you're saying that the boys produced the work by the end of the period. Let's discuss what the triggers might have been that got them working." 	<ul style="list-style-type: none"> Reflects the teacher's stated theories of practice back to him/her with the purpose of initiating a deeper discussion on the teacher's theories of practice e.g. <i>T's next statement is: "I've been told I spend too much time monitoring those boys, but you have to go to where the need is."</i> <i>C: "You believe the boys need a lot of support from you. What do you think is going on in those boys' minds when you are (a) monitoring them (b) leaving them to get on with their work?"</i>
Challenging: (confronting differences)	<ul style="list-style-type: none"> Directly or indirectly challenges what the teacher is doing e.g. "I'm suggesting you need to include more inquiry elements in your lesson". 	<ul style="list-style-type: none"> Challenges the teacher's actions and links to the teacher's theories of practice e.g. "You've said you don't like an inquiry approach because the students will misbehave when you use this technique. I'm asking myself if you really understand the inquiry approach because this hasn't been my experience." 	<ul style="list-style-type: none"> Challenges the teacher's theories of practice directly e.g. <i>Let's discuss your belief that an inquiry approach leads to poor behaviour. I think we have different ideas about this that I want to talk through with you before we go any further."</i>

Categories of questions/statements	Not unpacking teachers' theories of practice	Developing	Integrated
Expressing your own theories of practice (to help clarify the teachers' theories)	<ul style="list-style-type: none"> • Directly or indirectly states own theory of practice e.g. <i>The teacher stated that the lesson was awful because the students were too noisy. The coach pointed out that students were doing their work and there were few behaviour issues and asked, "Where's the awful lesson?" The coach indirectly expressed his/her own theory of practice that a classroom does not have to be quiet for effective learning to take place.</i> 	<ul style="list-style-type: none"> • States own theory of practice and links to the teacher's theory of practice e.g. <i>The coach says that he/she does not believe a classroom needs to be quiet for effective learning to take place and adds that he/she has noticed that the teacher really values a quiet classroom and spends a lot of classroom time managing noise levels.</i> 	<ul style="list-style-type: none"> • States own theory of practice and develops a discussion of the teacher's theory of practice e.g. <i>The coach says that he/she does not believe a classroom needs to be quiet for effective learning to take place and adds that he/she has noticed that the teacher really values a quiet classroom and spends a lot of classroom time managing noise levels. The coach asks the teacher to talk about why a quiet classroom is important to the teacher. The discussion then links to the ideal conditions for quality learning with this group of students.</i>

Routines around the use of the rubric.

The fourth characteristic of an effective rubric is that it is embedded into routines that require learners to examine their practice. Each coach in Study 2 was asked to tape a post-observation feedback discussion between him or her and a teacher, and to use the tool to reflect on the types of questions and statements they used. This routine was partially successful. Due to competing pressures of time, only one coach completed the exercise, therefore the routine could be criticised as impractical. Nevertheless, the coach (Kim), who did follow the routine, made the most significant changes in her practice after the training sessions, and one of her teachers, Tania, reported that she had changed her thinking and practice at Time 2. Therefore, the routine was used again in Study 3, but coaches were also encouraged to develop their own routines around the use of the tool. For example, some coaches in Study 3 referred to the ETTOP rubric (Version 2) as they were conducting observation discussions to check that they used the types of questions and statements that

engaged teachers' theories of practice. This adaptation met the fourth characteristic of an effective tool because it required the coaches to examine their practice.

In summary, the Version 1 and 2 ETTOP rubrics were developed to meet the four characteristics of an effective tool: based on sound theory, well designed (easy to understand and use), containing directions for how to improve and including routines around its use that required coaches to examine their practice. The use of the Version 1 rubric throughout Study 2 revealed that extensive revisions were needed to meet the second and third characteristics. The rubric was subsequently revised and Version 2 was used with coaches in Study 3. Chapter 6 and 7 discuss the effect on coaches' and teachers' practice of using the Version 1 and 2 ETTOP rubric in Study 2 and 3 respectively.

Chapter 6:

Study 2

The aim of Study 2, to help coaches engage with teachers' theories of practice, arose out of the findings from Study 1. When coaches bypassed teachers' theories of practice, feedback was minimally effective in changing practice. Although frameworks exist that may assist coaches in engaging with teachers' theories of practice, (for example, Robinson & Le Fevre, 2011, Timperley, 2011), there is a paucity of research into the kinds of questions and statements that help coaches engage with, unpack and challenge teachers' theories of practice. As detailed in Chapter 5, the Version 1 and 2 ETTOP rubrics were developed to address this gap in the research. Chapter 6 investigates the effectiveness of the ETTOP rubric (Version 1) in helping coaches unpack, engage with and challenge teachers' theories of practice in ways that teachers reported changes in their practice.

Methods

An overview of the methodology employed in Study 2 is included in Chapter 3. Study 2 was an exploratory three-phase study. Phase One involved data collection to establish a baseline. In Phase Two the rubric was designed and coaches were trained in its use. Phase Three consisted of a second round of data collection and concluded with a refinement of the rubric.

Participants.

Participants in Study 2 worked in the secondary sector. Coaches were volunteers either from a school support service (this term was explained in Chapter 4) or they were teachers with specific responsibility to work with other teachers in cycles of observation and feedback. The researcher used contacts within the school support service and personal networks to recruit participants. The participating teachers involved were also volunteers, nominated by their coaches because they were already in a coaching relationship. Teachers' learning areas were not a consideration in the selection of participants, and it was a coincidence that three of the six teachers taught Science.

Two coaches were specialist classroom teachers. This position was introduced into New Zealand secondary schools in 2006 to provide professional development, guidance, mentoring and induction to other teachers in their schools. Specialist classroom teachers

often support provisionally registered teachers, who have normally completed an initial teacher education qualification. These teachers are employed in a school while undergoing at least a two-year induction and mentoring programme before they can gain full teacher registration. Four participating teachers were provisionally registered. Table 8 gives a description of the six teacher participants, and their coaches, for whom there was Time 1 and Time 2 data.

Table 8
Participants in Study 2

Coach	Teacher	Years teaching	Subject
Kim	Tania	3–5	Mathematics
Kim	Patrick	0–2	Science
Joe	Brian	6–10	Science
Diane	Jim	3–5	English
Mollie	Kathy	0–2	Visual Arts
Mollie	Alison	0–2	Science

Data collected from all six teachers consisted of Time 1 and 2 post-observation audiotapes and Time 1 follow-up interviews. Because the Time 2 post-observation discussions with Mollie and Alison took place in the last week of the school year, it was not possible for the interviewer to complete a Time 2 follow-up interview with them. Therefore six teachers were included in the post-observation audiotape data, but four in the follow-up interview data.

Research procedures.

Procedures for Study 2 involved three phases. In phase 1 the coaches observed teachers and audio taped post-observation discussions. They sent the audiotapes to the researcher, who arranged for them to be transcribed. The researcher then conducted follow-up interviews with each teacher, at the beginning of which the teacher completed a questionnaire. In Phase 2 coaches were trained in how to unpack, engage with and challenge teachers' theories of practice using the ETTOP rubric (Version 1). Coaches' feedback on the rubric was collected during the training sessions. In Phase 3 a second set of post-observation feedback transcripts, questionnaires and follow-up interviews, was collected. Data collection for the three phases of Study 2 is outlined in Table 9.

Table 9
Study 2 Phases and Data collection

Phase	Data collection	Who
1	<ul style="list-style-type: none"> • Time 1 Transcripts of post-observation discussions • Time 1 Questionnaires • Time 1 Follow-up interviews 	<ul style="list-style-type: none"> • Coaches and teachers • Teachers • Teachers
2	<ul style="list-style-type: none"> • Coaches' feedback on use of the rubric 	<ul style="list-style-type: none"> • Coaches
3	<ul style="list-style-type: none"> • Time 2 Transcripts of post-observation discussions • Time 2 Questionnaires • Time 2 Follow-up interviews 	<ul style="list-style-type: none"> • Coaches and teachers • Teachers • Teachers

The researcher set up each follow-up interview directly with participating teachers. She aimed to complete the interviews within one week of the post-observation discussions. However, holidays, sickness and busyness meant that four out of 10 follow-up interviews took place up to three weeks after discussions with the teachers' coaches. Nevertheless, as with Study 1, teachers generally recalled the feedback discussion. When necessary they were prompted using extracts from the transcripts, because the aim was to probe how the feedback was or was not aligned with the teachers' theories of practice, rather than what feedback the teachers recalled. At the beginning of the follow-up interview, teachers completed a questionnaire. The rationale for using a questionnaire and details of its administration are discussed in Chapter 3.

Training the coaches (Phase 2).

Coaches needed training in how to engage with teachers' theories of practice because Study 1 showed that this important aspect was absent in feedback discussions with teachers. Two aims for the training sessions were that coaches could use the rubric to reflect on how successfully they engaged with teachers' theories of practice when conducting their feedback discussions, and provide feedback on any issues with the design of the ETTOP rubric (Version 1) so it could be refined for Study 3. It was anticipated that, as a result of training, coaches would improve in their engagement with teachers' theories of practice in Phase 3 of the study.

There were two training sessions, both of which took place between Phase 1 and Phase 3. The first was one day, and a second half-day took place a month later so that

coaches had time to use the ETTOP rubric (Version 1). An experienced facilitator conducted these sessions, and the researcher was not present, to reduce the possibility that coaches' responses about the ETTOP rubric (Version 1) could be influenced by social desirability (de Vaus, 2002). Both sessions were audio taped with the permission of all participants and coaches' written responses on the use of the rubric were also collected. One coach, Diane, could not attend the first session through illness, but she met with the facilitator before the second session to cover the main points.

In the first session the facilitator introduced the coaches to the concept of theories of practice. She then discussed the importance and challenges of unpacking these in feedback discussions, using data from Study 1 and some Phase 1 data from Study 2. Coaches were introduced to the ETTOP rubric (Version 1) as a tool to help them unpack, engage with and challenge teachers' theories of practice. As the coaches viewed film clips of role-played post-observation discussions they attempted to classify the actor coach's questions and statements using the categories and levels of the ETTOP (Version 1) rubric. Chapter 5 describes how the coaches' feedback was collected. Based on the coaches' feedback, the second session focussed on discussing the coaches' experiences of using the ETTOP (Version 1) rubric and coaches also practised how to identify and use each of the categories of the ETTOP rubric (Version 1): probing, clarifying, summarising and challenging.

Data Gathering Instruments.

Central to interviewing teachers about their questionnaire responses and the post-observation discussion was understanding teachers' *thinking* in relation to the feedback and feed forward they experienced. The questionnaire responses and follow-up interviews aimed to prompt the teachers to identify how they believed the coach's feedback and feed forward aligned with their theories of practice, and changes they subsequently made in their teaching. Research instruments included an audiotape of each coach's post-observation feedback discussion with each teacher, a teacher questionnaire, and a follow-up interview with the teachers.

The feedback discussion.

After audiotapes of the feedback discussion were transcribed, the researcher chunked all incidents of feedback in which the coaches attempted to engage with teachers' theories of practice. The purpose of chunking was to select specific incidents of feedback to

focus on during the follow-up interview. A similar process to that employed in Chapter 4 was followed.

The questionnaire.

There were two reasons for administering a questionnaire. Firstly, the questionnaire was used to triangulate data from the interviews. When a teacher's response to an item in the questionnaire appeared to be inconsistent with what he or she said during the interview, the response was clarified and discussed. Secondly, responses to the questionnaire at Time 1 served as baseline data. When the questionnaire was administered to the teachers at Time 2, after coaches were trained in the use of the ETTOP (Version 1) rubric, responses were analysed to determine the teachers' perceptions of changes in their beliefs and practice and their coaches' practice.

Themes in the questionnaire were developed out of the discussion in Chapter 2 and the findings of Study 1 on the importance of surfacing teachers' theories of practice in an important process towards effecting conceptual change. The questionnaire consisted of four sections. Section 1 focussed on the teacher's beliefs in relation to teaching and learning, section 2 on the teacher's learning processes and experiences of professional development during the last year, section 3 on the teacher's experiences of being coached and section 4 included demographic information. The questionnaire used a six point Likert scale (strongly disagree, disagree, somewhat disagree, somewhat agree, agree, strongly agree) as discussed in Chapter 3. The questionnaire is in Appendix B.

The eight items related to teacher beliefs were developed from the literature on teachers' perceptions of their understanding of the theories of practice that drive their teaching. For example Item 1 "*I find it easy to explain my beliefs about why I teach the way I do*" drew on the research of Brown and McIntyre (1993) who found that experienced teachers could not articulate the mental processes that lay behind the decisions they made in their classroom teaching. Eight items about the teacher's learning processes drew on the research around how people learn. Item 2 stated "*When I am challenged with new knowledge about how students learn, I relate it to what I already know*". This question aligns with the first finding of Bransford et al. (2000) that new learning needs to engage with people's preconceptions of how the world works, help people become aware of new information/skills and then integrate the new information/skills into people's current values and belief systems. Fourteen items about the experience of being coached focussed on the

teachers' perceptions of their coaches' success in providing feedback that improved their teaching. One item asked the teachers to rate "*The coach has beliefs about teaching effectively that are different from my beliefs about teaching effectively*" because change may be hindered when teachers perceive coaches as having the same ideas as them (e.g. Pask & Joy, 2007; Spillane, Reiser, & Reimer, 2002). For example, if a coach challenges a teacher's beliefs and ideas without stating his or her own contrasting theory of practice, the teacher may interpret the coach's feedback as affirmation of his or her current practice. In this situation the teacher may state that he or she and the coach share similar beliefs and ideas about effective practice because the teacher has reframed the coach's feedback through his or her own beliefs and ideas.

Before the questionnaire was administered to participants, it was trialled with two teachers individually, neither of whom was a participant in the three studies. Each teacher went through the questionnaire as a "think-aloud" in the researcher's presence, explaining the thought processes as he or she approached each item. This process verified that the items in the questionnaire were clear and addressed what was intended. Issues and limitations involved in using the questionnaire were discussed in Chapter 3.

The follow-up interview.

Since interviews were included in all three studies, the rationale for using interviews was discussed in Chapter 3. This section describes features of the interviews that were specific to Study 2. Because it was anticipated that teachers would need prompting to elicit their beliefs and ideas, interviews were open-ended and semi-structured.

The purpose of the first two questions was to establish the extent to which acting on feedback was linked to the prior development of co-constructed goals that had engaged with the teachers' theories of practice, and teachers' understanding of the term "feedback". The next three questions sought to determine teachers' perceptions of the impact of the coaches' feedback. These questions focussed on what changes teachers believed they made in their classroom practice as a result of the feedback and why the teachers believed they did or did not make changes. The researcher anchored these questions with reference to the chunks of feedback described earlier in this chapter. The purpose of the final four questions was to elicit any differences between the teachers' and coaches' theories of practice. These questions explored the relevance of the coaches' feedback in relation to the teachers' next steps and the significance of the coaches' feedback in changing the teachers' practice. As

with Study 1, prior to the interview, teachers were offered the opportunity to edit the transcripts of their follow-up interviews. No teachers requested that any comments be edited out of the transcript.

Data Analysis

This section outlines the methods of data analysis for the three sources of data employed in this study: the transcript of the post-observation discussion between each coach and teacher, the questionnaire completed by teachers, and the follow-up interview between the researcher and teacher.

The transcript of the feedback discussion.

The coaches' feedback was coded using the four categories and three levels of the ETTOP rubric (Version 1), which allowed the researcher to determine shifts in coaches' practice. As with Study 1, when a coach repeatedly used one category to develop a point, the section was chunked as one incident. The following chunk from a transcript of Diane's discussion with Jim is an example of how an extract was coded:

Diane (coach): The 'do now' which you did orally, is supposed to be something (students) can do totally independently for the first five minutes as a settling exercise.

Jim: Yes.

Diane: So, with you running it as a class conversation, it probably defeated –

Jim: - the purpose of that –

Diane: -the purpose.

This section was classified as "Challenging - Basic".

External moderation of coding the transcripts.

An external moderator, who also coded the feedback in Study 1, checked the coding by category and level. Because she conducted the training for the coaches she had developed a depth of understanding about the development of the ETTOP (Version 1) rubric. Firstly, the external moderator was introduced to the coding rules and any issues were clarified. The coding rules were:

- Coding was primarily in relation to the coach's interactions. However, the coding also considered the teacher's response (e.g. when the coach asked a "Basic" question but received a response that revealed the teacher's theories of practice, the question was coded more highly because of the response).
- A chunk was only coded into one category.
- If a chunk could be coded in more than one category, the coder examined whether one code led to another (e.g. if the coach summarised with the purpose of probing further, probing was the code).

The researcher chunked transcripts prior to coding. Transcripts from both Time 1 and Time 2 were included in the checking process to mitigate rater drift over time (Shadish et al., 2006). The external moderator and researcher separately and simultaneously coded a transcript and then compared their coding. When the coding achieved 85% reliability, with the number of agreements between the two coders divided by the total number of coding incidents (Miles & Huberman, 1994), they stopped coding. Three transcripts were coded at Time 1 and one at Time 2 before 85% agreement was reached.

The questionnaire.

There were two purposes in analysing the questionnaire: to investigate what shifts occurred in the teachers' perceptions between the first and second discussion with their coaches and whether these shifts were linked with coaches engaging to a greater degree with the teachers' theories of practice, and to refine the questionnaire for Study 3. To meet the first purpose, each item of the Time 1 and Time 2 questionnaires was compared. If a teacher scored an item more favourably at Time 2 the item was scored with a +, if less favourably with a -, and no change with a 0. The extent of shifts on the Likert scale was also recorded. For example, if a teacher changed in an item from *Somewhat agree* at Time 1 to *Strongly agree* at Time 2, the change was recorded as +2. To meet the second purpose, the researcher analysed every item in both Time 1 and 2 questionnaires across all participants to determine those that did not elicit a range of responses. These items were eliminated from the questionnaires for Study 3.

The follow-up interview.

Transcripts of the follow-up interviews were also coded to establish the extent to which feedback that engaged teachers' theories of practice impacted on their thinking and subsequent reports of practice at Time 1 and Time 2. As with Study 1, pattern codes (Miles & Huberman, 1994) were used to organise teachers' responses. The researcher initially noted each teacher's responses to the interview questions and then formed categories from responses that recurred among the teachers. The unit of analysis was a chunk of a teacher's statement related to the coach's feedback. When the teacher's statement was lengthy, the researcher paraphrased the content. The coding process was partially inductive because categories were formed from teachers' statements, but the interview questions also directed the types of responses. Categories were:

- Teachers: Changes made as a result of feedback
- Teachers: Changes not made as a result of feedback
- Coaches: Changes in coaches' feedback between Time 1 and Time 2.

An example of *Teachers: Changes made as a result of feedback* is from a transcript of Kim's discussion with Tania. Tania stated that she gave students differentiated tasks in the next lesson after her observation discussion with Kim. Because teachers reported a range of changes, a sub-category of *general/specific explanation of what each teacher did as a result of the feedback* was needed. Tania's example was categorised as *specific* because she explained that the differentiated task involved allowing students to pick their own level of task. A second sub-category was *Linked/not linked to engaging teacher's theory of practice*. Tania indicated that the change was consistent with her existing theory of practice when she said, "*I've been meaning to do more differentiation ...*", therefore this chunk was coded as *Linked to engaging teacher's theory of practice*. As this example shows, the researcher initially coded an interaction with the appropriate pattern code, then coded it again into one or more of the sub-categories. Figure 3 describes the coding framework.

<p>Teachers: Changes made as a result of feedback</p> <ul style="list-style-type: none"> • General/specific explanation of what teacher did as a result of the feedback • Linked/not linked to engaging teacher’s theory of practice
<p>Teachers: Changes not made as a result of the feedback</p> <ul style="list-style-type: none"> • Reason given for lack of change • No reason given for lack of change • Linked/not linked to engaging teacher’s theory of practice
<p>Coaches: Changes in the coach’s feedback between Time 1 and Time 2</p> <ul style="list-style-type: none"> • Categories of questions/statements • Invitational style

Figure 3. Coding framework for interviews with teachers.

Integrating the three data sources.

Data from the post-observation discussions, the questionnaires and follow-up interviews were triangulated. Each of the three data sources was the starting point for triangulation, depending on the results of data analysis. For example, if an analysis of the questionnaires showed a teacher consistently scored an improvement in the “Coaching” section at Time 2, the researcher re-examined both the coding from the post-observation discussions for that teacher and the coding framework of the follow-up interviews to determine whether there were patterns across the data sources.

The researcher also analysed the coding of Time 1 and Time 2 post-observation discussions to note shifts or lack of shifts in the coaches’ questions and statements. The follow-up interview coding framework and questionnaires were compared with these data to note any consistent patterns in how the teachers perceived the coaches had engaged with their theories of practice and what subsequent changes the teachers perceived they had made in their practice. Imagine, for example, that a coach made significant shifts from Time 1 to Time 2 in using *integrated* questions and statements. The teachers of that coach also reported positive changes in the way the coach engaged their ideas during the post-observation discussion. The follow-up interview data analysis showed that at Time 2 teachers reported specific changes in their teaching practice. In this situation the

triangulated data would reflect a strong relationship between the coach's engagement with teachers' theories of practice and subsequent shifts in the teachers' practice.

Findings

Findings are reported and discussed in three sections. The first report is how the coaches changed the types of questions/statements they used to engage with teachers' theories of practice and how the teachers perceived that the coaches' style changed over the study. The second focuses on the changes teachers did or did not make in their practice, linking to engagement with their theories of practice. The third area relates to an emerging theme about the importance of the coach expressing his or her own theory of practice.

Changes in how coaches engaged with teachers' theories of practice.

Data from four coaches and six teachers are reported on in this section. Table 10 shows the coaches' changes in levels of feedback questions and statements at Time 1 and Time 2 as a number and percentage of the coach's total feedback.

Table 10

Changes in Levels of Feedback to Teachers at Time 1 (T1) and Time 2 (T2) as a number and percentage of total feedback

Coach	Diane		Mollie				Joe			Kim		
Teachers	Jim T1	Jim T2	Kathy T1	Kathy T2	Ali T1	Ali T2	Brian T1	Brian T2	Pat T1	Pat T2	Tania T1	Tania T2
Basic	3 (18%)	5 (23%)	1 (6%)	1 (7%)	2 (13%)	0 (0%)	2 (22%)	0 (0%)	5 (28%)	0 (0%)	8 (17%)	1 (3%)
Developing	14 (82%)	13 (59%)	13 (81%)	12 (86%)	9 (60%)	9 (75%)	7 (78%)	13 (100%)	13 (72%)	10 (83%)	34 (74%)	22 (74%)
Integrated	0 (0%)	4 (18 %)	2 (13%)	1 (7%)	4 (27%)	3 (25%)	0 (0%)	0 (0%)	0 (0%)	2 (17%)	4 (9%)	7 (23%)
	17 (100%)	22 (100%)	16 (100%)	14 (100%)	15 (100%)	12 (100%)	9 (100%)	13 (100%)	18 (100%)	12 (100%)	46 (100%)	30 (100%)

Shifts in coaches' questions/statements from *Basic* to *Integrated* is the focus of analysis because *Basic* indicates no engagement, whereas *Integrated* indicates an engagement, with teacher's theories of practice. *Developing* questions/statements are not discussed because this level represents progress towards, rather than engaging with teachers' theories of practice.

Overall, coaches used a lower percentage of *basic* and a higher percentage of *integrated* levels of questions/statements in their post-observation discussions with teachers at Time 2, although there was some individual variability. The average percentage of *basic* questions/statements reduced from 19% at Time 1 to 9% at Time 2. Conversely, the average percentage of *integrated* questions/statements increased from 9% at Time 1 to 15% at Time 2, indicating coaches' greater engagement with teachers' theories of practice. One coach, Kim, showed a greater shift than other coaches. Her average percentage at the *basic* level reduced from 23% at Time 1 to 2% at Time 2 and her average percentage increased at the *integrated* level from 5% at Time 1 to 20% at Time 2.

An example of Kim's shift from *basic* at Time 1 to *integrated* feedback at Time 2 involved Tania. During the Time 1 feedback discussion, Tania told Kim that she did not agree with discovery learning. She was concerned that discovery learning took too much time and caused students to "go the wrong way". Kim tried to encourage Tania to use discovery learning more frequently by stating why it was effective:

Kim: ...the discovery lesson, problem solving investigations, these are powerful lessons -

Tania: OK.

Kim: - for maths. It links beautifully into the child actually discovering the formula for themselves, it's more powerful and more fun than the teacher ...saying what Pythagoras' theorem is.

Tania: Mmm

This exchange was classified as *Challenging – basic* because Kim was indirectly challenging Tania, but she did not make any links with Tania's expressed theory of practice and Tania engaged only minimally in the discussion. In her follow-up interview, Tania did not mention any feedback related to discovery learning. When the researcher raised the issue, Tania said she did not agree with discovery learning because she grew up in a

country that had a strong focus on tests and she believed that preparing students for tests was antithetical with discovery learning.

By Time 2, Kim had changed her approach in the feedback discussion. She appeared to have been concerned about an aspect of Tania's teaching style she had observed: students were required to work in total silence for a period of time. Rather than attempting to persuade Tania to change her approach, Kim asked Tania to explain her theory of teaching the 21st century student at their school, and how Tania taught now compared with how she was taught. An extended discussion followed in which Tania's theories of practice were surfaced. Tania reflected that her teachers had been very formal but she believed a different style was needed for the 21st century learner. Due to the internet, she believed teachers had less power. *"It just reinforces that [teachers] need to be open, we need to be flexible and willing to work with [students]."* Kim explained her own theory of practice around teaching mathematics in the 21st century and checked the extent to which Tania agreed with this. Kim also created dissonance when she challenged Tania to adopt the flexibility she believed to be important, and use the silent part of the lesson as an opportunity to provide individual support for selected students. In her second follow-up interview, Tania identified that Kim's style in the feedback discussions had changed: *She (Kim) took a few steps back from actually trying to coach me so much"*. From the description above, it is clear that Kim did not actually "step back" but she approached the discussion differently, with the result that Tania felt it had been less directive.

Two other coaches, Diane and Joe, are discussed because they had complete data sets for one teacher each. Diane and Joe generally improved in the types of questions they asked to engage with teachers' theories of practice but, unlike Kim, they did not promote a discussion about the teachers' theories of practice compared with their own. For example, in Diane's Time 2 discussion with Jim, she talked about the importance of teaching students the purpose of an activity. Jim initially stated that his purpose was to teach students both values and literacy strategies but he had not explicitly shared this with students.

Diane: So do you believe that students learn better if they're given a purpose for everything they do?

Jim: I certainly do ...we've been discussing the purpose for completing tasks and doing this reading ...it's usually in the context of having to

complete their tests and so on. Which I am not sure is an aim in itself...

Diane Pretty short term!

Diane was attempting to unpack Jim's theory of practice around sharing with students why they were doing a particular activity but Jim appeared to struggle to think of a purpose beyond passing a test. Diane indicated that she had a theory of practice about the issue with her riposte "*Pretty short term!*" This response prompted Jim to reflect that he wanted to teach the students to question what they read.

In the follow-up interview, Jim remembered but misunderstood the feedback. When asked if he had acted on the feedback, Jim said:

"Absolutely, absolutely. Let's say we're dealing with values, so put values on the board, discuss the values, meaning of the values, linking it into their knowledge ...if one of the values is excellence ...ask the question, 'what does excellence mean to you?' and 'when you are presenting a project, how do you express excellence, what does it mean to you?'"

Jim's response suggested that he had confused explaining the purpose of learning with unpacking the meaning of a topic and engaging students' prior understanding. Diane could have reduced Jim's misunderstanding about sharing with students the purpose of learning if she had stated her theory of practice about this aspect of learning and teaching and invited Jim to discuss his ideas, as Kim did with Tania.

Three out of the four teachers perceived that their coaches changed between the Time 1 and 2 feedback discussions. Tania's perceptions were discussed above. Jim believed Diane led him to think more about his practice at Time 2 through asking open-ended questions along the lines of "*This is what I saw, can you explain that?*" Jim reported that this type of question demonstrated that Diane understood Jim had reasons for the actions he took during the lesson and she wanted to discuss them. Brian believed that his coach, Joe, previously "*jumped into things I could do differently without so much of that listening to me talking about it.*" At Time 2 Brian reported Joe had changed because he provided the opportunity for Brian to discuss his analysis of the lesson.

Patrick did not believe his coach, Kim, had changed between Time 1 and Time 2. Although analysis of the post-observation transcripts showed that Kim had decreased the percentage of *basic* questions from 28% at Time 1 to 0% at Time 2, and increased the percentage of *integrated* questions from 0% at Time 1 to 17% at Time 2, she did not develop a discussion at Time 1 or Time 2 in which Patrick's theories of practice were explored. In the follow-up interview, Patrick discussed only feedback from Kim that had affirmed his current practice.

Coaches' changes in levels of feedback and teachers' reports in the follow-up interviews were compared with teachers' questionnaire items. Table 11 shows differences in teachers' responses in questionnaire items that related to their perception of how coaches changed from Time 1 to Time 2. Differences are recorded as (+) when the teacher scores the item more positively and (-) when the item is scored more negatively at Time 2.

Table 11
Questionnaire Responses: How Coaches Changed Between Time 1 and Time 2

Coach	Diane	Joe	Kim	
	Jim	Brian	Patrick	Tania
The coach has beliefs about teaching effectively that are different from my beliefs about teaching effectively	0	0	+1	0
Sometimes the coach raises aspects of my teaching that are difficult for me to discuss	-1	+1	-1	0
Most of the feedback the coach gives is new learning for me	0	+1	0	+2
The coach asks questions related to my beliefs about teaching and learning	0	-1	-1	+1
The coach asks me questions about what my thinking was when I used a specific strategy or method in my classroom teaching	0	+3	0	+1
The coach seeks my ideas when establishing my next steps in learning	0	+1	0	0

No item showed a consistent pattern of shift. The responses of individual teachers however, are interesting when compared with their perceptions in the follow-up interviews. Although Jim said his coach was asking more open-ended questions, he scored little change related to this aspect on the questionnaire. Brian's questionnaire responses, on the other hand, were consistent with his comments at the Time 2 interview. He said his coach, Joe, provided more opportunity for him to express his thoughts about the lesson; Brian moved three Likert points in relation to the item "*The coach asks me questions about what my thinking was when I used a specific strategy or method in my classroom teaching*". Patrick did not believe his coach had changed and his questionnaire responses mostly showed a zero or negative shift. Tania believed her coach had changed and she indicated positive shifts for three of the six items.

Changes in teachers' thinking and practice.

While changes were identified in each coach's practice, corresponding changes in reported teacher practice were not generally evident. Three of the four teachers showed similar patterns in their follow-up interviews and questionnaire responses for Time 1 and Time 2 in relation to feedback actioned and their thinking processes about the feedback. Table 12 shows differences in teachers' responses in questionnaire items that related to how they perceived they had changed their thinking and practice from Time 1 to Time 2. Differences are recorded as (+) when the teacher scores the item more positively and (-) when the item is scored more negatively at Time 2.

Table 12

Questionnaire Responses: Teachers' Perceptions of Changes in their Thinking and Practice Between Time 1 and Time 2

Coach	Diane	Joe	Kim	
Teachers	Jim	Brian	Patrick	Tania
I have significantly changed my beliefs about how to promote student learning through feedback given by the coach	-1	0	0	+3
My reflective conversations with the coach have led me to think about an aspect of my teaching in a new way.	+1	-1	0	+2
My reflective conversations with the coach have led me to try new things in the classroom.	0	-1	0	0
I have significantly changed my beliefs about how to promote student learning through reflective conversations with the coach.	-2	0	0	+3

Both the follow-up interviews and questionnaire responses indicated that Tania perceived she had changed her thinking and practice. At Time 1, Tania was reluctant to offer students differentiated activities because she could not easily check that they would follow the process she prescribed. In the follow-up interview at Time 2, she acknowledged that she had shifted in her thinking and practice because she now let certain classes have more control and she was differentiating the activities for groups within the class. It is possible that this change was linked with her feedback discussion at Time 2 in which Kim had devoted most of the discussion to exploring Tania's beliefs about teaching in the 21st Century in New Zealand, compared with the way Tania was taught 20 years before in the United States.

Teachers also described incidents in the feedback discussions when their thinking was not aligned with their coaches' theories of practice. For example, at Time 1 Kim advised Patrick, a first year teacher, to pace himself because Patrick said he was using the

whole weekend to plan his lessons for the next week. In the follow-up interview, Patrick said that he had not acted on this advice. He was driven by a theory of practice that every lesson should be well planned, with high interest activities, which took time to prepare. If Kim had probed Patrick's theory of practice she may have been able to develop solutions with him that were less time intensive.

An emerging theme: The significance of the coach's theories of practice.

A new theme that emerged from the findings was the importance of coaches expressing their own theories of practice during the observation process. Of the coaches in Study 2, Kim alone, in her discussions with Tania, explicitly explained and discussed her own theories of practice. That Tania was the only teacher who believed she had significantly changed her thinking and practice suggests this aspect could be a key to changing teachers. However, the ETTOP rubric (Version 1) was of limited value both in helping coaches develop this aspect and in measuring the extent to which they expressed their own theories of practice with the purpose of developing a discussion about the teachers' beliefs and ideas.

Coaches needed to surface their own and teachers' theories of practice through every part of the observation process. A pre-observation discussion is important because through it coaches and teachers can come to a common belief and understanding of the goals for the observation and the practice that is indicative of the achievement of these goals. It did not appear that most coaches had facilitated a pre-observation discussion with their teachers to develop an agreed goal for the observation and an understanding of what practice would reflect the achievement of the goal. At Time 1 only one coach, Kim, discussed the purpose of the observation with her teachers during the feedback discussion. At Time 2, Joe also did this.

Discussion

In Study 2 all three coaches made some shifts in the types of questions and statements used at Time 2 to unpack teachers' theories of practice. Three out of four teachers recorded that coaches made more space for them to express their thinking. However, only one teacher, Tania, believed she had changed her thinking and practice substantially between the Time 1 and Time 2 feedback discussions. An explanation for this lack of shift was that coaches did not engage with teachers' theories of practice deeply enough to promote a shift in the teachers' thinking and practice. The findings suggest that a

deep engagement with teachers' theories of practice includes three aspects. Firstly, questions/statements need to be at a level that not only unpacks but also engages with teachers' theories of practice. Secondly, questions/statements need to challenge teachers' existing ideas and beliefs. Thirdly, coaches need to express their own theories of practice and promote discussions in which the coaches' and teachers' theories of practice are compared.

Coaches need to engage with teachers' theories of practice at a deep level because conceptual change takes place within a teacher's complex conceptual framework that is composed of presuppositions, beliefs and mental models organised in theory-like structures (Vosniadou et al., 2008). It is not sufficient to unpack teachers' theories of practice. This may surface their concepts and beliefs, but will not in itself change their conceptual frameworks. An example, as discussed above, is when Diane attempted to discuss Jim's beliefs in relation to his actions. Although Jim appreciated being asked to explain the reasons for his actions, the discussion did not seem to lead to substantive changes in Jim's thinking or practice because Diane failed to directly challenge Jim's beliefs and concepts.

To achieve conceptual change, a teacher needs to experience dissonance with their current conceptual framework or be presented with an alternative concept. Only one coach, Kim, began to use dissonance and alternative concepts to effect change. As described above, she firstly helped Tania explore her current theory of practice, and where it had originated. Secondly, Kim discussed her own theory of practice, which showed Tania an alternative concept. Thirdly, she created dissonance through challenging Tania to consider her current practices in relation to her espoused beliefs. Tania was the only teacher who believed that her thinking and practice had significantly changed between Time 1 and Time 2.

Training was a key in helping coaches to engage with teachers' theories of practice but it needed to be revised for Study 3 to focus on engaging with teachers' theories of practice at a deeper level than was achieved in Study 2. In a study by Timperley et al. (2008) there was evidence that appropriate training for coaches can result in outcomes where teachers state that they value the interactions and intend to change their practice. Although the coaches were trained in how to co-construct new learning with teachers through respectful interactions, when their interactions were analysed, less than half showed evidence of this. The coaches' feedback discussions focussed on practical advice,

rather than making reference to principles of effective teaching (Timperley, 2014). After further training that focussed on engaging teachers' current beliefs and understandings, coaches were more successful in co-constructing new learning, and the teachers rated the interactions highly in terms of how they intended to change their practice (Timperley, 2014). The training in Study 3 also needed to emphasise engaging with teachers' theories of practice at every stage of the observation process.

In summary, Study 2 showed that with training coaches improved the types of questions and statements they used to engage with teachers' theories of practice, but this did not generally result in a corresponding improvement in teacher thinking and practice. To effect teacher change at a conceptual level, it is not sufficient for coaches to prompt teachers' theories of practice. They also need to be able to develop a discussion in which the teachers' theories of practice are explored, the coaches express their own theories of practice, and the two theories of practice are compared. A possible outcome of this process is that the teachers experience dissonance with their current conceptual frameworks. Coaches need to engage with this process during both the pre-observation and post-observation discussion. Training is needed in how to help coaches engage with teachers' theories of practice at a deep level.

Implications for Study 3

The findings from Study 2 indicated that four types of changes were required to improve Study 3. Data from Study 2 suggested that coaches did not generally engage with teachers' theories of practice. Therefore, firstly, the coaches' training needed to be changed to help coaches improve in this aspect and, secondly, coaches in Study 3 were interviewed to record their perceptions of how they attempted to engage with teachers' theories of practice in the follow-up discussions. Thirdly, research instruments needed some refinement to capture changes in teachers' thinking. Consequently, questions in the teachers' follow-up interviews and questionnaire were adapted. Details of changes in the coaches' training, interviewing coaches, and instruments are included in Chapter 7. Fourthly, the ETTOP rubric was refined to make it easier for coaches to use and understand and to emphasise the importance of coaches revealing their own theories of practice in their discussions with teachers. These adaptations are discussed in Chapter 5.

Another change in Study 3 arose out of attrition of participants in Study 2. The study began with four coaches and eight teachers, but at Time 2 there was a complete set of

data for only three coaches and four teachers. The main reason for the missing data was the timing of Study 2, which took place in the second half of the year. One coach, Mollie, completed her feedback discussions in the last week of the school year. By the time the discussions had been transcribed, the teachers were not available to be interviewed; they had left school for their summer holidays. This experience led to changes in Study 3. The sample was larger (six coaches and 18 teachers) and the research took place in the first half of the school year.

The aim of Study 3 developed out of the key findings from Study 2: to help coaches develop a discussion with teachers in which both coaches' and teachers' theories of practice were explored and discussed, with the result that teachers made pedagogical changes in their practice.

Chapter 7:

Study 3

Study 3 aimed to help coaches develop a discussion with teachers in which both the coaches' and teachers' theories of practice were explored and discussed in ways that would result in changes in pedagogical practice when this was necessary. In the earlier studies, teachers more often made minor mechanical or procedural changes as a result of interactions with their coach. The question explored in this study was how to help coaches effect pedagogical changes in teachers' practice through unpacking, engaging with and challenging teachers' theories of practice. A deeper engagement with both the coaches' and teachers' theories of practice was necessary because Study 2 showed that improving the types of questions and statements coaches used to engage with teachers' theories of practice was not generally sufficient to effect these changes. As with Study 2, the revised ETTOP (Engaging Teachers' Theories Of Practice) rubric (Version 2) played a central role in investigating how to help coaches develop the kinds of discussions that could lead to pedagogical changes in the teachers' practice.

Methods

Study 3 was a quasi-experimental study, which included a one-group pre-test/post-test. The methodology used in Study 3 was described in detail in Chapter 3. As with Study 2, there were three phases. In phase 1, data was collected to establish a baseline. Phase 2 involved training the coaches in the use of the ETTOP rubric (Version 2) and phase 3 comprised a second round of data collection. This section discusses only methods that are different from those employed in Study 2: the participants, the interviews with coaches and teachers and the coaches' training.

Participants.

Participating coaches were volunteers from a range of contexts. May was an external facilitator who was employed by an external provider, contracted by the Ministry of Education, to work with specific schools. All the other coaches were working within the same school as those colleagues they were coaching. Marianne was a specialist classroom teacher (this position was described in Chapter 6), Steven and Lily were literacy leaders, Caterina was a head of faculty and Diaz was a Te Kotahitanga in-school facilitator. Te

Kotahitanga is a New Zealand professional development initiative aimed at improving the participation and achievement of Māori secondary students. The role of the in-school facilitator was to help teachers implement changes in their teaching practices for Māori students, through cycles of observation and feedback (Bishop & Berryman, 2010). The same procedures were used to recruit teachers for this study as were used in Study 2. Of the 16 teachers described in Table 13, there was a complete set of data for 12, comprising observation audiotapes, follow-up interviews with the researcher and questionnaire responses from both Time 1 and Time 2. Two teachers, Rocket and Susan, did not complete a Time 2 questionnaire. Equipment malfunction resulted in an incomplete observation audiotape for Ellen at Time 2 and Elaine's follow-up interview at Time 2. All the available data, listed in Table 13, were used. Table 13 provides a description of the 16 participants.

Table 13
Participants in Study 3

Coach	Teacher	Years teaching	Secondary /Primary	Subject	Data provided
Marianne	Charlie	0–2	Secondary	Social Science	Time 1 and Time 2 observation audiotapes, follow-up interviews and questionnaires.
Marianne	Roger	3–5	Secondary	Languages /Social Science	Time 1 and Time 2 observation audiotapes. Time 1 and Time 2 follow-up interviews. Time 1 and Time 2 questionnaires.
Marianne	Sally	0–2	Secondary	Mathematics	Time 1 and Time 2 observation audiotapes. Time 1 and Time 2 follow-up interviews. Time 1 and Time 2 questionnaires.
Diaz	Justine	6–10	Secondary	Science	Time 1 and Time 2 observation audiotapes. Time 1 and Time 2 follow-up interviews. Time 1 and Time 2 questionnaires.
Diaz	Kevin	0–2	Secondary	Physical Education	Time 1 and Time 2 observation audiotapes. Time 1 and Time 2 follow-up interviews. Time 1 and Time 2 questionnaires.

Coach	Teacher	Years teaching	Secondary /Primary	Subject	Data provided
Lily	Odette	3–5	Secondary	Performing Arts	Time 1 and Time 2 observation audiotapes. Time 1 and Time 2 follow-up interviews. Time 1 and Time 2 questionnaires.
Lily	Fiona	11 or more	Secondary	English	Time 1 and Time 2 observation audiotapes. Time 1 and Time 2 follow-up interviews. Time 1 and Time 2 questionnaires.
Lily	Ioasa	0–2	Secondary	Social Science	Time 1 and Time 2 observation audiotapes. Time 1 and Time 2 follow-up interviews. Time 1 and Time 2 questionnaires.
Steven	Elaine	11 or more	Secondary	Science	Time 1 and Time 2 observation audiotapes. Time 1 follow-up interview. Time 2 partial follow-up interview. Time 1 and Time 2 questionnaires.
Steven	Mildred	3–5	Secondary	Media Studies	Time 1 and Time 2 observation audiotapes. Time 1 and Time 2 follow-up interviews. Time 1 and Time 2 questionnaires.
Steven	Tiger	3–5	Secondary	English/ Media Studies	Time 1 and Time 2 observation audiotapes. Time 1 and Time 2 follow-up interviews. Time 1 and Time 2 questionnaires.
Caterina	Rocket	3–5	Secondary	English	Time 1 and Time 2 observation audiotapes. Time 1 and Time 2 follow-up interviews. Time 1 questionnaire.
Caterina	Susan	3–5	Secondary	English	Time 1 and Time 2 observation audiotapes. Time 1 and Time 2 follow-up interviews. Time 1 questionnaire.

Coach	Teacher	Years teaching	Secondary /Primary	Subject	Data provided
Caterina	Tabitha	11 or more	Secondary	English	Time 1 and Time 2 observation audiotapes. Time 1 and Time 2 follow-up interviews. Time 1 and Time 2 questionnaires.
May	Ellen	3–5	Secondary	Visual Arts	Time 1 observation audiotapes. Time 2 partial observation audiotape. Time 1 and Time 2 follow-up interviews. Time 1 and Time 2 questionnaires.
May	Diana	3–5	Primary	Reading/ Numeracy	Time 1 and Time 2 observation audiotapes. Time 1 and Time 2 follow-up interviews. Time 1 and Time 2 questionnaires.

Research procedures.

As a result of the findings of Study 2, two changes were made in the procedures. An additional interview was undertaken with each coach at Time 1 and Time 2. The purpose was twofold: to understand the coaches' perceptions of changes in their practice before and after participating in training around the use of the ETTOP rubric (Version 2) and to compare coaches' perceptions of changes in their practice with the teachers' perceptions. Details of the interview questions with coaches are included below. Timing had been an issue in Study 2. Because some coaches had struggled to complete their Time 2 interviews with teachers before the end of the year, Study 3 focussed on collecting data during the first half of the year. As a result, there was a high response rate, with complete Time 1 and Time 2 data sets for 16 out of 18 teacher participants.

Training the coaches.

As with Study 2, there were two training sessions but they were adapted in three ways. Firstly, the training incorporated a section on practice analysis (Timperley, 2014) because Study 2 found that coaches did not engage with teachers' theories of practice during every stage of the observation process. Consequently, new film clips were prepared to show coaches not engaging and engaging with teachers' theories of practice during the pre-observation as well as the post-observation discussion. Because of the expansion of

focus, coaches were asked to send audiotapes of the pre-observation discussion in addition to the feedback discussion at Time 1 and Time 2.

Secondly, coaches were trained in the use of the revised ETTOP rubric (Version 2). The addition of a new category: *Expressing your own theories of practice (to help clarify the teachers' theories)* required additional training material. Study 2 showed few instances of coaches expressing and discussing their own theories of practice during their discussions with teachers. It is important that coaches do this so that their beliefs, ideas and assumptions can be examined and discussed along with those of the teachers. The new film clips prepared for the training sessions in Study 3 included models of a coach expressing and discussing her own theory of practice.

Thirdly, the six coaches were divided into two groups, consisting of May, Lily and Marianne in the first group to be trained and Steven, Caterina and Diaz in the second group. The reason for this division was either because the coaches in the second group had not completed their first round of observations and feedback before the date of the first training session, or they could not attend on the designated date.

Data gathering instruments.

Refinements to data gathering instruments included changes in the follow-up interviews with teachers and the questionnaire. A new instrument was added: the follow-up interview with coaches. This section includes a rationale for and a description of the changes made to the follow-up interviews and questionnaire.

Follow-up interviews with teachers.

Three changes were made in the construction of the follow-up interviews with teachers. Firstly, questions were changed because some of those used in Study 2 had not been successful in eliciting from teachers changes in their thinking as a result of discussions with their coaches, especially in relation to how the coaches engaged theories of practice. Secondly, new questions reflected the emphasis during the coaches' training on exploring the teachers' and coaches' theories of practice during both the pre- and post-observation discussion. Thirdly, the structure of the questions facilitated a pre/post comparison of the teachers' responses.

Three general questions from Study 2 were retained that had been successful in eliciting information about teachers' perceptions of their coaches' feedback. The questions were: *What was the focus of the observation? What feedback do you remember from your discussion with the coach? How and why did you change your practice?* New questions explored the extent to which the coach probed the teacher's beliefs and ideas during every stage of the observation process (the pre-observation discussion, the post-observation feedback and developing new practice). They also probed the extent to which the teacher believed the coach discussed his or her own beliefs during the observation process and what the teacher thought about the coach's expressed beliefs and ideas. A third aspect unpacked the teacher's thoughts about each of the coach's feedback points.

Because Study 3 emphasised the observation process rather than the feedback discussion alone, the researcher wrote new questions that separated the pre-observation discussion, post observation feedback and developing new practice. Questions about the pre-observation discussion focussed on whether it took place, what its focus was and whether goals were set and success criteria established. In relation to the post-observation feedback, the researcher examined with each teacher the major points of feedback identified from the transcript of the discussion between the coach and teacher as discussed above. Questions about developing new practice focussed on what changes the teacher perceived he or she had made in his or her thinking and practice as a result of the observation process and why he or she chose those aspects to change.

The format of some of the questions discussed above was changed to enable teachers' responses to be compared between Time 1 and Time 2. Each teacher was asked to respond to statements using the same six point Likert scale as the questionnaire (strongly disagree, disagree, somewhat disagree, somewhat agree, agree, strongly agree). The rationale for using a six-point scale is discussed in Chapter 3. Each descriptor on the Likert scale was also assigned a number value to facilitate a comparison between teachers' responses at Time 1 and Time 2. Strongly disagree had a value of 1, disagree: 2, somewhat disagree: 3, somewhat agree: 4, agree: 5, strongly agree: 6. Teachers did not have access to their Time 1 responses when they were interviewed at Time 2 to mitigate social desirability factors that could lead teachers to rate themselves more favourably at Time 2 (de Vaus, 2002). The statements focussed on the extent to which the coach discussed the teacher's ideas and his or her own ideas during each stage of the observation process. Examples of these statements are: *The coach discussed my ideas about learning and teaching when we*

set goals for the observation; the coach discussed his/her own beliefs and ideas when we set goals and constructed success criteria. If a teacher responded on the *agree* spectrum, the researcher asked *how* the coach discussed the teacher's or coach's beliefs and ideas and what his or her thoughts were when the coach discussed the teacher's or his or her own beliefs. If a teacher responded on the *disagree* spectrum, the statement was not discussed further because to do so may have required the teacher to make inferences about the coach's thinking. At Time 2, each teacher was also asked whether the coach's style had changed since Time 1.

Follow-up interviews with coaches.

Follow-up interviews with coaches were introduced in Study 3 after data from Study 2 indicated that coaches were not generally engaging with teachers' theories of practice at a deep level. The interviews with coaches had a threefold purpose. They aimed to investigate how successfully the coaches believed they unpacked, engaged with and challenged both the teachers' and their own ideas during the observation process. The interview questions with coaches were also designed to parallel the teachers' interviews so that the coaches' self-reports could be compared with the teachers' reports about the coaches' practice. Finally, the interviews aimed to establish the extent to which coaches believed they changed their practice as a result of training in the use of the ETTOP (Version 2) rubric.

Both teachers and coaches were asked about the extent to which coaches unpacked, engaged with and challenged teachers' theories of practice during each stage of the observation process. In the same format as the teachers, coaches responded to statements, using the identical six point Likert scale. Teachers' statements were modified for the coaches, for example: *I unpacked, engaged with and challenged the teacher's ideas about learning and teaching when we set goals for the observation.* Coaches were also asked to respond to statements about how easy they found it to unpack and engage with teachers' ideas and beliefs and to challenge teachers' beliefs and ideas. At the second interview, there were additional statements about the extent to which coaches believed they had changed aspects of the pre-observation discussion, post-observation feedback and developing new practice since the first interview, and about whether the ETTOP rubric (Version 2) had helped them unpack, engage with and challenge the teachers' beliefs and ideas.

The Questionnaire.

Study 2 showed that there were items in the questionnaire that did not yield useful data. An example is the first four items in relation to the coach. All teachers responded with *somewhat agree, agree, or strongly agree* to these items. A bias towards social desirability could not be discounted. Therefore these and some other items were eliminated from the questionnaire for Study 3. Other changes to the questionnaire reflected the emphasis in Study 3 on the entire observation process, rather than only on the feedback discussion. For example, questions about the coach's feedback were changed to two questions: one about feedback and one about feed forward.

Data Analysis

Data analysis of the transcripts of the pre- and post-observation discussions between each coach and teacher, and the questionnaires that teachers completed are not described here because the methods used were the same as for Study 2. This section focuses on two aspects of data analysis that differed from Study 2. Because the ETTOP rubric was revised for Study 3, modifications were needed to the process of the external moderation of coding the transcripts. Secondly, a new analytical framework was needed for analysing the follow-up interviews with teachers to reflect changes in the types of questions asked, and for coaches, because this was a new data source introduced in Study 3.

External moderation of coding the transcripts.

The external moderator who checked the coding for Study 2 was again employed for Study 3. The coding rules, described in Chapter 6, were the same as for Study 2 but the revised rubric was used, with its additional category *Expressing your own theories of practice*. The ETTOP rubric (Version 2) is included in Chapter 5. The external moderator and researcher coded one transcript at Time 1 and two at Time 2 before 85% agreement was reached. The major area of disagreement was between the categories of probing and challenging. Some probing statements and questions could have been classified as challenging, depending on the tone of the coach. The coders attempted to resolve these incidents by independently using the context of the statement or question and the teacher's response. If the coders still did not agree, the coding remained as a disagreement. Researcher bias was somewhat mitigated because the Time 2 transcripts were coded first. Therefore it was less likely that the coders would score the Time 2 transcripts more favourably.

The follow-up interview with teachers.

Follow-up interviews with teachers were analysed in two ways. As with Study 1 and 2, pattern coding was used inductively to reduce data from the teachers' and coaches' responses into manageable units. The process for coding was the same as that used for Study 2 and reported in Chapter 6. Categories developed were "Changes made as a result of feedback/feed forward", "Changes not made as a result of feedback/feed forward" and "Changes in teachers' thinking about their practice between Time 1 and Time 2". Coaches were assigned one category: "Changes in the coach's feedback between Time 1 and Time 2". The purpose of using these categories was to support the aim of Study 3, and identify firstly, reported changes in teachers' practice and thinking as a result of coaches' feedback and feed forward and secondly, teachers' perceptions of changes in the coaches' practice after coaches had been trained in the use of the ETTOP rubric (Version 2). Figure 4 describes the coding framework for Study 3.

Teachers: Changes made as a result of feedback/feed forward <ul style="list-style-type: none">• Changed in line with pedagogical/technical/procedural points of feedback• General/specific explanation of what the teacher did as a result of the feedback• Reasons given for changes• Linked/not linked to engaging teacher's theory of practice
Teachers: Changes not made as a result of the feedback/ feed forward <ul style="list-style-type: none">• Reason given for lack of change• No reason given for lack of change• Linked/not linked to engaging teacher's theory of practice
Teachers: Changes in teachers' thinking about their practice between Time 1 and Time 2
Coaches: Changes in the coach's feedback/ feed forward between Time 1 and Time 2 <ul style="list-style-type: none">• Questioning• Listening

Figure 4. Coding framework for interviews with teachers

As with Study 1 and 2, sub-categories were developed for a finer-grained analysis of some categories. An example of "Teachers: Changes not made as a result of the feedback/ feed

forward” occurred when Tiger stated that he did not enact his coach’s suggestion that he remove disruptive students from the classroom:

“I think the coach really felt that I should have just axed a few of [the disruptive students] and asked them to go... but with only a week and a half until the end of the year and a lot of really positive work done by ... many of them, [I did] not really feel like saying, ten days out before the end of the year, get out of the room.”

This incident was also attributed to the sub-categories “Reason given for a lack of change” and “Linked/not linked to engaging teacher’s theory of practice”. In the transcript Tiger elaborated on his reason for not changing his practice: removing students would mean they lost a valuable opportunity to learn so close to the end of the year, when students would sit an external exam. The feedback was also linked with engaging Tiger’s theory of practice because in their post-observation discussion his coach, Steven, suggested that Tiger was excessively kind and tolerant in the face of poor behaviour from specific disruptive students.

The second way teachers’ follow up interviews were analysed was to compare their responses for each of seven statements at Time 1 and Time 2. If a teacher responded with *Somewhat agree* at Time 1 to the statement *I have changed my practice as a result of the observation process* and *Agree* at Time 2, the teacher was judged to have shown a positive shift along the Likert scale of 1. Therefore this change was noted as (+1).

The follow-up interview with coaches.

Coaches’ ratings on their statements in follow-up interviews were analysed in relation to 13 statements in which coaches rated their practice, using the same 6 point Likert scale as described above. As for teachers, responses at Time 1 and Time 2 in relation to the statements were compared. The coaches’ responses were also examined alongside the teachers’ responses. Disparities between the coaches’ and teachers’ ratings are discussed below.

Findings

Overall, teachers reported changes in their practice, and coaches changed their practice, from Time 1 to Time 2. Coaches generally showed and reported stronger changes than teachers, but the difference between them was less marked than in Study 2 and a relationship was identified between coaches’ changes and reported changes in teachers’

thinking and practice. The details of these findings are reported and discussed in three sections: firstly, how coaches changed in their practice, including how they engaged with teachers' theories of practice and how they structured the observation process. The second section reports changes in the teachers' thinking and practice and the third section examines the relationship between the changes in the coaches' and teachers' practice.

Changes in coaches' practices: Engaging with teachers' theories of practice.

Transcripts of the coaches' feedback discussions with teachers showed that coaches changed their levels of feedback questions and statements used between Time 1 and Time 2 as identified in Table 14.

Table 14

Changes in Levels of Feedback to Teachers at Time 1 (T1) and Time 2 (T2) as a number and percentage of total feedback

Coach	Teachers	T1			T2		
		Not unpacking teachers' theories of practice	Developing	Integrated	Not unpacking teachers' theories of practice	Developing	Integrated
Marianne	Charlie	2 (12%)	14 (88%)	0 (0%)	4 (20%)	14 (70%)	2 (10%)
	Roger	11 (41%)	11 (41%)	5 (18%)	1 (4%)	17 (68%)	7 (28%)
	Sally	8 (47%)	9 (53%)	0 (0%)	0 (0%)	18 (82%)	4 (18%)
Diaz	Justine	26 (65%)	14 (35%)	0 (0%)	4 (9%)	40 (91%)	0 (0%)
	Kevin	15 (42%)	21 (58%)	0 (0%)	2 (4.5%)	40 (91%)	2 (4.5%)
Lily	Fiona	9 (53%)	8 (47%)	0 (0%)	4 (17%)	18 (78%)	1 (5%)
	Ioasa	25 (76%)	8 (24%)	0 (0%)	2 (12%)	13 (76%)	2 (12%)
	Odette	6 (40%)	9 (60%)	0 (0%)	4 (15%)	21 (78%)	2 (7%)
Steven	Elaine	2 (17%)	8 (66%)	2 (17%)	0 (0%)	12 (75%)	4 (25%)
	Mildred	5 (42%)	7 (58%)	0 (0%)	2 (8%)	19 (76%)	4 (16%)
Caterina	Tiger	2 (14%)	10 (72%)	2 (14%)	3 (6%)	38 (79%)	7 (15%)
	Rocket	3 (43%)	3 (43%)	1 (14%)	0 (0%)	14 (88%)	2 (12%)
	Susan	5 (45%)	6 (55%)	0 (0%)	1 (5%)	17 (77%)	4 (18%)
	Tabitha	2 (14%)	10 (72%)	2 (14%)	2 (11%)	14 (78%)	2 (11%)
May	Diana	6 (20%)	21 (70%)	3 (10%)	3 (13%)	18 (78%)	2 (9%)
	Ellen	6 (21%)	21 (72%)	2 (7%)	0 (0%)	22 (63%)	13 (37%)

As with Study 2, shifts in coaches' questions/statements from *Not unpacking* to *Integrated* is the focus of analysis. Changes in the coaches' levels of feedback from Time 1 to Time 2 showed a similar pattern to Study 2. *Not unpacking teachers' theories of practice* reduced from an average of 40% at Time 1 to 8% at Time 2. *Integrated* questions/statements increased from an average of 6% at Time 1 to 14% at Time 2. These changes indicated that coaches improved their engagement with teachers' theories of practice at Time 2. Individual differences between coaches were notable because of the relationship between coaches' changes in practice and teachers' reported changes in practice. Coaches who made the greatest average shifts between Time 1 and 2 in the *integrated* level were May (14%), and Marianne (13%). An example of Marianne's interactions with Sally at Time 1 and 2 is elaborated below because it illustrated how Marianne changed from not engaging (Time 1) to engaging with Sally's theories of practice (Time 2). Marianne's interactions with Sally showed a shift in integrated questions/statements from 0% at Time 1 to 18% at Time 2.

At Time 1 Marianne's questions/statements were often at the *not unpacking* level. She did not appear to demonstrate active listening skills that would have led her to follow up responses with an exploration of Sally's theories of practice. For example, Marianne asked Sally whether there were any particular issues she had with the class that had been observed. Sally replied:

I guess with junior classes, I find I have got a bit more freedom with time. I just feel some times with senior classes, you're a bit restricted in time ... I find that limits sometimes what things you can bring to the classroom.

Rather than questioning Sally further concerning her beliefs about the way time restricted her teaching activities, Marianne firstly empathized with Sally, stating "*It is hard at Year 12 when you've got high stakes assessment happening constantly*". She then discussed a reading she had given Sally that was unrelated to the issue of time. A little later Marianne asked Sally whether there was any flexibility in the mathematics department to assess students when they were ready, rather than all at the same time. Sally replied that the dates for assessment were fixed at the start of the year. With this question, Marianne was addressing the external constraints, rather than Sally's theory of practice. It appeared that the discussion did not resolve this issue for Sally because when Marianne asked her

whether there was anything she would like to implement for the next observation, Sally again raised the issue of time constraints with her senior classes.

A major difference at Time 2 was that Marianne moved beyond *not unpacking* questions/statements and began to listen to Sally's ideas. An example was when Marianne challenged Sally about her use of learning intentions and success criteria:

The learning intentions on the board were phrased in ways that were more about the activity they were going to do rather than the learning and I was wondering about your use of success criteria. How would the students have known ... what were their success criteria?

Sally explained that she had struggled to construct learning intentions and success criteria because the lesson was revision and extension of a previous lesson and she did not know how to separate the learning for each lesson. Marianne then summarized Sally's ideas:

Perhaps one of the ways we can think about a lesson is not necessarily just the single time period that it occupies ... your lesson last Thursday and this lesson obviously hinged... around the same learning intentions and success criteria. And so the students possibly had an understanding that I as an observer wasn't aware of to that degree.

As well as summarizing Sally's explanation and ideas, Marianne could have led the discussion into a deeper exploration of Sally's theories of practice about what learning might look like in a revision lesson. Sally, however, had already reflected on this aspect and began to suggest what the learning intention could have been: *"Today we will be able to convert those more complex [problems] with confidence"*.

Marianne believed she had made changes in her coaching between Time 1 and Time 2. In relation to the statement: *I have changed aspects of the post-observation feedback between the first interview and now*, Marianne rated herself *Agree*. She explained her response: *"I've tried to pick up on questions that are more probing/exploring ... trying to pick up on statements [the teachers have] made."* Marianne had developed a routine around the use of the ETTOP (Version 2) rubric that involved her studying the rubric before her Time 2 observation discussions:

Prior to the second round [of discussions] I spent some time sitting here in my office reviewing what ... we were doing and why I was asking those questions, and how to pick up on them. And going over those scenarios [in the ETTOP (Version 2) rubric], so I found it [the ETTOP rubric (Version 2)] useful.

At their Time 2 follow-up interviews, each coach was asked to respond to the statement *Using the ETTOP rubric has helped me to unpack, engage with and challenge the teacher's beliefs and ideas*. Five coaches rated themselves as *Agree* or *Strongly agree*, but Diaz rated herself *Somewhat agree*. Diaz's self-report was consistent with the data displayed in Table 14 above. She made the lowest percentage shift in the *Integrated* level from 0% at Time 1 to 4% at Time 2. Diaz accounted for her lack of shift by stating that as a Te Kotahitanga facilitator she worked within a prescriptive model that limited her flexibility to make changes in her practice.

Coaches generally reported that the ETTOP rubric (Version 2) had raised their awareness of the range of questions/statements they could use. Four coaches reported that they used it to reflect on and critique their own practice. Coaches suggested minor changes to the rubric, but the difference in comments between the coaches in Study 2 and 3 indicated that the ETTOP rubric (Version 2) was a more useful document than the original.

All six coaches reported changes when they were asked to respond to statements about their practice at Time 1 and Time 2. The greatest reported changes related to the pre-observation discussion and how easy coaches believed it was to unpack, engage with and challenge the teachers' theories of practice. Table 15 shows differences in the coaches' responses between Time 1 and Time 2. Differences are recorded as (+) when the coach responded to a statement more positively and (-) when he or she responded more negatively at Time 2. No difference is recorded as (0). There are two TOTALs. The vertical TOTAL column shows the total shift for each statement. The number was calculated by adding the shifts across the 6 coaches. The horizontal TOTAL shows the shift for each coach, gained by adding together a coach's shifts for each statement.

Table 15
Coaches' Perceptions of Shifts in Practice between Time 1 and Time 2

Statements	Marianne	Diaz	Lily	Steven	Caterina	May	TOTAL shift for each statement
I unpacked, engaged and challenged the teacher's ideas about learning and teaching when we set goals for the observation	+2	+5	+1	+1	+2	+4	+15
I unpacked, engaged and challenged the teacher's ideas about learning and teaching when we constructed the success criteria for the observation	+2	+5	+2	+1	+6	+4	+20
I discussed my own beliefs and ideas when we set goals and constructed success criteria	+1	+4	+3	+3	0	+5	+16
I unpacked, engaged with and challenged the teacher's ideas about learning and teaching during the post-observation feedback.	0	0	0	+2	0	+1	+3
I discussed my own beliefs and ideas during the post-observation feedback.	0	+1	0	+3	+1	-1	+4

Statements	Marianne	Diaz	Lily	Steven	Caterina	May	TOTAL shift for each statement
I unpacked, engaged with and challenged the teacher's ideas about learning and teaching when developing new practice	0	+1	-5	-1	0	+3	-2
I discussed my own beliefs and ideas when developing new practice.	0	+1	-5	0	0	-1	-5
I find it easy to unpack and engage with the teacher's beliefs and ideas.	0	+1	0	+4	+1	0	+6
I find it easy to challenge the teacher's beliefs and ideas.	+1	+1	+1	+1	+2	+5	+11
TOTAL SHIFT by coach	6	19	-3	14	12	20	

Coaches reported that they made the greatest changes in their practice in unpacking and engaging with the teachers' and their own theories of practice during the pre-observation discussion. Total shifts for these statements were +15, +16 and +20, compared with total shifts of +3, and +4 for the post-observation discussion and -2 and -5 for developing new practice. One explanation for the high total of reported shifts in the pre-observation discussions is that coaches had rated themselves much lower at Time 1 in relation to these statements. The average rating was ascertained by employing the rating scale used in interviews with coaches and teachers. As described in the section on *Data gathering instruments*, "Strongly Disagree" had a value of 1 compared to "Strongly agree" with a value of 6.

Reported shifts in the coaches' pre-observation discussions were supported by other data. Coaches were asked to record and send both the pre and post observation discussion at Time 1 and Time 2. At Time 1, coaches submitted 6 pre-observation discussions, compared with 16 post-observation discussions. At Time 2, there were 13 pre and 16 post observation discussions.

A possible reason for the increase in submissions of the pre-observation discussions and coaches' reported improvement in their practice is that this aspect of the observation process was emphasised during the coaches' training. Coaches watched and discussed two film clips of pre-observation discussions. In the first, the coach did not engage with teacher's theories of practice, and in the second, the coach used questions/ statements consistent with the *Integrated* level of the ETTOP rubric (Version 2). In his follow-up interview at Time 2, Steven described how the training had helped him understand the importance of the pre-observation discussion. He related an experience of observing a teacher who was not part of Study 3. Steven and the teacher did not have a pre-observation discussion because Steven believed there was a shared understanding of the goals for the observation. The teacher's practice during the lesson, however, revealed that their ideas were not aligned at all, and Steven believed that having a pre-observation discussion could have surfaced their different beliefs.

Individual differences in coaches' perceptions of their shifts (Table 15) were compared with changes in their levels of *Integrated* questions/statements between Time 1 and 2 (Table 14). The coach with the greatest perceptions of shifts was May, with a total of 20 and May also made the greatest percentage of changes in the level of her integrated

questions/statements. Marianne, who also showed a high percentage of shifts in her levels of *Integrated* questions/statements, reported fewer changes in her practice (6). In her follow-up interview at Time 2, Marianne was critical of her coaching skills. She described herself as “*very much a learner*” in unpacking, engaging with and challenging teachers’ theories of practice. She believed that she had improved in unpacking teachers’ theories of practice but found challenging them difficult. Marianne’s evaluation is interesting because it reflected not only her experience, but also the overall practice of the six coaches.

It is notable that both Marianne and May developed a routine around the use of the ETTOP rubric (Version 2) to reflect on their practice. Marianne’s use of the rubric is described above. Between Time 1 and Time 2, May studied the transcripts of her discussions with teachers and used the ETTOP rubric (Version 2) to analyse the types and levels of questions/statements she used. She stated that engaging in this process gave her a “jolt” about her practice and raised her awareness that she needed to change.

The role of training in changing coaches’ practice.

It is possible that coaches could have improved in their levels of questions/statements over the six months of the study without training. This alternative explanation was tested by comparing the levels of questions/statements coaches used in their observation discussions with teachers in Study 2 (Table 10) and Study 3 (Table 14). This comparison was made because the studies ran for a similar time period, but Study 2 began midway through the year when the coaches had been in a coaching relationship with their teachers for six months, whereas Study 3 started at the beginning of the school year. Figure 5 illustrates the timing of the two studies.

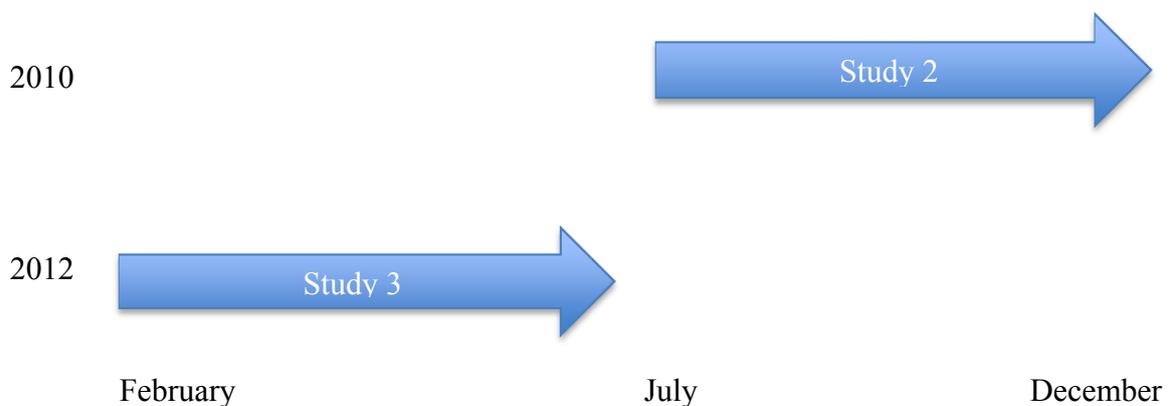


Figure 5. Timeline of Study 2 and Study 3

If coaches would have improved without training, those in Study 2 should have shown comparable levels of questions/statements at Time 1 as the Study 3 coaches did at Time 2. Table 16 shows the difference in the percentage of levels of questions/statements between Study 2 (Time 1) and Study 3 (Time 1 and 2) as a percentage of the total incidents of feedback.

Table 16
Differences in levels of feedback related to unpacking teachers theories of practice between Study 2 and Study 3 Coaches

	Study 2 coaches at T1	Study 3 coaches at T1	Difference	Study 3 coaches at T2 after training	Difference
Did not unpack teachers' theories of practice	20%	40%	+20%	8%	-32%
Integrated	4%	5%	+1%	14%	+9%

Did not unpack and *Integrated* were the levels chosen from coding transcripts using the respective ETTOP rubrics. *Did not unpack* is a hybrid term because this level was called *Basic* in the first ETTOP rubric and *Not unpacking* in the second. *Did not unpack* indicates no engagement with teachers' theories of practice whereas *Integrated* indicates that the coach has developed a discussion about the teacher's theory of practice. Improvement is shown when the percentage of *Did not unpack* questions/statements decreases and the percentage of *Integrated* increases. Table 16 shows that although the Study 2 coaches employed a higher level of questions/statements at Time 1 than the Study 3 coaches, the difference was not as great as the difference between Time 1 and 2 for the Study 3 coaches, after they had been trained. Coaches in Study 2 at Time 1 used 20% fewer questions/statements at the level of *Did not unpack* than those at Time 1 in Study 3. After training, however, the coaches in Study 3 reduced *Did not unpack* questions/statements by 32%. In relation to *Integrated* questions/statements, coaches in Study 2 and 3 were similar at Time 1, but Study 3 coaches improved 9% at Time 2. This comparison suggests that there may be some improvement in coaches' practice in *Did not unpack* without training, but training accelerates the changes. Although the gains in *Integrated* questions/statements were modest at Time 2, it does not appear likely that coaches would use more *Integrated* questions/statements without training.

In summary, there was evidence that coaches changed their practice from Time 1 to Time 2 as a result of the training. Analysis of transcripts of the discussions with teachers indicated there was a greater engagement with teachers' theories of practice. Changes in the *Integrated* level of questions/statements were unlikely to have occurred naturally over time without training. Coaches also reported that they had changed their practice, particularly in relation to unpacking and engaging with teachers' beliefs and ideas during the pre-observation discussion. Coaches who reported the greatest shifts in their practice had experienced dissatisfaction with their current practice and had developed routines around the use of the ETTOP rubric (Version 2). The purpose for improving coaches' engagement with teachers' theories of practice, however, was to facilitate changes in teachers' thinking and practice. The next section addresses what changes teachers reported and the third section compares the relationship between changes in the coaches' and teachers' practice.

Reported changes in teachers' practice and thinking.

This section explores the degree of reported change in teachers' thinking and practice and the types of changes that were reported. During the Time 1 and Time 2 follow-up interviews teachers were asked to respond to the statement *I have changed my practice as a result of the observation process*. Table 16 shows the differences in teachers' responses between Time 1 and Time 2.

Table 16
Teachers' Reports of Changes in their Practice at Time 1 and Time 2

Teacher	Shift	Pedagogical/Technical or procedural changes: Time 1	Pedagogical/Technical or procedural changes: Time 2
Charlie	0	Pedagogical	Pedagogical
Roger	+1	Technical or procedural	Pedagogical
Sally	+1	Technical or procedural	Pedagogical
Justine	0	Technical or procedural	Technical or procedural
Kevin	0	Pedagogical	Pedagogical
Fiona	0	Technical or procedural	Pedagogical
Ioasa	0	Technical or procedural	Technical or procedural

Odette	0	Technical or procedural	Technical or procedural
Tiger	-1	Pedagogical	No change
Mildred	+2	Technical or procedural	Pedagogical
Rocket	0	Pedagogical	Pedagogical
Tabitha	0	Pedagogical	Pedagogical
Susan	0	Pedagogical	Pedagogical
Diana	0	Pedagogical	Pedagogical

During the follow-up interviews, every teacher nominated one of the *Agree* options at both Time 1 and Time 2. The researcher followed up these responses with probing questions to ascertain *how* teachers perceived they had changed their practice. She then classified the reported changes as either technical/procedural or pedagogical, as defined in Chapter 2. At Time 1, seven teachers reported they had made pedagogical and seven technical/ procedural changes in their practice. At Time 2, 10 teachers reported pedagogical, three reported technical/procedural changes and one response indicated no change.

Sally was an example of a teacher who reported she made a technical /procedural change at Time 1 and a pedagogical change at Time 2. At Time 1 she stated that she had changed the groups in her classroom because she believed one group was often off-task. At Time 2, her coach, Marianne, gave feedback that Sally’s learning intentions were related to the activity, rather than the intended learning and that there were no success criteria. Sally stated that since the feedback she had been concentrating on writing learning intentions to make them more learning focused. She made this change because she knew she was struggling in this area. Sally also articulated how she had changed her thinking as a result of the observation process. She said that her discussions with Marianne had made her think more about *why* she was planning to do a particular activity, because her coach always asked her to explain her thinking.

Three teachers, Ioasa, Odette and Justine reported technical/ procedural changes at Time 2. There was no evidence in the transcripts that their coaches, Lily and Diaz, engaged with the teachers’ beliefs and ideas. Odette could not have reported pedagogical changes in practice because all Lily’s feedback was about technical/procedural issues, but Lily and Diaz raised pedagogical issues with Ioasa and Justine, which were not acted upon. Lily

began her feedback by asking Ioasa what he thought of the lesson. Ioasa replied that he thought it had gone well. He said, “*I actually thought the kids got the general idea of how a three level reading guide goes.*” Lily then gave him feedback about how he could improve his use of three level reading guides. She did not activate dissonance with Ioasa by addressing the difference between his belief that the guides had worked well with her belief that improvements were needed to challenge the students’ thinking. Ioasa listened attentively to the feedback and accurately summarized the main points. In his follow-up interview, he remembered the feedback without prompting but stated that he had not acted on it because he had not used three level guides since. He reported that he would “probably” change the way he used three level guides in future. When asked what changes he had made to his practice, Ioasa discussed changing where he positioned himself while teaching, which he described as a minor change.

Justine articulated that she did not believe she needed to change her practice. Diaz gave her feedback that she should conduct a survey with her class to gauge whether students valued Justine’s approach to learning. Diaz was directive that the survey should take place; she asked Justine for a copy when it had been completed. She did not, however, check whether Justine believed a survey was necessary or desirable. In her follow-up interview, Justine reported that she had not conducted the survey because family sickness had caused her to be absent from school and too much time had elapsed for the survey to be relevant.

Tiger was the only teacher to report a negative shift on the agree / disagree scale in his perception of changes in his practice. He chose *Agree* at Time 1 and *Somewhat agree* at Time 2, which represents a negative shift of -1. Tiger selected *Somewhat agree* at Time 2 because he believed that he did not always put into practice what had been agreed during the feedback discussions. He felt that sometimes the nature of the class worked against the changes he tried to make, and therefore he came to believe that Steven’s suggestions were not always relevant for a particular class.

Teachers’ questionnaire responses were generally consistent with their responses in the follow-up interviews regarding their reported changes in practice. In relation to the item *As a result of the observation process with the coach, I have tried new things in the classroom*, all teachers except Diana reported on the *agree* continuum at Time 1 and all teachers reported on the *agree* continuum at Time 2. Teachers were less positive about the

extent to which they perceived they had changed their beliefs. Two items in the questionnaire probed this aspect: *I have significantly changed my beliefs about how to promote student learning through feedback given by the coach* and *I have significantly changed my beliefs about how to promote student learning through feed forward given by the coach*. There were 14 teachers with Time 1 and Time 2 questionnaire data. For the first item, four reported on the *disagree* continuum at Time 1 and three at Time 2. For the second item five reported on the *disagree* continuum at Time 1 and 3 at Time 2. It would appear either that engaging with teachers' theories of practice has a stronger effect on teachers' practice than on their beliefs or the teachers were less aware of changes in their beliefs.

Relationship between coaches' changes and teachers' reported changes.

Patterns were analysed in coaches' changes and teachers' reported changes in two areas: the relationship between coaches' levels of feedback and teachers' reports of changes in practice, and changes in the pre-observation discussion. A mixed pattern was evident between coaches' changes in the levels of feedback from Time 1 to Time 2 (Table 14), and coaches' and teachers' reported changes in practice. Three coaches who showed high percentages of shift from using *not unpacking* questions and statements at Time 1 to *integrated* questions and statements at Time 2 were May, Marianne and Steven. Marianne coached two teachers, Sally and Roger, who reported positive shifts in their practice. Sally reported that the Time 2 discussion felt more thorough than at Time 1. Marianne changed from using 0% of *integrated* questions/statements in her discussions with Sally at Time 1 to 18% at Time 2. She increased her percentage of *integrated* questions/statements with Roger from 18% at Time 1 to 28% at Time 2. Steven coached Mildred, who also reported positive shifts in her practice. Steven changed from using 0% of *integrated* questions/statements in his discussions with Mildred at Time 1 to 16% at Time 2. Additionally, the four teachers who reported a positive shift in trying new things in their classrooms, Roger, Elaine, Mildred and Diana, all worked with these three coaches.

The pattern was not consistent, however. May showed the greatest percentage of shift with Ellen in increasing *integrated* questions and statements from 7% at Time 1 to 37% at Time 2. Because there was a malfunction with the audiotape of Ellen and May's post-observation discussion, it was not possible for the researcher to probe Ellen's perceptions of the effect of May's feedback and feed forward on her practice and thinking,

nor whether the changes were pedagogical or technical/procedural. Ellen's questionnaire responses showed a modest shift in *I have significantly changed my beliefs about how to promote student learning through feedback given by the coach* from *somewhat agree* at Time 1 to *agree* at Time 2. In her Time 2 follow-up interview, Ellen provided a possible reason why she did not report strong shifts in her practice. She stated that although she believed she had changed her beliefs, she did not always change her practice:

A lot of the things that [May and I] talk about are not new concepts... but they are all things that I don't always practice ... I know what I should be doing but I don't always do what I know I should be doing.

Ellen stated that pressure of time inhibited her from making the changes in her practice that she believed were desirable. Although she raised this issue with the researcher in both the Time 1 and Time 2 follow-up interviews, she did not appear to have discussed it with May.

The coach who made the least improvement in the percentage of *integrated* questions/statements from Time 1 to Time 2 was Diaz and her teachers, Justine and Kevin reported minimal changes in their practice. Diaz was coded with 0% of *integrated* questions/statements at Time 1 and 4% at Time 2. She did, however, reduce her percentage of *not unpacking* questions/statements from 54% at Time 1 to 7% at Time 2. As discussed earlier, Diaz believed that the Te Kotahitanga model of coaching inhibited her from making changes in her practice. Nevertheless, she reported the greatest number of positive shifts in practice from Time 1 to Time 2 of any coach (Table 15). Neither Justine nor Kevin reported any shifts in their practice from Time 1 to Time 2 (Table 16). Justine described technical/procedural changes at Time 1 and 2. She had been away from teaching for three years but stated that she had a good knowledge of best practice and the observation process was a useful reminder. Justine also reported no change from Time 1 to 2 in her questionnaire responses. Kevin reported pedagogical changes at Time 1 and 2. As a beginning teacher, he found the coaching supportive and helpful. However, at Time 2 he stated that he wanted more from his coach:

I kind of do [need] more direction on how I'm going ... Like you tried that ... that didn't work, would you do it again?

Kevin’s statement was interesting because it appeared he was not actually seeking direction, but to engage with his coach in a deeper discussion about aspects of his teaching. The kinds of questions/statements he expressed a desire for may have unpacked, engaged with, and challenged his theories of practice at the *integrated* level.

The second area in which there was a relationship between the coaches’ and teachers’ reports was the pre-observation discussion. As described above, this aspect was given some emphasis during the coaches’ training. Both coaches and teachers generally reported improvements in the coaches’ practice in engaging with teachers’ ideas and beliefs during the pre-observation discussion between Time 1 and Time 2, but coaches reported stronger shifts. As shown in Table 15 above, all coaches reported that they had improved in unpacking, engaging with and challenging teachers’ ideas about learning and teaching when they set goals and constructed success criteria for the observation. Teachers generally reported in their follow-up interviews that coaches had improved in discussing their ideas when they set goals for the observation. Table 18 shows the shifts in 15 teachers’ perceptions between Time 1 and Time 2.

Table 18

Teachers’ Reports of Changes in Coaches’ Discussion of Teachers’ Ideas When Goal Setting for the Observation

Teacher	Shift
Charlie	-1
Roger	+1
Sally	0
Justine	+5
Kevin	0
Fiona	+1
Ioasa	+1
Odette	0
Tiger	+1
Mildred	+1
Rocket	+3
Tabitha	0
Susan	+2
Diana	0
Ellen	0

Eight teachers reported a positive shift in the extent to which coaches discussed their ideas when setting goals for the observation. Rocket reported a shift of +3. At Time 1 she chose *Disagree* for the statement *The coach discussed my ideas about learning and teaching when we set goals for the observation*. Rocket did not believe that her coach, Caterina, had set goals for the observation with her. When the researcher articulated the goal that Caterina stated at the start of the post-observation discussion, Rocket did not recognise it. At Time 2, Rocket chose *Agree* for the same statement. She could state the goal for the observation and she said that Caterina discussed her ideas: “[Caterina] was asking me what I wanted to achieve.” Rocket stated that the biggest difference in Caterina’s practice between Time 1 and 2 was that she listened more carefully to Rocket’s ideas at Time 2: “Listening is very important. Not just sitting there telling someone this is what you should be doing, but actually listening to the other person who [is] obviously going to have their own opinions about what we’re doing and why”.

Few coaches appeared to have co-constructed success criteria for the observation with teachers at Time 1 or Time 2, so there was insufficient data to discuss this aspect.

This section has shown some relationship between coaches’ improvement in using *integrated* questions/statements and teachers’ reported changes in practice. There were also some similarities between how coaches reported they had improved their practice in the pre-observation discussion at Time 2, and teachers’ perceived shifts in the coaches’ practice.

Overall, the findings indicate that it is challenging for coaches to help teachers make pedagogical changes in their practice and thinking. Two factors seem to have played a part. When coaches increased the number of questions/statements at the *integrated* level and engaged with teachers’ beliefs and ideas at every stage of the observation process, teachers were more likely to make pedagogical changes to their practice and try new things in the classroom. Coaches reported that the ETTOP rubric (Version 2) helped them improve, but this was more evident when coaches used the rubric to reflect on their practice. Secondly, training generally had a positive impact on the coaches’ practice. After training, all coaches used fewer *not unpacking* and more *integrated* questions/statements. Additionally, the pre-observation discussion was emphasised during the training sessions, and both coaches and teachers generally reported changes in the way coaches conducted the pre-observation discussions at Time 2.

Discussion

The ETTOP rubric (Version 2) played a central role in helping some coaches develop discussions with teachers, which led to pedagogical changes in some teachers' practice and thinking. This section explores the effectiveness of the rubric in relation to its impact on coaches' and subsequently, teachers' practice and beliefs.

Effects of training on the coaches' practice

The coaches' practice generally changed in two major ways between Time 1, without training in the rubric, and Time 2 following training. They used more questions/statements in their discussions with teachers that elaborated on their own and the teachers' theories of practice and they changed the structure of the observation process, with more time given to the pre-observation discussion. Because both aspects were emphasised during the coaches' training sessions, this section argues that training, rather than natural improvement, was an important component in changing coaches' practice.

The coaches' training in the use of the ETTOP rubric (Version 2) effectively laid a foundation for facilitating conceptual change (Vosniadou et al., 2008, p. 22) with some coaches. Presenting an alternative approach is one pathway to conceptual change (Chinn & Brewer, 1993; Inagaki & Hatano, 2008) because showing an alternative approach can create dissonance with one's current practice. The coaches' training included film clips to demonstrate an alternative approach to giving feedback, which included engaging with teachers' beliefs and ideas during the pre and post observation discussions, using the rubric. In their follow-up interviews, four coaches made unprompted references as to how these film clips helped to improve their understanding of how to unpack, engage with and challenge teachers' theories of practice.

Training in the ETTOP rubric (Version 2) appeared to change the coaches' practice. All coaches showed some shifts in *Not unpacking* and *Integrated* at Time 1 and 2. The training was not sufficient, however, to generally improve coaches' practice in ways that had a major impact on teachers' practice and thinking. Two possible explanations for this lack of impact are explored. The first possibility is that the coaches needed more training in unpacking, engaging with and challenging teachers' theories of practice. In Study 3 coaches participated in one and a half days of training. Timperley et al. (2007) suggest that frequent professional development opportunities over an extended period of time may be more

effective in achieving deep and sustainable shifts in practice than, for example, a one-off workshop.

A second possible explanation is linked with the issue of training. The two coaches, May and Marianne, who made the greatest changes in their practice, developed routines around the use of the ETTOP rubric (version 2) between the training sessions to monitor their practice. As with Study 2, coaches were given homework between the two training sessions; they were asked to analyse one of their post-observation discussions, using the ETTOP rubric (Version 2) to monitor their types and levels of questions/statements. The aim of the task was to help coaches develop routines around the use of the rubric, which is one of the characteristics of an effective tool (Timperley & Parr, 2009). Half the coaches stated that they had not used the rubric outside the training sessions but May reviewed transcripts of her discussions using the rubric and Marianne studied the rubric before conducting observation discussions. As a result, these coaches experienced and embraced dissonance with their current practice. May described the dissonance as a “jolt”, and Marianne reported that she was aware of her limitations in how she engaged with teachers’ theories of practice. For the ETTOP rubric (Version 2) to be instrumental in helping coaches make significant changes in their practice, its use needs to be embedded in the coaches’ routines around the observation process.

The challenge of effecting pedagogical changes in teachers’ practice and beliefs.

The findings suggest that it is challenging to change teachers’ practice and beliefs. Although 10 out of 14 teachers reported that they had made pedagogical changes in their practice at Time 2, only half the teachers reported substantially changing their beliefs as a result of feedback and/or feed forward. This section discusses firstly how dissonance was also a key to changing teachers’ practice and beliefs and secondly, the challenges involved in accessing teachers’ beliefs.

The three teachers who reported the greatest shifts in their practice stated that during the observation process they experienced dissatisfaction with their current practice. Their reports align with the research of Timperley et al. (2007), who assert that creating dissonance with one’s current position is one of the iterative learning processes when developing new understandings and skills. Creating dissonance does not ensure conceptual change, however. A teacher may resolve the dissonance with seven possible responses, and

only one of these is to change their beliefs (Chinn & Brewer, 1993). Study 3 showed that the skill of the coach is a key to both activating teachers' dissonance and resolving the dissonance in ways that change teachers' practice. One of the purposes of the ETTOP rubric (Version 2) was to help coaches create dissonance in their discussions with teachers, especially in the two categories *Challenging (confronting differences)* and *Expressing your own theories of practice (to help clarify the teachers' theories)*. There is some alignment with coaches who shifted their practice from *not unpacking* to *integrated* and teachers who experienced dissonance and used it to make pedagogical changes in their practice.

Few conclusions could be drawn about changes in teachers' beliefs. Although seven teachers reported that they had significantly changed their beliefs about how to promote student learning as a result of feedback and/or feed forward from the coach, these teachers were not more likely to report pedagogical changes in their practice than teachers who reported no change. On the contrary, two of the three teachers who reported improvements in changing their practice reported no shift in relation to these items. A possible explanation evident in the transcripts is that coaches did not progress beyond challenging teachers' beliefs to develop a discussion in which teachers and coaches together worked through any dissonance created by the challenge.

An example of a discussion that did not progress beyond challenging was between Steven (the coach) and Mildred. Mildred was one of the two teachers described above who reported that she changed her practice but not her beliefs. She was the only teacher in Study 3 to challenge her coach's feedback during the post-observation discussion. Mildred and Steven were discussing issues associated with the range of student capability in the class. Steven challenged Mildred to differentiate tasks for students by creating different success criteria for students based on their reading data. Mildred replied that there was not sufficient time to develop enough knowledge of individual student needs because she only taught the students three times a week for three months, rather than for the full school year. After this statement, Steven did not challenge Mildred's belief or continue the discussion. Steven's experience is consistent with the findings of Timperley and Earl (2008) who suggested that professional development providers were more likely to retreat from exploring dissonance than to develop a discussion to explore and resolve it.

Another explanation for a lack of relationship between teachers' changes in beliefs and making pedagogical changes in their practice is that the study may not have

successfully captured the teachers' beliefs. As Brown and McIntyre (1993) found, it is not easy to gain access to teachers' thinking processes about their practice. When the researcher asked teachers about their thinking in relation to each incident of feedback and feed forward, she could not be certain that the teachers were able to articulate what they had actually thought during the their discussions with the coaches, or that they were willing to share their beliefs.

Unlike the coaches, all teachers' changes were self-reported. The limitations of self-reports are acknowledged (Porter, 2006), but were partially mitigated in follow-up interviews by asking teachers to expand on their description of changes they had made in their practice and thinking, which gave the researcher more information than, for example, a questionnaire response only.

In summary, the ETTOP rubric (Version 2) was a useful tool in helping most coaches shift their practice from not engaging to engaging with teachers' theories of practice. Coaches who made the strongest shifts in their practice generally coached teachers who made pedagogical shifts in their practice, and to a more limited extent, their beliefs. Training was needed to change coaches' practice, but coaches who made the greatest shifts developed routines that enabled them to use the rubric in their practice beyond the training. The final chapter summarises and discusses the findings from each of the three studies and discusses implications for further research in this field.

Chapter 8:

Conclusion

This chapter summarises the major findings from the three studies, and how this research can contribute to knowledge about unpacking and engaging with teachers' theories of practice in a coaching model. The limitations, further research and professional learning and development opportunities are also discussed.

Summary of Major Findings from Studies 1, 2 and 3

Teacher professional development is at the heart of this thesis. Timperley et al. (2007) assert that there is a "black box" between teachers' participation in professional learning and development and its subsequent impact on their practice. Each of the three studies aimed to provide a cumulative insight into the "black box" by investigating teachers' practice and beliefs as a result of feedback and feed forward from their coaches.

Study 1 explored the effectiveness of feedback in changing teachers' practice, particularly whether some levels of feedback, as described by Hattie and Timperley (2007), were more effective in leading to changes in teachers' practice. The levels were feedback about the task, feedback about the process and feedback that leads to self-regulation. Although this was a small study with two coaches and four teachers, the findings were both consistent and disturbing: teachers remembered and enacted less than two out of 18 incidents of feedback, regardless of the level of feedback. There were two possible explanations related to the coaches' practice; they overwhelmed teachers with the amount of feedback, and they did not generally unpack, engage with or challenge teachers' theories of practice. Neither coach had received any training in this aspect.

The findings from Study 1 were instrumental in the development of new research questions for Study 2. The key question became: "How can coaches improve feedback to teachers through engaging and challenging teachers' theories of practice?" A supplementary question was "What was the effect of the coaches' feedback and feed forward on teachers' reported practice and beliefs?" To support coaches in this process, the researcher developed a tool, the *Engaging With Teachers' Theories of Practice (ETTOP)* rubric, which included categories and levels of questions/statements that moved from a coach not unpacking teachers' theories of practice to a discussion in which the teachers' theories of practice were integrated into the coaches' feedback and feed forward. A second

supplementary question was related to evaluating the value of the tool: “How effective is the ETTOP rubric in helping coaches engage with and challenge teachers’ theories of practice?”

The development and use of the ETTOP rubric was based on four characteristics of a tool designed to assist in teaching and learning as discussed by Robinson et al., (2009) and Timperley and Parr (2009). Robinson et al., (2009) identified two characteristics: the idea in the tool must be both based on sound theory and easy to understand and use. Timperley and Parr (2009) contributed two more characteristics: routines around the tool’s use require the teacher to examine evidence of his or her own practice, and the tool contains clear directions for how to improve practice.

The ETTOP rubric aimed to help coaches identify the types of questions/statements that were and were not effective in engaging with and challenging teachers’ theories of practice. Categories of questions/statements included *probing*, *clarifying*, *summarising*, and *challenging*. There were three ascending levels of questions/statements from *Basic* to *Developing to Integrated*. Coaches were trained in the use of the ETTOP rubric (Version 1). Their evaluations indicated that the rubric needed more refinement to meet the characteristics of an effective tool, especially in relation to its ease of use and clarity of directions for how to improve. As a result, the rubric was refined as ETTOP (Version 2) for Study 3.

Study 2 measured the effect of training coaches in the use of the ETTOP rubric (Version 1) on their own practice and teachers’ practice. Coaches’ post-observation discussions with teachers were coded at Time 1 and Time 2 using the categories and levels of the ETTOP rubric (Version 1). Teachers were also interviewed at Time 1 and Time 2. Findings from Study 2 indicated that although coaches improved in how they engaged with and challenged teachers’ theories of practice, there was not generally a similar improvement in teachers’ practice and beliefs. A possible explanation was that most coaches did not explore the teachers’ theories of practice at a deep enough level to create dissonance with the teachers’ current practice and beliefs. Additionally, most coaches did not discuss their own theories of practice with the teachers. This is important because when a coach does not openly discuss his or her theories of practice, teachers may interpret the his or her suggestions as directive (Timperley et al., 2008), rather than one person’s ideas, which could be modified through discussion.

Another significant finding from Study 2 was that coaches needed to engage with and challenge teachers' theories of practice at every stage of the observation process. Timperley (2014) defined three stages as the pre-observation discussion, analysis of practice and creating new practice. Only two of the four coaches had pre-observation discussions in which goals were set for the observation. Revising the coaches' training was seen as the key to improving these two key aspects of the observation process. The training programme for Study 2 used film clips of a coach and teacher engaged in a post-observation discussion only.

Study 3 was a refinement of Study 2, but several modifications were made in the procedures and analysis of data. The rubric was modified to become The ETTOP rubric (Version 2). An additional category *Expressing your own theories of practice* was added to focus coaches on this important aspect. The *Basic* level was renamed *Not unpacking teachers' theories of practice* to more accurately reflect its indicators and examples. Indicators and examples were changed or added to provide greater clarity between the levels. As a result of the findings from Study 2, the coaches' training was modified to include studying and critiquing film clips of a coach and teacher engaged in a discussion of their theories of practice during each stage of the observation process. An additional aspect of Study 3 was that coaches were interviewed at Time 1 and Time 2 to gain an understanding of how they believed their practice had changed as a result of the training.

Findings from Study 3 suggested that the ETTOP rubric (Version 2) had value in helping coaches shift their practice to engaging and challenging teachers' theories of practice. All coaches improved from not engaging to engaging with teachers' theories of practice. All teachers reported that they had made changes in their practice, but only half the teachers reported changes in their beliefs as a result of feedback and/or feed forward given by the coach. There was some relationship between coaches who made the strongest shifts in their practice and teachers who reported pedagogical shifts in their practice, and to some extent, their beliefs. Coaches who showed the greatest shifts had developed routines around their use of the ETTOP rubric (version 2) that led them to reflect on the questions/statements they used. As a result, these coaches described experiencing dissonance with their current practice.

In summary a progression of the findings from all three studies showed that when coaches engage with teachers' theories of practice, teachers are more likely to make

pedagogical shifts in their practice and in their beliefs. The ETTOP rubric (Version 2) appeared to be a useful tool in helping coaches to access and focus on teachers' theories of practice, but its effectiveness was enhanced when coaches used it to reflect on their own practice.

Contribution to Knowledge

Given the focus of this thesis on exploring how coaches can unpack, engage with and challenge teachers' theories of practice to facilitate the process of conceptual change, the first contribution this thesis makes to the body of knowledge is the exploration of the effectiveness of tools, in this case the ETTOP rubric (Version 2), in helping coaches engage with and challenge teachers' theories of practice. Although the rubric is in its infancy, there is evidence from Studies 2 and 3 that it was effective in prompting a shift in the level of coaches' questions/statements. Tools, however, rarely stand on their own in terms of effectiveness. It is the routines around them that can make the difference (Timperley & Parr, 2009) and the importance of routines became evident in Study 3. Those coaches who developed reflective routines around the use of the tool made the greatest shifts.

Additionally, Study 3 showed that when coaches used questions/ statements that explored teachers' theories of practice at a deep level, teachers were more likely to report pedagogical changes in their practice, and to some extent, their beliefs. While other researchers (e.g. Knight, 2007; Timperley, 2014) have developed approaches that engage coaches with teachers' theories of practice, the use of the ETTOP rubric (Version 2) extends previous studies because it guides coaches to use specific types and levels of questions/statements that engage and challenge teachers' beliefs and ideas.

The second contribution is that this thesis enhances an understanding of the challenges implicit in activating the four iterative learning processes for developing new skills and knowledge to begin the process of conceptual change (Timperley & Alton-Lee, 2008). These authors posited that Process 1 involves cueing and retrieving prior knowledge; process 2 involves becoming aware of new information/skills, which are integrated into the person's beliefs systems; process 3 involves creating dissonance with the person's current position; and process 4 involves developing enhanced co and self-regulation. Studies 2 and 3 showed that coaches found it difficult to create dissonance with a teacher's current position and thereby begin the process of conceptual change that results in pedagogical changes in teachers' beliefs and practice. As a result of training, many

coaches improved in unpacking, engaging with and challenging teachers' theories of practice, but they seldom followed through challenges by exploring possible ensuing dissonance with teachers. Some teachers, on the other hand, stated that they wanted coaches to discuss and challenge their ideas more. After a Study 2 coach successfully facilitated dissonance with a teacher's current position, the teacher acknowledged that she had made pedagogical shifts in her thinking.

In Study 3 two coaches reported they had critiqued their own practice (process 4), using the ETTOP rubric (Version 2) to independently reflect on the quality of questions/statements they used in their discussions with teachers. As a result, these coaches became dissatisfied with their current practice, and worked at changing the levels and types of questions they employed. These coaches demonstrated the characteristics of self-regulated learners (Butler & Winne, 1995), who are able to “judge performance relative to goals, generate internal feedback about amounts and rates of progress towards goals and adjust further action based on that feedback” (p. 258). This finding offers some insight that coaches could be helped to develop the self-regulatory aspect of Process 4 through using a reflective tool such as the ETTOP rubric (Version 2) to critique and then improve their practice.

The thesis contributed to two areas of discussion in the literature on conceptual change. Chinn and Brewer (1993) theorise that although much of the research into conceptual change has focussed on children's knowledge acquisition, it may also offer insights into how to change teachers' concepts and subsequently their practice. The experience of some Study 3 coaches illustrated that the process of conceptual change may be similar in children and adults. These coaches encountered discrepant events that created dissonance with their current practice and led them to make key shifts in their approach to coaching. Their experience is consistent with Clement (2008), who suggests that conceptual change in children may be effected through creating a discrepant event that promotes dissonance with students' preconceptions.

Many researchers (e.g. Chinn & Brewer, 1993; Inagaki & Hatano, 2008) stress that conceptual change is a difficult and gradual process. The findings from Study 2 indicated that without engaging with teachers' theories of practice, coaching was unlikely to result in conceptual change. The findings from Study 3 showed that unpacking, engaging with and challenging teachers' theories of practice did not appear to be sufficient in bringing about

conceptual change. Coaches also needed to be able to help teachers *change* their theories of practice through systematically changing the beliefs and presuppositions of the original theory (Vosniadou, 2008). This is difficult work, which depends not only on the skills of coaches, but also on how teachers respond when their theories of practice are challenged (Chinn & Brewer, 1993). There was some evidence in Study 2 that this process can be achieved in a coaching context.

Limitations of the Study

A limitation of this study is that all the data related to teachers' changes in their practice and thinking was gained from self-reports. Ho, O'Farrell, Hong and You (2008) explain that one strength of self-reports is that they can provide access to unique information, but they may also be unreliable and have questionable validity. A way the researcher attempted to mitigate this risk was by using complementary methods to triangulate the self-reports. She followed up teachers' statements, using transcripts from the discussion between the teachers and coaches to probe further. For example, when teachers stated they had changed their practice, the researcher asked additional questions about the nature of the changes and the extent to which the teachers' changes were linked to feedback or feed forward from the coaches. Teachers' comments in the follow-up interviews were also checked for consistency with their questionnaire responses. When there seemed to be differences between the two data sources, the researcher asked teachers to elaborate on their responses. A second way that the risk of self-reports was mitigated was that the teachers' self-reports across Studies 2 and 3 were consistent with data collected about the coaches' practice. When data coded from the discussions between coaches and teachers showed that coaches engaged with and challenged teachers' theories of practice at the *integrated* level, teachers generally reported pedagogical changes in their practice, and to some extent, their beliefs.

A second limitation is that Studies 2 and 3 were of a short duration, encompassing approximately six months, yet many researchers state that conceptual change is often a gradual process that requires an extended period of time (Chinn & Brewer, 1993; diSessa, 2008; Inagaki & Hatano, 2008). It is possible that a more extended study, including further training for coaches, would result in greater shifts in teacher practice and beliefs. Despite this limitation, most coaches in Study 2 and all coaches in Study 3 showed improvement in engaging with and challenging teachers' theories of practice during the intervention.

Additionally, one teacher in Study 2 and three teachers in Study 3 reported that they had made pedagogical shifts in their practice.

A third limitation related to the participating coaches and teachers. Because they were all volunteers, it is possible that the coaches were more motivated to change their practice than some non-participating coaches may have been. Additionally, the coaches may have selected teachers who were likely to make stronger shifts in their practice. Another factor was that all three studies were small. Study 1 comprised 2 coaches and 4 teachers; Study 2, 4 coaches and 6 teachers and Study 3, 6 coaches and 16 teachers. For all these reasons, generalizability may be limited to coaches and teachers who have demonstrated some motivation to change their practice.

Implications for Further Research

The findings from the three studies opened up areas for further investigation. Training participating teachers in how to express and debate their ideas and beliefs during the observation process would be a possible area for further research, to determine whether such training would lead to greater changes in teachers' practice and beliefs. The reason this training may be desirable is that in all three studies most teachers were outwardly submissive to the coaches' suggestions, even when they did not agree with them. As a result of training teachers may become more assertive in promoting their theories of practice in their discussions with their coaches. Openly discussed dissonance could then become a feature of the interactions between coaches and teachers, which may lead to changes in the teachers' or coaches' practice, or both.

Studies 2 and 3 developed a model for training coaches, which demonstrated some success in changing coaches' practice and teachers' practice and beliefs. Further development of the model is warranted, because Study 3 indicated that when coaches examined their own practice, using the ETTOP rubric (Version 2), teachers made greater shifts in their practice, and to some extent, their beliefs. Therefore part of the training could include a requirement that coaches reflect on the types and levels of questions/statements they used in their discussions with teachers. Additionally, the ETTOP rubric (Version 2) appeared to be a useful tool to help coaches engage with teachers' theories of practice but the rubric needs to be tested in a greater number of coaching contexts to establish its reliability to shift teachers' practice over a range of contexts.

Further research could investigate the extent to which changing teachers' pedagogical practice and beliefs results in improved student outcomes. As Timperley et al. (2007) state, "Improving teacher practice should not be considered an end in itself but should be judged according to the impact on students" (p. 12). Therefore a worthwhile study could investigate how reported pedagogical changes in teachers' practices were enacted in the classroom. A researcher could then interview students to determine their perceptions of the changes in teacher practice on their learning, and student achievement data could be used to triangulate the students' perceptions.

Implications for Policy and Professional Learning

Changes to the registration of teachers in New Zealand has meant that every teacher must provide evidence that he or she has met all the registered teacher criteria when renewing his or her teacher certificate or applying for full registration. One of the possible sources of evidence stated on the Teachers' Council website is a "formal observation of teaching ...with structured feedback and next steps discussed with the teacher" (<http://www.teacherscouncil.govt.nz/rtc>). The Teachers Council seems to have understood that there are challenges involved in this process, and has issued a statement acknowledging that "for the Registered Teacher Criteria to be successfully used in the appraisal of teachers, the skills/knowledge of professional leaders needs to be improved" (<http://www.teacherscouncil.govt.nz/rtc>). This statement suggests that professional leaders may need training in how to give feedback and co-construct teachers' next steps in learning. This thesis has demonstrated that the skills and knowledge of professional leaders could be improved with training in how to engage with, challenge and discuss teachers' theories of practice. The ETTOP rubric (Version 2) may be a useful tool to guide professional leaders in their discussions with teachers, and to help them reflect on how to improve the levels of questions/statements they employ, so that the appraisal process is effective in helping teachers who need to change their practice and beliefs meet each of the registered teacher criteria.

In 2013 the New Zealand government invested more than \$70 million in teacher professional learning and development. Developing a greater understanding of what happens in the "black box" between teacher professional learning and development and teacher practice (Timperley et al., 2007) ensures that this valuable resource is maximised in relation to changing teachers' practice and beliefs. Several examples have been discussed in

this thesis of how teachers misunderstood or disregarded new learning because their theories of practice were bypassed (e.g. Coburn, 2004; Franke et al., 1998). It is hoped that this thesis can contribute in a small way to making some of that investment more effective by improving how providers of teacher professional development engage with and challenge teachers' theories of practice, with the result that teachers make significant changes in their practice and beliefs.

Appendices

Appendix A: Ethics Material, including Participant Information sheets and Consent forms for Study 3.



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Participant Information Sheet: Principal /BOT

Title: How coaches/facilitators unpack and engage teachers' theories of practice.

My name is Irene Andersen and I am conducting research as part of a Doctor of Education degree in the Faculty of Education. My supervisors are Prof. Helen Timperley and Dr Mei Kuin Lai of the Faculty of Education, University of Auckland.

Few studies have been conducted about understanding the processes involved by which teachers change their practice. When teachers contract with external coaches/facilitators to participate in cycles of observation and reflection, the coach's/facilitator's feedback is a significant element in this process. For feedback to be effective in changing teachers' practice, the coach/facilitator needs to unpack and engage the teacher's beliefs about learning and teaching (their theories of practice). This is not a simple process and there is evidence that coaches/facilitators struggle to develop a discussion with teachers in which these theories come to the fore (Timperley, Parr and Hulsbosch, 2008). This project is Part 3 of a three-part study. Part 3 involves training coaches in the use of a tool to unpack and engage teachers' theories of practice.

Firstly, a post-observation interview between the coach/facilitator and the teacher is audiotaped. The interview will then be transcribed. I will code the ways the coach/facilitator attempts to unpack the teacher's theories of practice. Next, I will give the teacher a self-report questionnaire to complete that addresses the teacher's beliefs, approaches to learning and professional development, and their perceptions of the effectiveness of the coach/facilitator. The data from this questionnaire will be triangulated with an interview between the teacher and me. Two other teachers working with the same coach/facilitator will participate in the same way. In total, there will be six coaches/facilitators and 18 teachers involved in this study. I will also interview the coach/facilitator. This interview will be audiotaped and transcribed.

Secondly, the six participant coaches/facilitators will receive professional development in using a tool to unpack teachers' theories of practice. The professional development consists of one and a half days of workshops, which will be led by an external facilitator.

Day 1 (6 hours): Coaches/facilitators will be instructed in the use of the tool. The coaches/facilitators will then undertake to use the tool in their normal observations and record their experiences.

Day 2: (3.5 hours) Coaches/facilitators will report back on how they have used the tool in reflecting on their post-observation feedback, particularly unpacking teachers' theories of practice. Further training in the use of the tool will arise from the issues encountered by the coaches/facilitators.

Thirdly there will be a second round of the post-observation discussions as described above to analyse changes in the coaches/facilitators' practice as a result of using the tool.

The school's participation in my research project would be greatly appreciated. It will involve:

- your consent to allowing me to approach teachers
- to allow me to administer the questionnaire
- to allow the interviews between teachers and me to be conducted on site
- to allow the coach to participate in two workshops.

Teacher participation is voluntary. I request your assurance that the decision of teachers to participate or not will not affect their standing in the school and they may withdraw from the project at any time without consequences.

The interview between the coach/facilitator and the teacher will take place as part of a normal cycle of observation and reflection. This interview will be audiotaped. The administration of the questionnaire and the interview between the teacher and me will be arranged at a time suitable for the teacher. Both will take place at school and last up to 90 minutes. The interview with the coach/facilitator and me will also be audiotaped. The interview will take place at school and last up to one hour. The interviews will be audiotaped but neither the coach/facilitator, the teacher, nor the school will be identified by name on the audiotape. Confidentiality of the identity of some participants cannot be guaranteed because there is a limited number of coaches/facilitators working with teachers in this field. Nevertheless, the only people with access to the audiotape will be me, my supervisors, and the professional transcriber, who will sign a Transcriber Confidentiality Agreement. All participants in this study will be given an "alias name" and this is the only name that will appear on the transcripts, questionnaires and interviews. Schools will be referred to by a description of their type (e.g. co-ed, area school). Therefore if the information provided is reported/published this will not identify the coach/facilitator, teacher or the school as its source. The school has the right to withdraw from the study at any time and will be able to withdraw their data from the project up to 31 December 2012.

Even if the teacher agrees to being recorded, he/she may choose to have the recorder turned off at any time.

Audiotapes and transcriptions of the interviews will be stored in a locked cupboard at the University of Auckland for a period of six years. After this time the transcripts will be shredded and the tapes destroyed.

Participation in this study will involve up to six hours of each teacher's time. This includes:

- a preliminary meeting to discuss participation in the study (30 minutes)
- completion of the questionnaire, twice (60 minutes)
- Two interviews with me (two hours)
- editing the transcript of the interview if desired (two hours).

Participation in this study will involve up to 10 hours of each coach's time. This includes:

- a preliminary meeting to discuss participation in the study (30 minutes)
- two interviews of up to one hour each
- two workshops of 6 and 3.5 hours each.

A written summary of the results of this research will be made available to the principal/BOT, participating coaches/facilitators and participating teachers by 31 January 2013.

If your school is willing to allow me to recruit teachers for this study, and conduct my data collection within the school, please fill in the attached Consent Form and hand it to the coach/facilitator or post it using the enclosed stamped addressed envelope.

Thank you for your time. If you have any queries or wish to know more please call or text me on 0275 880 442 or email or contact my supervisors at the address below.

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For Ethical concerns contact:
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The University of Auckland Human Participants Ethics Committee
The University of Auckland
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APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE ON 11 August 2010 for 2 Years. Reference Number 2009/359



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PRINCIPAL/BOT CONSENT FORM

THIS CONSENT FORM WILL BE HELD FOR A PERIOD OF SIX YEARS

Title: How coaches/facilitators unpack and engage teachers' theories of practice.

Researcher: Irene Andersen, student in Doctor of Education degree, Faculty of Education.

Supervisors: Prof. Helen Timperley and Dr Mei Kuin Lai, Faculty of Education.

I agree to allow the researcher to recruit teachers for this study, and conduct her data collection within the school.

I agree to allow the coach to participate in two workshops of one and a half days.

I have read and understood the information sheet: Principal/BOT. I understand the nature of the research and why this school has been selected. I have had an opportunity to ask questions and all my questions have been answered.

I agree that teachers' participation is voluntary and their decision to participate or not will not affect their standing in the school.

- I understand that neither the school nor any teacher will be identified by name or description in any later publication.
- I understand that confidentiality of the participants' identity cannot be guaranteed.
- I understand that the interviews will be recorded.
- I understand that material gained from the questionnaire and interviews may be used and published.
- I understand that the principal or the BOT may withdraw their permission for the researcher to conduct her research within its premises at any time without giving a reason.
- I understand that a written summary of the results of this research will be made available to the principal/BOT, participating coaches/facilitators and participating teachers by 31 January, 2013.
- I understand that the data collected for this study will be held in a secure place (separately from the consent forms) at the university, for up to six years. After this time the audiotapes will be destroyed and the transcripts shredded.
- I agree that the meetings associated with this research (introductory discussion, the administration of the questionnaire, the interview between the teacher and researcher, the optional meeting to review the transcripts) may be held on site at this school.

Signed: _____

Name: _____

Date: _____

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Auckland, New Zealand

Participant Information Sheet: Coach/Facilitator

Title: How coaches/facilitators unpack and engage teachers' theories of practice.

My name is Irene Andersen and I am conducting research as part of a Doctor of Education degree in the Faculty of Education. My supervisors are Prof. Helen Timperley and Dr Mei Kuin Lai of the Faculty of Education, University of Auckland.

You are invited to participate in this study because you work in an area of secondary facilitation that involves cycles of observation and reflection with individual teachers.

Few studies have been conducted about understanding the processes involved by which teachers change their practice. When teachers contract with coaches/facilitators to participate in cycles of observation and reflection, the coach's feedback is a significant element in this process. For feedback to be effective in changing teachers' practice, the coach/facilitator needs to unpack and engage the teacher's beliefs about learning and teaching (their theories of practice). This is not a simple process and there is evidence that coaches struggle to develop a discussion with teachers in which these theories come to the fore (Timperley, Parr and Hulsbosch, 2008). This project is Part 3 of a three-part study. Part 3 involves training coaches in the use of a tool to unpack and engage teachers' theories of practice.

Firstly, a post-observation interview between you and the teacher is audiotaped. The interview will then be transcribed and I will code the ways you attempt to unpack the teacher's theories of practice. Next, I will give the teacher a self-report questionnaire to complete that addresses the teacher's beliefs, approaches to learning and professional development, and their perceptions of the effectiveness of you as the coach. The data from this questionnaire will be triangulated with an interview between the teacher and me. Two other teachers working with you will participate in the same way. In total, there will be six coaches/facilitators and 18 teachers involved in this study. I will also interview you and audiotape the interview.

If you are interested in participating you need to give me the names of three teachers you work with in cycles of observation and reflection. I will then meet with each teacher to explain their role in the research. The basis for the selection of coaches/facilitators will be whether the teachers they work with are willing to be involved. If there are more teachers and coaches/facilitators willing to be involved than the research requires, selection will be based on the location of the school and my familiarity with the school.

Participation in Part 3 of this study will involve up to 10 hours of your time. This includes a preliminary meeting to discuss participation in the study, the one and a half days of training and two interviews.

The interview between you and the teacher will take place as part of your normal cycle of observation and reflection. You will audiotape this interview. Because there are risks involved for the teacher in audiotaping this discussion, the teacher may request that the tape be turned off at any time. The administration of the questionnaire and interview between the teacher and me will be arranged at a time suitable for the teacher. It will take place at school and last up to one hour. From the questionnaire and interview I will gain information about the way the teacher perceives your effectiveness as a coach related to how you unpack and engage the teacher's theories of practice.

The interview will be audiotaped but neither you, the teacher, nor the school will be identified by name on the audiotape. Confidentiality of identity cannot be guaranteed because there is a limited number of coaches/facilitators working with teachers in this field. Nevertheless, the only people with access to the audiotape will be me, my supervisors, and the professional transcriber, who will sign a Transcriber Confidentiality Agreement. All participants in this study will be given an "alias name" and this is the only name that will appear on the transcripts, questionnaires and interviews. Schools will be referred to by a description of their type (e.g. co-ed, area school). Therefore if the information provided is reported/published this will not identify the coach/facilitator, teacher or the school as its source.

Your interview with me will also be audiotaped. The interview with you will be arranged at a time suitable to you. It will take place at school and last up to one hour.

Secondly, the six participant coaches/facilitators will receive professional development in using a tool to unpack teachers' theories of practice. The professional development consists of two half-day workshops, which will be led by an external facilitator.

Day 1 (6 hours): Coaches/facilitators will be instructed in the use of the tool. The coaches/facilitators will then undertake to use the tool in their normal observations and record their experiences.

Day 2: (3.5 hours) Coaches/facilitators will report back on how they have used the tool in reflecting on their post-observation feedback, particularly unpacking teachers' theories of practice. Further training in the use of the tool will arise from the issues encountered by the coaches/facilitators.

Both Day 1 and Day 2 will be audiotaped but none of the coaches/facilitators will be identified by name. Each coach/facilitator will adopt an "alias name" and they will be addressed by this name on the tape. Confidentiality of identity cannot be guaranteed because there is a limited number of coaches/facilitators working with teachers in this field. Nevertheless, the only people with access to the audiotape will be me, my supervisors, and the professional transcriber, who will sign a Transcriber Confidentiality Agreement. The external facilitator, who will lead the professional development days, will also sign a confidentiality agreement. The "alias name" is the only name that will appear on the transcripts. Schools will be referred to by a description of their type (e.g. co-ed, area school). Therefore if the information provided is reported/published this will not identify the coach/facilitator, teacher or the school as its source.

Thirdly there will be a second round of the post-observation discussions as described above to analyse changes in the coaches/facilitators' practice as a result of using the tool.

Your participation is voluntary and your team leader/principal has given an assurance that your decision to participate or not will not affect your standing within Team Solutions/ your school.

The information gained will not affect your relationship or standing with the researcher or Team Solutions in any way. You will be able to withdraw from the project at any time without consequences to your relationship with me, the teachers involved or your standing within Team Solutions.

Audiotapes and transcriptions of the interviews will be stored in a locked cupboard at the University of Auckland for a period of six years. After this time the transcripts will be shredded and the tapes destroyed.

A written summary of the results of this research will be made available to the principal/BOT, participating coaches/facilitators and participating teachers by 31 January 2013.

If you are willing to be part of this study, please fill in the attached Consent Form and hand to the researcher. Coaches/facilitators, teachers, or the school are able to withdraw their data until 31 December 2012.

Thank you for your time. If you have any queries or wish to know more please call or text me on 0275 880 442 or email or contact my supervisors at the address below.

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The University of Auckland Human Participants Ethics Committee
The University of Auckland
Private Bag 92019
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Auckland, New Zealand

COACH/FACILITATOR CONSENT FORM

THIS CONSENT FORM WILL BE HELD FOR A PERIOD OF SIX YEARS

Title: How coaches/facilitators unpack and engage teachers' theories of practice.

Researcher: Irene Andersen, student in Doctor of Education degree, Faculty of Education.
Supervisors: Prof. Helen Timperley and Dr Mei Kuin Lai, Faculty of Education.

I agree to take part in this research.

I have read and understood the participant information sheet: Coach/Facilitator. I understand the nature of the research and why I have been selected. I have had an opportunity to ask questions and all my questions have been answered.

- I understand that my participation is voluntary and that my decision to participate or not will not affect my standing within Team Solutions/ my school.
- I understand that if the information I provide is reported/published, this will be done in such a way that does not identify me as the source
- I understand that confidentiality of the participants' identity cannot be guaranteed.
- I understand that my interviews with the teacher, the researcher, and the content of the workshops will be recorded.
- I understand that during the interviews with the teacher the teacher may request that the audiotape of the interview be turned off at any time.
- I understand that during the researcher's interviews with the teacher, the researcher will gain information about the way the teacher perceives how I unpack and engage with their theories of practice.
- I understand that the teacher will complete a questionnaire twice, which includes questions about the effectiveness of my coaching role.
- I understand that the interviews and workshops may be transcribed by a professional transcriber, who has signed a Transcriber Confidentiality Agreement.
- I understand that material gained from the interviews and workshops may be used and published.
- I understand that I may withdraw from the research at any time without giving a reason.
- I understand that I may withdraw my data from the project up until 31 December 2012.
- I understand that the data collected for this study will be held in a secure place (separately from the consent forms) at the university, for up to six years. After this time the audiotapes will be destroyed and the transcripts shredded.
- I understand that a written summary of the results of this research will be made available to the principal/BOT, participating coaches/facilitators and participating teachers by 31 January, 2013.
- I understand that the study will involve up to 10 hours of my time which includes a preliminary meeting to discuss participation in the study, two interviews and two half-days of professional development on using a tool to unpack teachers' theories of practice.
- I agree to give the researcher a list of names of teachers I currently work with in cycles of observation and feedback.

Signed: _____

Name: _____

Date: _____

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Participant Information Sheet: Teacher

Title: How coaches/facilitators unpack and engage teachers' theories of practice.

My name is Irene Andersen and I am conducting research as part of a Doctor of Education degree in the Faculty of Education. My supervisors are Prof. Helen Timperley and Dr Mei Kuin Lai of the Faculty of Education, University of Auckland.

You are invited to participate in this study. You have been selected because you work with a coach/facilitator who has expressed interest in participating in this study.

Few studies have been conducted about understanding the processes involved by which teachers change their practice. When teachers contract with coaches/facilitators to participate in cycles of observation and reflection, the coach's feedback is a significant element in this process. For feedback to be effective in changing teachers' practice, the coach/facilitator needs to unpack and engage the teacher's beliefs about learning and teaching (their theories of practice). This is not a simple process and there is evidence that coaches/facilitators struggle to develop a discussion with teachers in which these theories come to the fore (Timperley, Parr and Hulsbosch, 2008). This project is Part 3 of a three-part study. Part 3 involves training coaches in the use of a tool to unpack and engage teachers' theories of practice.

My proposal is that firstly a post-observation interview between the coach/facilitator and you is audiotaped by the coach/facilitator. The interview will then be transcribed and I will code the ways the coach/facilitator attempts to unpack your theories of practice. Next, I will give you a self-report questionnaire to complete that addresses your beliefs, approaches to learning and professional development, and your perceptions of the effectiveness of the coach/facilitator. The data from this questionnaire will be triangulated with an interview between you and me. Two other teachers working with the same coach/facilitator will participate in the same way. In total, there will be six coaches/facilitators and 18 teachers involved in this study. The coach/facilitator will also be interviewed.

The process described above will be repeated approximately six months later.

Your participation is voluntary and the principal has given an assurance that your decision to participate or not will not affect your standing within the school.

Participation in this study will involve up to six hours of your time. This includes:

- a preliminary meeting to discuss participation in the study (30 minutes)
- completion of the questionnaire, twice (1 hour)
- two interviews with me (two hours)
- editing the transcripts of the interviews if desired (two hours).

The interviews between you and the coach/facilitator will take place as part of your normal cycle of observation and reflection. They will be audiotaped. You may request that the audiotapes be turned off at any time if you are not happy that aspects of the interview are recorded. The administration of the questionnaires and interviews between you and me will be arranged at a time suitable for you. They will take place at school and last up to one hour each. The interviews will be audiotaped but neither you, the facilitator nor the school will be identified by name on the audiotapes.

Confidentiality of the identity of the participants cannot be guaranteed because there is a limited number of teachers working with coaches/facilitators in this field. Nevertheless, the only people with access to the audiotapes will be me, my supervisors, and the professional transcriber, who will sign a Transcriber Confidentiality Agreement. All participants in this study will be given an "alias name" and this is the only name that will appear on the transcripts, questionnaires and interviews. Schools will be referred to by a description of their type (e.g. co-ed, area school). Therefore if the information provided is reported/published this will not identify the coach/facilitator, teacher or the school as its source.

You may elect to read these transcripts and edit your comments to ensure that they are an accurate record of what you said or to change what you said if you are concerned about any aspect. You will be able to withdraw your data up to 31 December 2012. Audiotapes and transcriptions of the interviews will be stored in a locked cupboard at the University of Auckland for a period of six years. After this time the transcripts will be shredded and the tapes destroyed.

A written summary of the results of this research will be made available to the principal/BOT, participating coaches/facilitators and participating teachers by 31 January 2013.

If you are willing to be part of this study, please fill in the attached Consent Form and hand to the researcher.

Thank you for your time. If you have any queries or wish to know more please call or text me on 0275 880 442 or email or contact my supervisors at the address below.

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Auckland, New Zealand

TEACHER CONSENT FORM

THIS CONSENT FORM WILL BE HELD FOR A PERIOD OF SIX YEARS

Title: How coaches/facilitators unpack and engage teachers' theories of practice.

Researcher: Irene Andersen, student in Doctor of Education degree, Faculty of Education.
Supervisors: Prof. Helen Timperley and Dr Mei Kuin Lai, Faculty of Education.

I agree to take part in this research.

I have read and understood the participant information sheet: Teacher. I understand the nature of the research and why I have been selected. I have had an opportunity to ask questions and all my questions have been answered.

- I understand that my participation is voluntary and that the principal has given an assurance that my decision to participate or not will not affect my standing within the school.
- I understand that if the information I provide is reported/published, this will be done in such a way that does not identify me as the source.
- I understand that confidentiality of the participants' identity cannot be guaranteed.
- I understand that my interviews with the coach/facilitator and my interviews with the researcher will be recorded.
- I understand that I may request that the audiotape tapes be turned off at any time during my interviews with the coach/facilitator.
- I understand that the interviews may be transcribed by a professional transcriber, who has signed a Transcriber Confidentiality Agreement.
- I understand that I have the option of editing my responses on the transcripts of the interviews with the researcher. If I want to do this, I should indicate below that I want to have the opportunity to edit my responses.
- I understand that material gained from the questionnaire and interviews may be used and published.
- I understand that I may withdraw from the research at any time without giving a reason.
- I understand that I may withdraw my data from the research up until 31 December, 2012
- I understand that the data collected for this study will be held in a secure place (separately from the consent forms) at the university, for up to six years. After this time the audiotapes will be destroyed and the transcripts shredded.
- I understand that a written summary of the results of this research will be made available to the principal/BOT, participating coaches/facilitators and participating teachers by 31 January, 2013.
- I understand that the study will involve up to six hours of my time which includes a preliminary meeting to discuss participation in the study, completing a questionnaire twice, two interviews with the researcher and editing the transcripts of the interviews if desired.

Signed: _____

Name: _____

Date: _____

I do / do not want to have the opportunity to edit my responses in the transcripts.

Signed: _____

Date: _____

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Appendix B: Questionnaires

Questionnaire (Study 2)

Part 1: Your beliefs in relation to teaching and learning.

		Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
1.	I find it easy to explain my beliefs about why I teach the way I do.						
2.	My beliefs about teaching and learning have a strong influence on the way I teach.						
3.	My beliefs about effective teaching and learning have changed from when I first started teaching.						
4.	I have changed my beliefs about teaching through discussions with other teachers.						
5.	I have changed my beliefs about how to teach my subject through discussions with other teachers.						
6.	Ideas about how to raise student achievement effectively in my subject have changed since I first began teaching.						
7.	I believe that I need to change my teaching practice to be more effective in raising student achievement.						
8.	The way I am expected to change is sometimes contrary to what I know works in my classroom.						

Part 2: You as a learner.

This section gathers information about your experiences of:

- your learning processes as a teacher
- Professional development in the last year, which may include the following when they have a focus on new learning: your own reading, participation in workshops, courses, conferences and staff meetings/department meetings.

		Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
1.	I understand the ways that help me to learn most effectively.						
2.	When I am challenged with new knowledge about how students learn, I relate it to what I already know.						
3.	I have developed ways to help me check on my effectiveness as a teacher.						
4.	My learning experiences in the last year have led me to seek out additional information from other teachers, an instructional leader, or some other source.						
5.	I mainly develop my understanding about teaching and learning through reading research.						
6.	In the last year professional development has mostly involved learning that is new to me.						
7.	Professional development that has the greatest impact on my teaching presents ideas that are similar to my beliefs about teaching and learning.						
8.	During the last year I have participated in professional development that has advocated practices I believe are unhelpful in improving student achievement.						

Part 3: Coaching

In this section you are asked to consider your experiences of being coached by an external facilitator.

		Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
1.	The coach is able to communicate with me clearly.						
2.	The coach has knowledge that can help me improve my teaching.						
3.	The coach understands how to help me improve my teaching.						
4.	The coach understands the complexities of being a classroom teacher.						
5.	The coach has beliefs about teaching effectively that are different from my beliefs about teaching effectively.						
6.	Sometimes the coach raises aspects of my teaching that are difficult for me to discuss.						
7.	Most of the feedback the coach gives is new learning for me.						
8.	I have significantly changed my beliefs about how to promote student learning through feedback given by the coach.						
9.	The coach asks questions related to my beliefs about teaching and learning.						
10.	The coach asks me questions about what my thinking was when I used a specific strategy or method in my classroom teaching.						
11.	My reflective conversations with the coach have led me to think about an aspect of my teaching in a new way.						
12.	My reflective conversations with the coach have led me to try new things in the classroom.						
13.	I have significantly changed my beliefs about how to promote student learning through reflective conversations with the coach.						
14.	The coach seeks my ideas when establishing my next steps in learning.						
15.	I am able to monitor my progress towards achieving goals I have set with the coach.						

Part 4: Your background

1. Are you: Mark (X) ONE box
 Female
 Male
2. Are you: Mark (X) one or more boxes
 New Zealand European
 Māori
 Pasifika
 Asian
 Other

Mark (X) ONE box for the remaining questions.

3. How many years have you taught prior to this school year?
 0-2
 3-5
 6-10

- 11 or more
4. What is your highest qualification?
- Teachers' Training Certificate, Teaching Diploma OR Trade Certificate
- Bachelors' Degree
- Post Graduate Diploma
- Masters' Degree
- Doctorate
5. Are you currently involved in postgraduate study related to professional learning?
- Yes
- No
6. What is your MAIN teaching subject?
- Business (including Accounting, Economics, Enterprise Studies)
- English
- ESOL
- Health
- Integrated Studies OR Home Room
- Languages (including Te Reo)
- Mathematics
- Media Studies
- Performing Arts
- Physical Education
- Science
- Social Science (including Social Studies, Classical Studies, History, Geography)
- Technology
- Visual Arts
- Other (Please specify) _____
7. What professional development initiative are you personally currently involved with?
- AtoL
- Numeracy
- Secondary Literacy Project
- Te Kotahitanga
8. How many coaching cycles* has the coach completed with you within the last year?
- 1-2
- 3-4
- 5-6
- 7-8
- 9-10

* A coaching cycle involves:

- Observation by the coach
 - A reflective conversation between the coach and the teacher
- Setting goals for the next observation

Questionnaire (Study 3)

Part 1: Your beliefs in relation to teaching and learning.

		Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
1.	I find it easy to explain my beliefs about why I teach the way I do.						
2.	I have changed my beliefs about how to teach my subject in the last two years.						
3.	Ideas about how to raise student achievement effectively in my subject have changed in the last two years.						
4.	I believe that I need to change my teaching practice to be more effective in raising student achievement.						
5.	The way I am expected to change is sometimes contrary to what I know works in my classroom.						

Part 2: You as a learner.

This section gathers information about your experiences of:

- your learning processes as a teacher
- professional development in the last year, which may include the following when they have a focus on new learning: your own reading, participation in workshops, courses, conferences and staff meetings/department meetings.

		Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
1.	I understand the ways that help me to learn most effectively.						
2.	When I am presented with new knowledge about how students learn, I relate it to what I already know.						
3.	In the last year the coaching process has mostly involved learning that is new to me.						
4.	Coaching that has the greatest impact on my teaching presents ideas that are similar to my beliefs about teaching and learning.						
5.	During the last year I have participated in a coaching process that has advocated practices I believe are unhelpful in improving student achievement.						

Part 3: Coaching

In this section you are asked to consider your experiences with the coach.

		Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
1.	Sometimes the coach raises aspects of my teaching that are difficult for me to discuss.						
2.	Most of the feedback the coach gives is new learning for me.						
3.	Most of the feed forward the coach gives is new learning for me.						
4.	I have significantly changed my beliefs about how to promote student learning through feedback given by the coach.						
5.	I have significantly changed my beliefs about how to promote student learning through feed forward given by the coach.						
6.	The coach asks me questions about what my thinking was when I used a specific strategy or method in my classroom teaching.						
7.	As a result of the observation process with the coach I have thought about an aspect of my teaching in a new way.						
8.	As a result of the observation process with the coach I have tried new things in the classroom.						
9.	As a result of the observation process with my coach, I have significantly changed my beliefs about how to promote student learning.						

Part 4: Your background

Mark (X) ONE box

1. Are you:
 Female
 Male
2. Are you:
 New Zealand European
 Maori
 Pasifika
 Asian
 Other
3. How many years have you taught prior to this school year?
 0-2
 3-5
 6-10
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4. What is your highest qualification?
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 Bachelors' Degree
 Post Graduate Diploma
 Masters' Degree
 Doctorate
5. Are you currently involved in post graduate study related to professional learning?
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 No
6. What is your MAIN teaching subject?
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 ESOL
 Health
 Integrated Studies OR Home Room
 Languages (including Te Reo)
 Mathematics
 Media Studies
 Performing Arts
 Physical Education
 Science
 Social Science (including Social Studies, Classical Studies, History, Geography)
 Technology
 Visual Arts
 Other (Please specify) _____
7. What professional development initiative are you personally currently involved with?
 AtoL
 Numeracy
 Secondary Literacy Project
 Te Kotahitanga
8. How many coaching cycles* has the coach completed with you within the last year?
 1-2
 3-4
 5-6
 7-8
 9-10

* A coaching cycle involves:

- Observation by the coach
 - A reflective conversation between the coach and the teacher
- Setting goals for the next observation

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