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InSights

Professional Conversations and Improvement-Focused Feedback

A Review of the Research Literature and the Impact on Practice and Student Outcomes

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Enablers for effective professional conversations

These enablers are the conditions and processes that support professionals to examine the effectiveness of their practice and be committed to make appropriate changes for improvement.

AITSL commissioned Professor Helen Timperley, University of Auckland, to undertake the *Professional Conversations and Improvement-Focused Feedback* literature review to draw together national and international research in relation to conversations that support professional growth. The purpose of the review was to examine the characteristics and impact of these conversations, synthesise the common themes and identify the enablers and barriers to effective professional conversations. The review looked at professional conversations that achieved real changes in teaching practice, improved student outcomes, created better solutions to problems or developed new practice.

The *Australian Professional Standards for Teachers* and the *Australian Professional Standard for Principals* are underpinned by a view of professionalism that goes beyond technical competencies. This view encompasses the type of individual who is driven by the moral imperative to promote the engagement, learning, and well-being of each of their students and continues to learn and improve their knowledge and skills.
The analysis in *Professional Conversations and Improvement-Focused Feedback* was framed in terms of the type of professionalism the conversations promoted and collated under the descriptor of adaptive expertise.

Adaptive expertise is needed to navigate the constant societal and technological changes present in today's complex education contexts. Characterised by teachers and leaders developing agency for their own improvement, adaptive expertise challenges the belief that expertise is developed simply through repeated practice.

Key features of adaptive expertise include professionals:

- being focused on the moral imperative of improving a range of valued outcomes for students
- taking agency for the continued development of their knowledge and skills through self- and co-regulated learning
- creating self-awareness in terms of existing assumptions and when they might be helpful or unhelpful, and in this way becoming highly metacognitive.

Context forms the wallpaper for all the other conditions and processes and serves to shape the professional conversations but at the same time is shaped by them.

Contexts include national, jurisdictional, sector, region and school contexts, as well as the professional learning context in which the conversations are situated.

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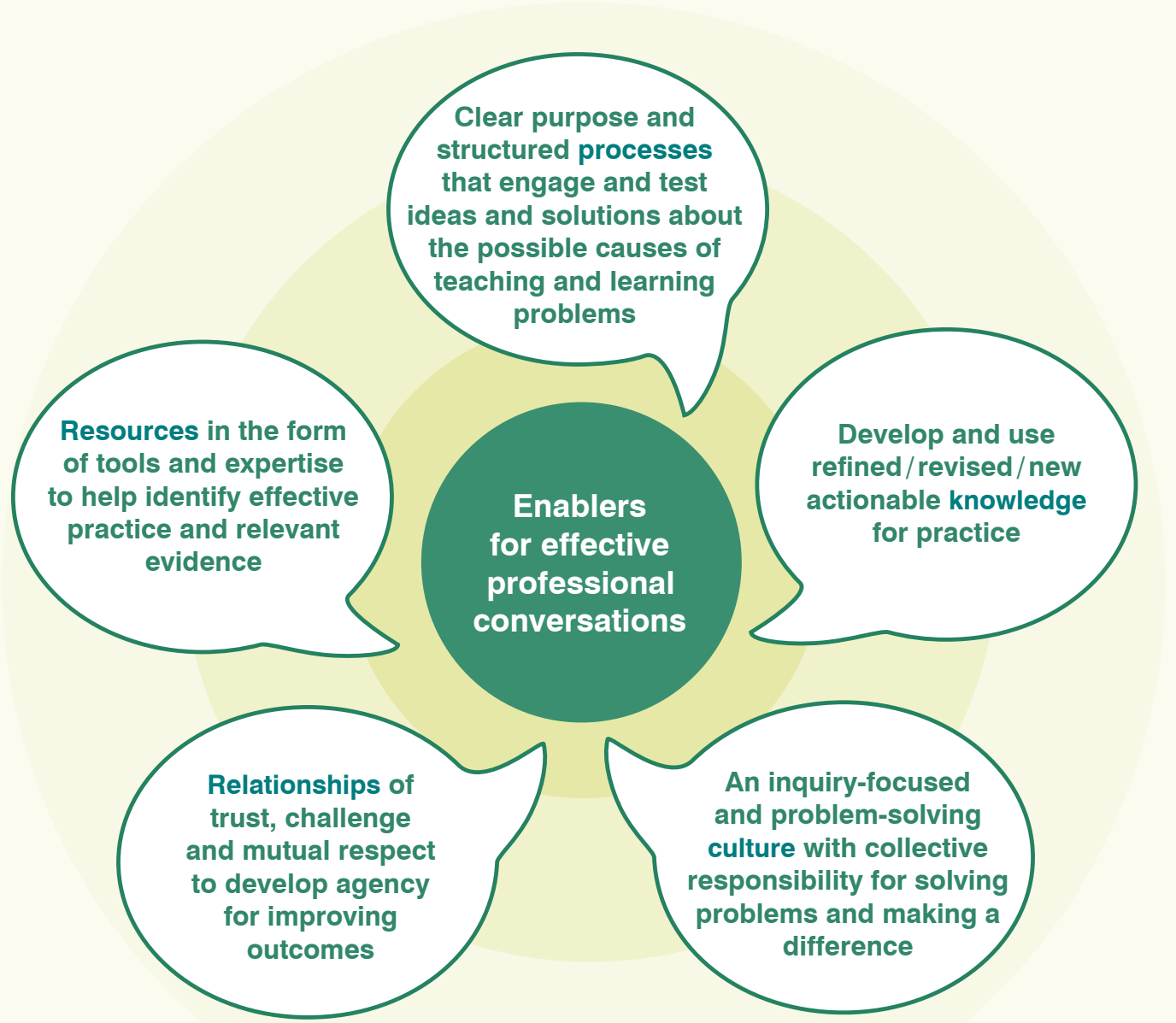

Resources

- Resources in the form of tools and expertise are essential in shaping the quality and direction of conversations.
- Tools and expertise bring high quality information to conversations, supporting participants to challenge each other to improve practice, solve problems and promote better outcomes for students.
- Expertise in conversational processes is essential for productive conversations.

Relationships

- Relationships are developed through conversations and do not necessarily exist prior to them.
- Relationships of trust and mutual respect need to be accompanied by challenge and high expectations for the conversations to be effective.
- Agency implies a commitment and a belief that it is within an individual or group's capacity to make a difference.

Processes

- Clarity is enhanced when the participants in a conversation have a shared understanding of its purpose and there are processes in place to achieve that purpose.
- Processes are sufficiently flexible to allow all participants to express, engage and test different ideas.
- Effective processes resolve the dichotomy of 'asking questions' versus 'telling' through treating all views as hypotheses, testing their validity through deep inquiry and developing integrative solutions.

Knowledge

- Knowledge is both an outcome of the conversation and a resource brought to it as participants come to see things in a different way.
- New knowledge arises from a mix of context-specific individual theories of practice, leaders', colleagues' and expert theories of practice or research-based theories.
- Knowledge must be directly applicable to the participants' contexts and actionable in that context if it is to be used.

Culture

- A culture focused on improving outcomes provides purpose and is both an enabler and an outcome of conversations as they develop over time.
- The culture can facilitate a shift from participants attributing particular problems to outside influences to participants focusing on their own interactions with others and what can be changed.
- Through this improvement-focused culture and the shifting of attributions, conversations create the professional agency needed to make progress towards achieving particular outcomes.

Source: Professional Conversations and Improvement-Focused Feedback
www.aitsl.edu.au/professional-growth/research

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2. Introduction

Professional conversations and improvement-focused feedback among teachers are essential for developing great leadership, teaching and student learning. Professional knowledge is constructed through social interaction and is situated and enacted in social communities of practice. Conversations are essential to its development (Orland-Barak, 2006). There is strong advocacy for and some evidence that outcomes for students improve when teachers collectively plan and analyse lessons together or discuss and examine student work (Desimone, Porter, Garet, Yoon, & Birman, 2002; Hattie, 2009).

Effective professional development depends on the quality of conversations as teachers negotiate meaning with one another and learn from those with specialist expertise. While books and other written articles provide important information, and artefacts such as lesson plans can be useful, it is the interpretive conversations that transform the information and artefacts into actionable knowledge. An international synthesis of the research on professional learning and development that focused on improved outcomes for students identified that providing teachers with opportunities to discuss new practice with their colleagues was an important feature of all effective approaches (Timperley & Alton-Lee, 2008).

An apparent contradiction arises, however, when the research focus turns to the actual conversations. Many of the articles sourced for this review concur with McLaughlin and Talbert (2001) that deep sustained conversations among teachers about matters of teaching and learning remain uncommon. Professionals, including leaders, talk in generalities, fail to make tacit knowledge explicit, gloss over differences so as not to offend, rarely seek clarification from one another or revert to telling others what they should do (see, for example, Achinstein, 2002; Eraut, 2000; Grossman, Wineburg & Woolworth, 2001; Horn & Little, 2010; Little, 1990; Myung & Martinez, 2013; Robinson, Sinnema & Le Fevre, 2014). These problems are not unique to education (Ashford et al., 2003; Argyris & Schon, 1974; Sartain, Stoelinga & Brown, 2011). Several of these authors have suggested that this contradiction can only be understood through the detailed study of actual conversations but note how few of these studies have been undertaken.

In this review, a systematic approach was taken to identify and analyse research articles that provided a detailed analysis of professional conversations and demonstrated how they promoted the learning of the participants in ways that:

- achieved real changes in teaching practice
- improved student outcomes
- created better solutions to problems
- developed new practice.

The review begins with a definition of the kinds of professional conversations that were in-scope and out-of-scope, and a summary of its intended purposes. I then outline the assumptions underpinning the analysis of the reviewed articles. A key assumption is that professional conversations should promote the learning of the participants in ways that influence thinking and practice, and, as with student learning, it should be visible (Hattie, 2009; 2012). The nature of conversations in these contexts is consistent with what we know about learning and has been described as a fundamental change in thinking about how best to promote professional development (Vescio, Ross & Adams, 2008).

Another underpinning assumption relates to the type of professionalism that should be promoted through professional conversations. None of the authors of the reviewed studies suggest that professional conversations should promote a technicist view of leading, teaching or learning, so I have outlined the alternative as the development of adaptive expertise.

This section on adaptive expertise is followed by one on methodology that includes the search strategies employed and the decision rules about the inclusion and exclusion of particular studies. Next, a theoretical framing is presented that formed the analysis and interpretive framework for the individual studies.

These introductory sections are followed by a description and review of a number of research studies that included a detailed analysis of professional conversations. The review concludes with the important enablers and barriers that were common across the studies and identifies directions for future research.

3. Defining professional conversations and purpose

Given their centrality to professional work, professional conversations capture a broad range of professional activities. For the purposes of this literature review, the term '*professional conversations'* refers to formal and informal dialogue that occurs between education professionals including teachers, mentors, coaches and school leaders and is focused on educational matters. The types of professional conversations covered by this review were those that promote teacher collegiality and self-efficacy through the sharing of practice and information.

Table 1 provides a summary of the types of conversations that were considered to be in-scope and out-of-scope for the review (AITSL, 2014, Request for Quotation).

Table 1. Conversations in scope and not in scope for the review.

Conversations within scope	Conversations not in scope
Lesson observation and feedback (peer and school leader)	Performance management conversations
Peer to peer conversations e.g. focus on curriculum, teacher practice and strategies, student learning	Employment/Industrial conversations
Career development	Conversations with parents
School leader to teacher	Conversations with students
Coaching	Administrative conversations
Mentoring	Written feedback
Goal-setting and achievement	
Induction	

The purpose of the review was to identify from the national and international literature the attributes of professional conversations and improvement-focused feedback that support the professional growth of teachers. The review describes the factors that act as enablers or barriers to effective professional conversations within the workplace. It describes how these enablers create a culture of improvement and effect changes in teacher practice and student outcomes (AITSL, 2014, Request for Quotation).

Professionalism promoted through conversations

The Australian Institute for Teaching and School Leadership [AITSL] developed the following national standards:

- the Australian Professional Standards for Teachers (2011) that describe what teachers should know and do at different career stages
- the Australian Professional Standard for Principals (2011) which sets out what principals are expected to know, understand and do to achieve in their work.

Underpinning these standards is a view of professionalism that goes beyond technical competencies. This view encompasses the kind of professional who is is driven by the moral imperative to promote the engagement, learning, and well-being of each of their students and continues to learn and improve their knowledge and skills.

Most of the articles sourced for this review are underpinned either explicitly or implicitly by similar ideas about professionalism. Common themes refer to teachers and leaders being reflective (e.g. Peterson, Taylor, Burnham & Schock, 2009), metacognitive and therefore aware of their beliefs (e.g. Lofthouse & Hall, 2014), being autonomous in the sense that they internalise inquiry habits of mind (Lesnick, Jiang, Sporte, Sartain & Hart, 2010), and seeking rather than passively receiving feedback (Ashford et al, 2003). I have brought these ideas together under the descriptor of developing adaptive expertise, an idea that was originally proposed by Hatano & Inagaki (1986) and further developed by others in relation to initial teacher education (e.g. Feiman-Nemser, 2008; Soslau, 2012; Timperley, 2012) and their more experienced counterparts (e.g. Timperley, 2011a; Le Fevre, Timperley & Ell, in press).

Two broad types of expertise, routine and adaptive, are identified in this literature. Routine experts become highly skilled in their profession by learning through repeated practice. It is well matched to stable environments with relatively well-defined problems. Teachers who think in terms of "I am an expert, I have been teaching this for 10 years" come from a routine expertise orientation. But as Lin, Schwartz & Hatano (2005) observe, the conditions that comprise stable environments are simply non-existent in today's complex educational contexts which are constantly affected by societal and technological changes. These contexts require a more adaptive type of expertise.

Key features of adaptive expertise include professionals:

- being focused on the moral imperative of improving a range of valued outcomes for students
- taking agency for the continued development of their knowledge and skills through self- and co-regulated learning as new evidence comes to light or new students present new challenges
- creating self-awareness in terms of existing assumptions and when they might be helpful or unhelpful, and in this way becoming highly metacognitive.

One of the key features of adaptive expertise is the move from a passive stance where others try to improve the practice of teachers and leaders, to a more active orientation where leaders and teachers develop agency for their own improvement. They constantly seek feedback from a range of sources, including their students, rather than waiting until others offer it.

The implications of this view of professionalism in this analysis of professional conversations and improvement-focused feedback are that the interpretations of the findings of individual studies need to be considered with these attributes in mind. Do the conversations develop the kind of agency, learning and knowledge associated with adaptive expertise or do they treat teachers as technicians who need to be told and shown how to practise?

4. Methodology

Given the focus on the outcomes of conversations in this review, the methodology is framed in terms of a realist synthesis approach (Pawson, 2002). A meta-analysis was inappropriate because many of the outcomes were qualitative and only two studies provided sufficient quantitative data to calculate an effect size that could be reasonably attributed to the conversations. Understandably, no relevant meta-analyses were located. More surprisingly, the same applied to existing reviews on professional conversations that included reference to outcomes.

A realist synthesis seeks to answer the question: "What works, for whom, under what circumstances and why?" Answering this question required a strategy to identify empirical studies with sufficiently robust outcomes, and a theoretical framing within which to interpret them. This section describes the empirical search strategies, while the following one outlines the theoretical framing.

Search strategies

Due to the specific criteria for inclusion in this review regarding a recorded analysis of conversations and a reasonably robust process to identify outcomes, a range of search strategies were adopted.

Several databases including the Australian Educational Index, ERIC, Scopus and ProQuest were searched using the terms of professional conversations, mentoring, coaching and professional learning communities.

In addition, specific searches were undertaken of several academic journals including Professional Development in Education, Teaching and Teacher Education, and the Journal of Teacher Education.

In addition, publications were reviewed from websites of key educational improvement organisations such as the Carnegie Foundation, the Deming Institute, Thinking Collaborative and the UChicago Consortium for Chicago School Reform.

Promising references within articles that met the criteria for inclusion were followed up strategically in order to identify studies that contained empirical research or case studies, as opposed to the descriptive or persuasive articles yielded by a more general search. The AITSL team provided a list of Australian articles, all of which were followed up. Finally, a number of academics whose work in the field of professional conversations was likely to meet the criteria for inclusion or inform the context for detailed analysis were contacted.

In total over 300 articles, papers and book chapters were downloaded and analysed. Of these articles only 50% were sufficiently relevant to be used, with most providing context rather than allowing a detailed analysis of the actual conversations.

Rules for inclusion or exclusion

The criteria were strongly influenced by the brief from AITSL (Request for Quotation, 2014) for this review. This brief was to analyse professional conversations and improvement-focused feedback in relation to outcomes for teacher practice and students. All professional conversations have the potential to deepen professional knowledge but a requirement of a systematic review is to identify those more likely to do so than others, together with evidence of change.

A broad range of literature was used to inform the theoretical and contextual analysis. Studies analysed in detail, however, needed to meet two criteria: they had to record and analyse the professional conversations, and report on outcomes. Finding studies with clear and systematically analysed outcomes was particularly challenging. To be included in the detailed analysis the study had to meet one of the following criteria:

Criterion 1: The study reported systematic[1] improvement in student outcomes that could reasonably be attributed, at least in part, to the quality of the conversation. Changes reported by students (e.g. surveys) were of particular interest as a form of evidence but no studies were located where this data source was reported systematically.

Criterion 2: The study reported systematic evidence of changes in teaching or leadership practice that could reasonably be linked to improved student outcomes. This criterion is more problematic because there is a range of evidence demonstrating that changes in practice do not necessarily mean changes in student outcomes (Timperley & Alton-Lee, 2008). The links between practice and outcomes is more complicated than a simplistic process-product construction (Opfer & Pedder, 2011).

Criterion 3: The study reported evidence of improvement in conversational skills that bring theoretically supported learning resources to the participants to advance their problem-solving capability, together with evidence that this capability improved.

1 By 'systematic' I refer to an analysis of a measure from a reasonable sample of students on an attribute relevant to the focus of the professional conversation (e.g. the focus of the conversations was an analysis of students' low mathematics achievement and over the course of the conversations the mathematics achievement improved). Anecdotal reports by teachers or leaders that students' learning or performance improved was not considered sufficient.

In the course of the search, many studies were sourced that did not meet these criteria. These studies were used to inform and elaborate the detailed analysis of the individual studies. They often included useful insights that allowed the findings from the detailed analysis to be further nuanced. Other studies reported changes in thinking but did not directly link these changes to evidence of changes to professional practice, student outcomes or improved problem-solving capabilities. Recent theoretical and empirical evidence indicates that change requires addressing a mix of beliefs, practice, and content knowledge and that focusing on only one is not sufficient (Langdon, 2014; Opfer & Pedder, 2011). Kennedy (1999) has extensively studied "the problem of enactment" in professional development that demonstrates that teachers have difficulty translating new knowledge or changed beliefs into the complexities of their classrooms even when highly motivated to do so.

5. Theoretical framing

In order to give some cohesion to the analysis of a complex phenomenon such as professional conversations, it is important to be explicit about the theoretical framing guiding the analysis of the research studies that met the criteria for selection. Because an underlying assumption was that the professional conversations should promote professional learning in ways that develop adaptive expertise and impact on outcomes, I identified some key principles that guided the analysis of the empirical studies. These principles were then used to identify enablers and barriers to effective conversations. While these principles fall broadly into the categories of context, relationships, resources, processes, knowledge and culture, these areas cannot be seen as distinct or independent from one another. What people talk about, for example, is strongly influenced by the context and the relationships between the participants. Similarly processes both enable and constrain particular knowledge development (Orland-Barak, 2006).

Contexts

Context counts. Collegial processes are influenced by, and can influence, the context in which they occur (Opfer & Pedder, 2011). This happens in both educational contexts and non-educational ones. Ashford et al. (2003), for example, identified how organisational cultures affect feedback-seeking orientations and behaviours.

Several attributes of context have been noted when discussing particular types of conversations in this review. These include the context and expectations of the wider education system, particularly in the areas of accountability, development and improvement (Datnow, Park & Kennedy-Lewis, 2013; Wayman, Spikes & Volonnino, 2013; Finnigan, Daly & Che, 2012). These wider contexts, in turn, influence organisational contexts and cultures. Some argue (e.g. Vescio et al., 2008) that learning through professional conversations in communities requires "a fundamental change in the institutional structures that have governed schooling" (p. 80). Lofthouse, Leat, Towler, Hall & Cummings (2010) suggest the same applies to culture. They put forward the position that "The culture of hierarchical management and a focus on short term measurable outcomes can militate against a longer term commitment to a culture which encourages professional inquiry" (p. 5). On the other hand, little focus on shared goals or achieving particular outcomes through professional conversations can equally militate against improvement and inquiry (Schildkamp & Poortman, in press; Datnow et al., 2013) and the development of adaptive expertise.

Relationships

There is considerable evidence that for new learning to lead to changes in practice that go beyond compliance, educators need to be supported both to learn what they need to know and to make the relevant changes. Support is important because cognition, emotion and motivation are closely intertwined (Immordino-Yang & Damasio, 2007). When stressed or threatened we narrow our horizons and opportunities to learn. Myung and Martinez (2013) drew on the business literature to understand the stress teachers often feel when undergoing evaluative feedback. When teachers feel threatened feedback is rarely useful. Threat needs to be turned into challenge because few learn deeply from threat.

At the same time, teacher knowledge and practice may need to be challenged when familiar and ineffective ways of doing things continue. The art of professional conversations is to flexibly integrate support and expectations to improve in ways that ensure the participants feel respected, can learn, and are motivated to change.

Resources to support learning

Resources to support learning through conversations take many forms. One type of resource gaining considerable attention is the use of tools, which are essentially socially constructed artefacts (Lofthouse & Hall, 2014). They may take the form of protocols or rubrics describing effective practice. Equally they may be forms of evidence about students and their learning. They are usually constructed for the purposes of directing the participants' attention to a particular attribute of a situation (Timperley & Parr, 2009). Ikemoto and Honig (2010) argue that tools can act as an enabler when they provide a scaffold to deepen conversations, the associated inquiry and the development of shared meanings.

Another important resource in conversations is expertise. Expertise may be in the subject or content of a discussion, or in the processes of the conversation. Expertise may be internal to the group having the conversation, or external to it in the form of a coach or a researcher in a participant-observer role.

Learning processes

One of the ongoing frustrations in initial teacher education programs and in professional development of already qualified teachers is the limited transfer of formally taught theories into practice. Often new ideas are recast by the teachers into something they think they already know but, in reality, have only a superficial resemblance (e.g. Korthagen & Wubbels, 2001; Wideen, Mayer-Smith & Moon, 1998; Hammerness et al., 2005). An important contributor to this situation is the failure of those promoting learning to engage the learners' prior conceptions of 'how the world works' (Bransford, Brown, & Cocking, 2000) and to build on or challenge those theories through the conversations. The relevant theories for education professionals typically include their beliefs about what knowledge is important, how students learn, and how best to teach them.

Another important principle underpinning the development of adaptive expertise is that teachers and leaders take agency and responsibility for their own learning. In contrast, a routine expertise framing assumes that knowledge and skills are transmitted from an expert to one less expert. Adaptive experts are, therefore, assisted to seek opportunities to learn, are aware of how to construct those opportunities, and have monitoring systems to ensure any changes in practice are more effective for their student learners. This difference comes into the realm of metacognition and self-regulated learning. Definitions of these important ideas of learning abound, but I have drawn on the definition offered by Lucas and Claxton (2010) for this review:

Meta-cognition … is essentially thinking about thinking …. Meta-cognitive skills are the higher order skills which ensure learners have the ability to stand back and take control of their own learning. (p. 138)

While metacognition relates to awareness, self-regulation refers to the extent to which learners actively use this awareness to initiate, motivate and direct their own efforts to acquire knowledge and skills instead of relying on others as agents of instruction (Schunk & Zimmerman, 1994).

Central to effective self-regulated learning are three questions the education professional needs to be able to answer, which are highlighted in the meta-analysis on feedback by Hattie and Timperley (2007) and are particularly pertinent to this review. The first, "Where am I going?" requires the learner to have a clear goal. The next, "How am I going?" requires the learner to have accurate information about their current level of knowledge and skills in relation to their goal. The final question, "Where to next?" means the learner can identify specific strategies to close the gap between their goal and current performance.

Promoting deep transferrable knowledge and skills

The knowledge base relevant to effective teaching is growing rapidly (e.g. Hattie, 2009; 2012). Some argue that failure to use that knowledge in their practice is the equivalent of educational malpractice (Halbert & Kaser, 2013). In teaching, knowledge cannot be separated from its enactment: teachers do not learn new things and then learn how to implement them (Aitken, Sinnema & Meyer, 2013; Timperley, 2012). Rather, they develop this knowledge through a mix of theory, practice, and finding out how students respond in a particular context. Kennedy (1999) identified the problem of enactment that occurred even when teachers were motivated to implement new and challenging practices. They were unable to do so when faced with the competing demands within their classrooms. A key attribute of professional development that makes a difference to student learning involves processes that enable educators to develop the skills to implement what they are learning in their context of practice (Joyce & Showers, 2002). Professional conversations are ideally placed to assist this.

There is increasing evidence that for professional knowledge to be readily retrieved in practice, it must be organised into conceptual frameworks, so that it is connected and organised around important ideas together with the patterns and relationships between different aspects of these ideas (Bransford et al., 2000). This kind of knowledge involves deep transferrable learning (Pellegrino & Hilton, 2012) so that what is learned in one situation can be transferred to another.

Culture

Organisational culture is usually considered to be the basic assumptions shared by the organisation's members that shape their decisions and practices (Leithwood & Jantzi, 1999). Different organisational cultures give rise to particular routines, which in turn reinforce the culture and may remain unquestioned regardless of the extent to which the routines are effective in achieving organisational aims. The key premises underpinning the notion of adaptive expertise apply as much to organisational cultures as they do to individuals: they are focused on the moral imperative of improving outcomes for students, their members take agency for continued development of their knowledge and skills for this purpose, and they examine and challenge the effectiveness of existing cultural assumptions.

Cultures are sometimes cast in generic terms, such as accountability, managerial, collegial or collaborative (Lofthouse & Leat, 2013). The use of these terms is designed to group particular attributes and carry with them underlying assumptions of desirability. It is unlikely that these generic terms will be helpful in this review because the attributes need to be more carefully nuanced in terms of the effects they have on particular conversations. Therefore, I have attended more to the specifics of culture rather than using generic, and at times emotive, labels.

6. The evidence from unsupported / untrained conversations

Schools are places of intense activity and the professional conversations that accompany the activity largely determine whether these activities simply form part of an organisation's routines or become opportunities to learn and improve. Conversations are innate to our development, with our neural networks patterned in ways that lead to automaticity in what we attend to and how we respond. Attempting to record and analyse all the conversations that occur in any organisational setting is almost impossible, so the research is typically focused on particular conversations for particular purposes in particular locations. Researchers then bring their lens about what they consider to be important when making interpretations about a conversation's effectiveness. Given this orientation, it is not surprising that unsupported or untrained conversations are usually the subject of critique rather than of praise. My use of an adaptive expertise lens supports much of the critique evident in both educational and other organisational literatures.

Eraut (2000), for example, describes talk among teachers as not adding up to much. Part of the difficulty is about making the tacit explicit rather than talking in generalities that assume shared meaning. Taken-for-granted language and frameworks can create inaccurate assumptions about learners and learning (Coburn, 2006). Other authors have focused on the difficulty of confronting well-established norms of privacy and non-interference in another professional's work (Little, 1990), or contending with disagreement and difference (Achinstein, 2002). These latter conversations usually suffer from obscure messages that minimize concerns and differences (Wajnryb, 1998), or are dominated by one party through stating untested assumptions about what is leading to what, as if the assumptions are the truth (Argyris & Schon, 1974).

Practical difficulties inherent in educational organisations, with the urgency of immediate and multiple tasks to which the professionals must attend, create barriers for teachers to engage in sustained interaction with sufficient frequency, specificity and depth to generate new insights or learning about improving instructional practices (Kennedy, 2005; Horn and Little, 2010).

One of the most extensively researched areas is that of feedback following an observation of practice. These studies have taken place in initial teacher education (Feiman-Nemser, Parker & Zeichner, 1992; Strong & Baron, 2004), early career teaching (Feiman-Nemser, 2012) and with more experienced colleagues (Timperley, 2012). Without training, those giving feedback typically fail to engage the existing theories of the recipients of the feedback and are primarily concerned with immediate issues of practical performance. Suggestions to improve often come in the form of 'telling' or 'transmission' of ideas. Alternatively they are indirect, non-specific and dissociated from the analysis of the observed lesson or any specific theoretical construction, using words such as "I was wondering if you might …" or "What do you think about …?"

7. The evidence from supported conversations

This is the main section of the review. It is divided into three parts based on common foci for the conversations. These foci were selected on the basis that there was a sufficient number of studies to be able to draw warranted conclusions. These foci include:

- the interpretation and use of evidence
- observations and improvement-oriented feedback
- solving problems and developing new practices.

Assigning a particular study to a particular focus was somewhat arbitrary because there is considerable overlap between them. For example, feedback following an observation may involve collaboratively discussing problems of practice using evidence from the observation. The decision about which focus a given study belonged to was determined by its primary focus and purpose.

Focus one: the interpretation and use of evidence

There is a general consensus that schools have access to a wide variety of data and evidence that could be used to greater advantage than currently to improve schools, teaching and learning (e.g. Daly, 2012; Downey & Kelly, 2013). There is less consensus about the ways in which the evidence can contribute to this purpose. Some argue that better use of evidence is essential for schools to shift from an industrial era to a knowledge era (Dunn, Ben Jaafar, Earl & Katz, 2013). An associated argument is that if schools are to fulfill their mission of educating all students, rather than just those who have traditionally succeeded (an idea fundamental to the development of adaptive expertise) then collecting and analysing systematic evidence on their learning and progress is essential (Daly, 2012). We can no longer rely on "anecdotal evidence, personal preference, or historical precedence" (Herman & Gribbins, 2001, p.1). In response, many governments and policy makers, including those in Australia, have introduced systems for more standardised collection and analysis of evidence, with accountabilities for improvement either explicitly or implicitly included.

Despite some disagreement about how best to use evidence and for what purpose, there is considerable agreement in the literature that teachers and schools are not well prepared to do so (Daly, 2012; Ingram, Louis & Schroeder, 2004; Wayman & Jimerson, 2014). Indeed, the expression 'data-rich but information poor' has almost become a cliché. Part of the problem is that greater availability of evidence, whether accompanied or not by pressures for improvement and accountabilities, is not sufficient for improvement (Lasky, Schaffer & Hopkins, 2008; Wayman, Spikes & Volonnino, 2013). The evidence must be interpreted in ways that enable those involved to use it in subsequent decisions and actions. This process is much more challenging than previously assumed (Timperley, 2006).

In many contexts, evidence in various forms has often been given to teachers without adequate discussion and agreement about what it means (Hill, Rowan, & Ball, 2005; Hipp & Huffman, 2007). In the absence of a collective interpretation process, Hipp and Huffman (2007) concluded from their longitudinal study in 19 schools across six states in the United States that we assume "Our beliefs are the truth. The truth is obvious" (p. 119). These authors, along with others (Coburn, 2001, 2005; Datnow, Hubbard, & Mehan, 2002; Spillane, Reiser, & Reimer, 2002; Wayman & Jimerson, 2014), observed that, for deep understanding and effective use of evidence to develop, social interaction and collaboration are needed to co-construct meaning and decide what is worth doing.

This section identifies qualities of conversations focused on using evidence that lead to deeper inquiry into particular situations and better solutions to challenging problems, or to the development of important knowledge and skills. In addition, these processes lead to those involved having greater confidence and willingness to engage in similar conversations for these purposes in the future. At their heart they involve transforming evidence into useable information.

To this end, I have used the term "evidence" in its broad sense and interchangeably with the term "data", the preferred reference of many researchers. An inclusive definition that is consistent with this broad conception is any information that is collected and organised from relevant key stakeholders (e.g., parents, teachers, and students) to represent some aspect of schools (Lai & Schildkamp, 2012). It may include evidence from any of these stakeholders about their learning, beliefs, motivation or actions.

It proved to be challenging to find studies that detailed both the conversations with some indication of outcomes in relation to the interpretation and use of evidence. As Coburn and Turner (2011) observe, "few studies of data use that attend to outcomes also attend to the process by which these outcomes are produced.… Similarly, few studies that attend to the underlying interpretive processes of data use … attend to student learning" (p. 197).

In the next section, four studies of conversations are described in some detail. Attention is paid both to the contextual factors that enable or act as barriers to productive conversations and to the conversational process itself. A final section draws together material from the four studies and introduces additional research that is relevant to the conclusions but did not meet our criteria for detailed analysis. In these additional studies, either the conversations were not recorded and analysed, or outcomes were not reported.

Data teams in schools

The use of data teams in schools in the Netherlands is reported in a study by Schildkamp and Poortman (in press). In the Netherlands, schools traditionally enjoy considerable autonomy and are free to choose the religious, ideological and pedagogical principles on which they base their education, as well as the organisation of their teaching activities. The inspectorate, however, holds schools accountable for the quality of their education.

The study's authors, Schildkamp and Poortman, acted as participant observers and audio-recorded and analysed the conversations of four data teams from six upper secondary schools over a period of two years. One team consisted of teachers from three different school locations. Their definition of data was broad and included student assessment data, student records, structured classroom observation data and student survey results. The teams consisted of leaders and teachers from the schools, together with a data expert who was also the researcher.

The purpose of the teams was to collaboratively use data to solve identified problems using data through a structured eight-step process. This process included problem definition, formulating hypotheses, data collection, data quality check, data analysis, interpretation and conclusions, implementing improvement measures, and evaluation. In using data collaboratively, a focus is brought to the conversations and allows for a 'fertile exchange' of ideas (Schildkamp & Poortman, 2015, p. 2). Feedback loops were built into the process outlined above and effective teams used the process recursively. For example, if the data collection disconfirmed a particular hypothesis, then new hypotheses were generated and checked with more evidence. The problems tackled by the different teams included the high percentage of students repeating grades, low mathematics achievement, and the influence of entry standards on student success.

The measures the authors used to evaluate the conversations focused on the extent to which they worked through the steps to the stage of evaluation and on the quality of the conversations in the data teams. Two quality measures were used. The first related to depth of inquiry. Superficial inquiry was characterised by fragments that concern "only storytelling, retelling (known) information and personal anecdotes" not based on systematically collected data. Deep inquiry was characterised by fragments that show data team members "developing new knowledge based on data, focused on taking action in their classroom". This refers to analysing, interpreting, comparing, summarising and drawing conclusions based on data to create new knowledge to solve the data team problem (Schildkamp & Poortman, in press, p. 17).

The second measure focused on "attribution". Attribution was considered to be of low quality when the team referred to factors outside of the school, such as problems arising in the primary school. High quality attribution was at the level of the teachers' own functioning, such as the quality of instruction.

The teams were variably successful with two of the four teams working through the whole process over the two years. As they did so, they also engaged in several feedback loops at different stages. The two more successful teams developed deeper inquiry and more evidence-based conversations through the process, moved from external to internal attribution and made progress in solving the identified problem. In both teams, their data collection demonstrated that their initial hypotheses focused on external factors were inaccurate, and they needed to re-consider attributions closer to the teachers' own functioning.

As an example, the team that examined the problem of grade repetition initially attributed the problem to the schools' retention policy and the motivation of students. The analysis of students' records and a student survey did not support these hypotheses. Further iterations of data collection showed more accurate hypotheses were that students had poor planning skills and needed more feedback and monitoring through the regular checking of homework. The leader summarised their findings following discussion of this issue: *"what students are missing. Direction, motivation by the teacher, directing their planning and not expecting them to do it perfectly within two weeks, but maintaining it. Our attitude in that is very important"* (Schildkamp & Poortman, in press, p. 21).

An additional problem was the coherence of the curriculum across grade levels in terms of the content taught and assessments used. Both these hypotheses were actioned by the schools concerned and the number of students repeating a grade was significantly reduced from 30% to 23% within a year. Progress in these teams was not linear and their efforts to influence the thinking of other staff not always successful. As one teacher explained to the researchers, *"We can find out in our data team that a certain hypothesis or myth is incorrect, but in the teacher lounge these myths can still survive"* (Schildkamp & Poortman, in press, p. 23). Collaboration and conversations were key for this team's progress in their use of data to solve identified problems, with participants expressing their satisfaction at the level of collaboration. As one teacher commented, *'…people work together…people listen to each other and are not afraid to speak up. We all work together at an equal level.'* (Schildkamp & Poortman, 2015, p. 14).

The other two teams made less progress. One team investigated the problem of low mathematics achievement but causal attributions remained external to the teachers. As the department head said in the data team, *"Math is a very difficult subject, so I do not see it as a problem that several students are failing"* (p. 29). Rather than participate in the data team, the school leadership remained outside of it, and looked to blame the teachers, rather than examining their own contribution to the problem: *"She does not see that she has a problem. That is understandable because she has been a teacher for so many years and nobody ever told her that she had a problem. I hope that the data will show that she has a problem that she needs to address"* (p.29). Much of the data they needed to investigate their hypotheses

was not available and the team disbanded after the sixth meeting. Lack of collaboration was also highlighted by the authors, *'…the data team members did not let each other speak freely, and interrupted each other'* (Schildkamp & Poortman, 2015, p. 18). The study suggests that this may have been a hindering factor for this team's effective use of data as 'Collaboration, trust, and the willingness and capability to address conflict are necessary ingredients for the use of data' (Schildkamp & Poortman, 2015, p. 26).

In the other school, the problem being investigated was unclear, the team had difficulty identifying appropriate data or accessing it, and they jumped from one hypothesis to another on the basis of a small amount of data. They made little progress and discontinued after a year.

Examining students' mathematical thinking

In this next study by Kazemi and Franke (2004) in the United States, elementary students' attempts to solve mathematical problems comprised the evidence that formed the focus of the teachers' inquiry. The school was situated in a very low socio-economic community with highly transient students. The teachers were engaged in a wider professional development initiative in cognitively guided instruction in mathematics, with the researchers both participating in this initiative and supporting the teachers' inquiry into the students' mathematics thinking.

The researchers worked with ten teachers in their monthly inquiry group over a period of a year, during which time they participated in and recorded the groups' interactions. Their analysis was guided by a situated view of learning focusing on how people engage in routine activity and the role tools and participation structures play in the practices that evolved.

The researchers contributed considerable expertise to the group. They selected the mathematical problems the teachers were to use for their students so that all teachers were focused on analysing a common mathematics problem in each session. They visited the teachers' classrooms between workgroup sessions which allowed them to learn more about student thinking and teaching practices. During the inquiry sessions, they pressed the teachers to describe the details of the students' strategies. They also used their expertise to introduce common strategies into the discussion if the teachers had not identified them, and occasionally brought in research knowledge about student thinking.

Over the year, the teachers demonstrated considerable shifts in the focus of their deliberations, or, as the authors describe, "shifts in participation" (Kazemi & Franke, 2004, p. 206). In the early meetings, the teachers experienced difficulty either detailing or eliciting student thinking. They had not thought about the necessity of asking students about their thinking or observing them closely. Instead they made assumptions, usually about the students' ability, as to why they were able or unable to solve the mathematical problems. As one teacher described during an early session:

I found that some of my students were, I guess just like, they felt intimidated. They had their right answer, but then you ask them, "How did you get it?" It was like, "I got it, why do you want to know?" They didn't want to say how they got it.

(Kazemi & Franke, 2004 p. 217)

The researchers worked with the teachers to observe the students' strategies in more detail. At the second meeting, one teacher, Miguel, began to talk with greater specificity about the strategies he had observed the students using. The problem involved finding out how many tables of four were needed for 16 children.

Miguel: So afterwards, one kid really impressed me. John, after he did it – he showed me the answer, and I wrote down what he said. He laid out one crayon and he put four crayons around it. And he represented one table with four students. So he put another crayon out and represented a second table. And he put four students there, and the third crayon and he represented four students. Until he got up to 16. He counted up to 16 with the crayons.

(Kazemi & Franke, 2004 pp. 217-8)

Over time, and at variable rates, the teachers developed the relevant skills and came to realise that teachers' work involves attending to children's thinking. As they worked with the students to voice their efforts to elicit and build thinking, they realised they needed to do this for themselves. Towards the end of the year, a teacher described her observation of the students' strategies in detail, with another teacher showing intrigue about what students could do. The researcher helped to extend their thinking drawing on what she had seen in the classrooms.

Natalie: *This one [he counted the sevens] by threes, and this one by twos. He went 14, 14, 14, 14, 14, 14. Since there were only three left because it was an uneven number, the last three he made 21. And then over here with the fours, did 8 and 8. And then put the eights together to make 16. So he's got these rafters going out.*

Patrick: *That's really wild.*

Researcher: *We actually see this strategy a lot. When we let kids invent their own ways – this is one of the most common ways they do it. Naturally, without us prompting at all, they use this kind of notation.*

(Kazemi & Franke, 2004 p. 218)

Through this coaching process, the teachers came to recognise and appreciate the students' mathematical competencies and the strategies they used. The teachers came to consider more closely their own instructional trajectories across different grade levels.

Evidence of reading comprehension

The next study by Lai and McNaughton (2008) took place in seven schools located in a low socio-economic suburb in New Zealand over a three year period. At the time, the New Zealand education system could be described as a low stakes environment without systematic attention being paid to evidence and accountability. Age-normed assessments were available for schools to use at their discretion, but no data were reported beyond the school and its immediate community. However, there was some pressure on the schools with low student results to improve outcomes, and additional resources had been provided by the Ministry of Education to do so.

The researchers in this study acted as participant observers, recording and analysing their conversations with groups of leaders and teachers to improve reading results in their ethnically and linguistically diverse 9-14 year old students. The researchers also analysed the student achievement data together with observation data on teaching practice. These data formed the basis of the conversations.

Prior to this study, the participating school leaders had engaged in extensive professional development to improve their skills in both the technical aspects of collecting, recording and analysing evidence, and in conducting learning conversations around the interpretation process.

The researchers, teachers and leaders then engaged in an inquiry process that involved:

- Examining current reading comprehension scores from standardised tests compared with national averages for the purpose of identifying students' strengths and weaknesses
- Linking that data to classroom observations to answer two key questions: "What are we doing which could have influenced the pattern of student achievement results?" and "How can we improve what we are doing to raise student achievement?"
- Encouraging discussion and critique of the varying interpretations and treating them tentatively as "theories to be tested", not as "facts", then checking different theories through an agreed process
- Designing and taking action on the basis of the agreed theory that was supported by the evidence
- Checking to see if the changes they had made resulted in a difference to student reading achievement.

Different aspects of reading were addressed over the three years as sources of evidence were examined and re-examined and new problems were identified, including problems with paragraph comprehension and the drop in reading achievement over the summer.

To illustrate the process, the following description focuses on how one group identified and addressed the problem relating to paragraph comprehension. Mixed groups of teachers and leaders began by comparing various graphed measures of reading (word recognition, sentence comprehension, paragraph comprehension and vocabulary) with national averages on a standardised test. The researchers prompted them to identify students' strengths and weaknesses from the graphs. The clear weakness was paragraph comprehension. At the prompting of the researcher, they examined the students' responses on the test in order to diagnose more deeply what the students might have been thinking as they provided answers. The test asked students to fill in words that were missing from the text. With the researchers' assistance, the leaders and teachers noticed that students appeared to be over-predicting or guessing the missing words, rather than ensuring that the word they inserted made sense in the context of the whole paragraph.

In order to investigate if the problem was linked to teaching, the teachers developed a classroom observation protocol with the researchers to test out a number of possible explanations. The observations gave them some clues. For example, the teachers used a common reading comprehension strategy but not in ways that supported the students to check the text for meaning. This strategy involved asking students to make predictions of possible events in a story. The teachers accepted all student contributions whether or not the prediction bore any relationship to the story. Students were not asked to check the accuracy of their predictions against the information in the text.

The researchers took the evidence back to the leaders and teachers to be discussed as a possible explanation for the problem. They agreed the explanation was plausible and spontaneously provided other examples from their own experien**ce.** As one leader observed, *"A teacher was reading a story about the beach and asked the students to predict what happened next. The student said, 'They fly to the moon!'"* (Lai & McNaughton, 2008, p. 17). The teacher did not require the student to check his answer against the information in the story. They then discussed ways to incorporate more checking of meaning into their programmes.

Observations a year later showed teachers asking students to check for meaning on a regular basis and guiding students to look for textual evidence for their predictions. Overall, students gained approximately nine months of achievement in reading comprehension over and above the nationally expected gain.

Another school looked at the drop in students' reading results over the summer break. The following excerpt describes the kind of hypothesis testing in which they engaged with the researchers when looking at the evidence:

Teacher 1: *Is the slump due to the transition from year six to seven? Some students move from contributing primaries [schools] to intermediate schools*[2]*.*

Researcher 1: *Good hypothesis. The developmental literature on transitions suggests that there can be disruptions in learning when you transition from one setting to another, if settings are not well coordinated in terms of processes of teaching and learning and other features of unfamiliarity. However, we only examined the same students moving from year six to seven in the same schools.*

Teacher 2: *Maybe it's the test? In years four to six, STAR consists of four subtests. At year seven, the test adds two extra subtests. The decrease in scores could be because of the two extra subtests, which may have been unfamiliar to students. I think they would struggle more with the fifth subtest on emotive language.*

Researcher 2: *The evidence to test your idea is to conduct a subtest analysis of the scores at the end of year six and at the beginning of year seven. You would be right if students do worse in the extra subtests. Let's examine the results.*

(Lai & McNaughton, 2007, p. 20-21)

2 In New Zealand, there are two kinds of primary schools, "contributing" primary schools (years one to six) that send their students to intermediate schools (years seven and eight), and "full" primaries, which have students from years one to eight.

Their further investigations failed to pinpoint the causes of the drop because it happened across all subtests, so they decided to focus on teaching the more sophisticated strategies the students needed to achieve in both years six and seven. Students' reading achievement improved as a result.

Teachers examining reading progress

This fourth study reported in Timperley (2008) and Timperley and Wiseman (2003) took place over three years and analysed the conversations around evidence about the reading progress of students in their first year of school. The teachers involved came from seven schools located in two low socio-economic communities in New Zealand. They had all engaged in the same extensive professional development in literacy over a two year period prior to the research. The students in two schools showed accelerated gains in literacy compared with students in the other five schools. The usual explanations for these gains did not stand up to scrutiny. The students were from similar backgrounds and had similar reading levels when they started school. Classroom observations showed that the teachers were all able to implement the instructional approaches promoted in the professional development, and teachers' questionnaire responses indicated that nearly all valued the approach to literacy instruction very highly and felt equally motivated to implement it. It wasn't until the second year of the study that the possibility arose that the quality of the conversations around evidence of reading progress accounted for the differences in student progress.

During the professional development, the teachers in all the schools were encouraged to meet regularly to discuss any issues that arose when implementing the new approach to literacy instruction. All schools had continued with these meetings either once or twice per term. However, the focus of the conversations and the use of evidence in these meetings differed among the high and low achieving schools.

In the high achieving schools, the teachers gave their team leader the students' reading and writing levels prior to the meeting. The leaders plotted the progress of individual students in relation to expected national progress on to a graph. Teachers were also expected to bring to the meeting additional diagnostic data on any students who were not making adequate progress. A sense of urgency in making a difference pervaded the conversation. For example, the leader introduced one meeting that had been delayed for week in the following way:

> *We had to postpone the meeting until today but I have made the graph available to some of you already … instead of waiting until today because it would have meant that we lost a few valuable days if we waited until today to action this tomorrow. So I have said to some of you to have a look at it and see if we can make some improvement to our teaching, and some of you have.*
>
> ***(Timperley, 2008, p. 71)***

The teachers reviewed the progress of those students discussed at the previous meeting to see if the agreed strategies to accelerate progress had been successful. Then they turned their focus to the more recently graphed scores and collectively reviewed each student whose progress was falling below the expected rate. The conversation focused on diagnosing difficulties and discussing possible strategies to overcome them. The leaders insisted that suggested strategies were accompanied by reasons explaining why a particular strategy might address the particular problem. When the teacher of the student being discussed indicated that suggested strategies were unlikely to be useful, further data collection was decided, usually in the form of classroom observations. These observations were designed as a problem-solving exercise, not an accountability process. For example, when one teacher asked for help, the leader responded, *"Do you want someone to observe you teaching the book or do you want to observe somebody [teaching], or do you want someone to look at the reading strategies in the whole process?"* (Timperley, 2008, p.72). The teacher requested that the leader observe her teaching, and the follow-up observation became a continuation of the conversation.

In contrast, the conversations during the meetings in the other five schools were more focused on teaching practice. When student data was used it was given little importance. The purpose of the meeting was defined loosely in terms of "improvement" and "implementing the programme". Teachers shared ideas with no requirement to articulate the reasoning underpinning the contributed ideas, nor were the ideas critiqued for their potential efficacy or later checked to see if they made any difference. Factors external to the classroom or school were often offered as causal explanations for poor student progress. The opening remarks of a leader in one of these schools contrasts with those of the leader above. She began the meeting:

> *What we're going to do today is I just wanted to just very quickly go through the latest bit of data – I've given you a copy but I know it's a paper war and just have a look at it today and if you don't want it just give it back to me. You don't have to file it or anything like that at this stage … it's just hand-written.*
>
> ***(Timperley, 2008, p. 74)***

When the results of the research were discussed with the leaders of these five schools, they too began to plot their data and discuss it with the teachers on a regular basis and with a new sense of urgency. Achievement improved in all but one school. Observations of the conversations in this school showed the teachers spent a lot of their time discussing how out of school factors (e.g. family practices) were having a detrimental effect on the students' achievement, with the leader showing her frustration by implying the teachers were to blame.

Enablers and barriers: teachers interpreting and using evidence

In this analysis of enablers and barriers, evidence from the four studies described above is brought together with additional literature that included reference to conversations about evidence but did not meet our criteria for inclusion in that they either did not analyse the conversations or did not report outcomes. In general, the research literature on conversations about evidence shows that using evidence can lead to deeper interpretation and meaning to solve problems and improve teaching and learning. Equally they can constrain it (Daly, 2012; Datnow et al., 2007; Young, 2006; Supovitz, Merrill & Conger, 2010). The conditions that enable or constrain can be both external and internal and are summarised below.

Contexts of support and high expectations

In no other area is the influence of wider education systems more evident than in conversations focused on using evidence. The systemic expectations, particularly in the areas of accountability, development and improvement, strongly influence teachers' and leaders' interpretive conversations around evidence. One of the wider system issues that arise is the potentially conflicting purposes for which the evidence is used. When teachers and schools experience strong accountability pressures through public use of evidence, particularly when there is a history of simplistic use or misuse to support particular decisions, they are less likely to perceive the evidence as a source of information for development (Fleisch, 2008; Schildkamp & Lai, 2013; Wayman, Spikes & Volonnino, 2013). These conflicting purposes and the differing perceptions of teachers could, in turn, impact on the effectiveness of conversations based on evidence. In the studies reviewed above where better outcomes were achieved, there was a great deal of systemic support, with some pressure through expectations, to use evidence to improve outcomes.

It needs to be noted that the misinterpretation or misuse of data or evidence can equally occur within a group when unhelpful patterns of conversations are not interrupted, language is not shared and expertise is limited (Confrey & Makar, 2005; Wayman et al., 2007; Young, 2006), thereby also having the potential to reduce the effectiveness of the conversations.

System support should not be seen as equivalent to no pressure and few expectations. As illustrated by the study of the data teams in the Netherlands (Schildkamp & Poortman, in press), with little system pressure to solve a particular problem, the data teams could abandon their efforts to do so. The system challenge is to balance support with expectations to improve.

The organisational context also plays a part. In three of the four studies reviewed in detail above, the use of evidence or data for improvement purposes was located in a wider professional learning context. The resulting professional conversations effectively focused and complemented what was happening in these other contexts..

Relationships of trust, support and mutual respect

As the United States Department of Education has recognised, "Mutual trust may prove to be the glue needed to hold together the district and school practices that involve using data to improve instruction and achievement" (Means, Padilla, DeBarger, & Bakia, 2009, p. 49). The importance of this statement was highlighted in the work of Finnigan et al. (2012). These authors identified that low-performing schools in the United States that were facing state sanctions demonstrated a lack of trust and teachers felt burned out. Protocols for discussing data were perceived as an imposition on teachers' work, rather than a support.

An important aspect of the more effective conversations reviewed above was that the clear purpose and focus on improvement, together with support, served to engender trust that their views would be respected and that others would take the time to listen and understand the reasoning on which an individual's ideas were based. Trust included a belief that they would work together to solve problems identified in the evidence.

Barriers developed when teachers felt blamed for poor outcomes for students. Alternatively, where respect was interpreted as accepting of any explanation for the lack of student progress, little change occurred.

Resources: quality of evidence and expertise to transform evidence into information

The main artefact in these conversations was the evidence itself. Evidence related to students included their work, interviews about their reasoning, records of attendance, surveys, homework completion together with progress and achievement. Where improvement was made, all of this evidence was interpreted by the groups as feedback on the effectiveness of teaching (Hattie, 2012).

Another important attribute of the evidence in these studies was the multiple sources on which the studies were able to draw. In the studies by Lai and McNaughton (2008) and Timperley (2008), evidence was also collected on teaching practices, with a focus on teachers' interactions with students, so relationships between student progress and classroom practices could be considered. In another study by Lai and McNaughton (2013), they examined data use in 48 primary schools where students made significant gains in their literacy achievement following support for schooling improvement. These schools also used a wide range of evidence. The teachers analysed and discussed both the students' achievement data and evidence from classroom observations so they were able to identify which practices needed to change. As one participating teacher said, *"If you don't know how to improve your teaching, then inquiring ten more times [into the data] is not going to help you come up with a more effective teaching practice"* (pp. 23-24). The main barrier related to the evidence was its poor quality or absence at critical discussion points.

The other essential resource evident in all four studies analysed above was the expertise to interpret and use the evidence. These studies also identified the complexity of the interpretation process through which the evidence can be transformed into actionable information. Sometimes the evidence is blamed when it is the interpretation process that is the problem. As Hatch (2011) describes, "data don't make decisions, people do," (cited in Datnow et al., 2013, p. 359). This complexity and the potential stumbling blocks have been supported by the work of other authors in the field (Firestone, Fitz & Broadfoot, 1999; Little, 1999; Louis & Kruse, 1998; Schildkamp & Poortman, in press).

In all the studies reviewed in this section, the participants had access to external expertise but school leaders took an active role. Their combined expertise included establishing expectations and support to have conversations in an inquiry process. This inquiry process involved the identification and testing of hypotheses about the causative factors that might underlie interpretation of the evidence. These external and internal experts worked together to help teams of teachers to collect relevant evidence to test the explanatory power of their hypotheses, and to turn the findings into actionable knowledge. In two of the studies, expertise related to the development of pedagogical content knowledge was also a contributor (Kazemi and Franke, 2004; Lai & McNaughton, 2008). The need for this wider skill set to support the transformation of evidence into information for improvement purposes through these social influence processes has also been identified by other researchers in the area

(e.g. Camburn, Rowan & Taylor, 2003; Coburn & Turner, 2011; Daly, 2010; 2012; Datnow et al., 2013; Timperley, 2005; Tschannen-Moran, 2004), together with the assistance leaders frequently need to do so (Timperley, 2008; Wootton, 2014).

Processes of inquiry

There were commonalities in the processes used in the conversations with positive outcomes in the four reviewed studies above. All these conversations followed a clear structure underpinned by a systematic and iterative inquiry process. The structure was sufficiently flexible to allow retracing to earlier steps when the evidence demonstrated a need to reconsider the direction of decisions and action. These successful conversations all took place over an extended period of time. As Lai and McNaughton (2008) note, "this was not an overnight phenomenon" (p.22). The common process that teachers used in three of the studies were:

- Interrogating relevant evidence to identify the areas in which students were experiencing difficulties and framing these in terms of challenging problems to be solved:
  - All had criteria which they used to define the problem which served as the goal
- Developing theories or hypotheses that might explain why the problem persisted:
  - These hypotheses came increasingly to focus on teaching, learning and school organisations
- Deciding on the kinds of evidence they could use to test the hypotheses and then collecting, discussing, critiquing and revising the hypothesis in the face of the evidence
- Designing how they needed to act differently to address the most useful hypothesis and systematically taking that action
- Testing throughout how effectively their new actions were addressing the problem and revising the hypothesis or the actions accordingly.

When the evidence comprised understanding students' thinking through the analysis of their work (Kazemi and Franke, 2004), the language used to describe the process was different but the underlying processes were similar.

Looking at evidence for no particular purpose other than one of generalised "improvement" or for accountability does not appear to have the same impact on outcomes. In support of the importance of having such a structured process, Datnow et al. (2013), through the analysis of case studies in the United States, identified that protocols to guide conversations about evidence can be helpful. The protocols "guided teachers through a process that began with a discussion of basic trends and then went into more detail regarding strengths, weaknesses, grade-level or course trends, and often also trends by subgroup" (p. 355). Coburn and Turner (2011) also give qualified support to the use of protocols provided they direct the teachers' attention to a focus on student learning. As with any protocols, they can become a constraint when they lead to a focus on the protocol (e.g. completing the steps), rather than forming the structure for meaningful discussions.

Development of knowledge and skills through the conversation

In the four studies reviewed in detail above (Kazemi and Franke, 2004; Lai & McNaughton, 2008; Schildkamp & Poortman, in press; Timperley, 2008), attention was given to developing knowledge and skills from engaging in the conversations. In all cases, leaders and teachers were developing skills in what constituted quality evidence, how to use this evidence to represent an important attribute (such as students' thinking), how to formulate hypotheses and devise ways to test them, and how to evaluate the effectiveness of their efforts. At times, they also needed to deepen their pedagogical content knowledge in order to formulate and test hypotheses and to take appropriate action. These actions became both enablers for effective conversations and outcomes from them.

A problem-solving culture focused on making a difference

This element brings together several points made above but puts the emphasis on culture and the development of agency and responsibility. Evident in all the studies reviewed above was a shift in attributions about the causes of low achievement or difficulties students experienced with their thinking. Instead of viewing the problems as residing solely within students, teachers focused on their own interactions with those students and how they taught them. This allowed the teachers to take ownership of the problem and develop collective responsibility for making a difference. They looked less to external causes, and thus external solutions, and more towards causes over which they had some control. In doing so they became motivated to take the risk to examine their own practice in the interests of improving student outcomes.

The participants did not necessarily come to the table with an inquiry orientation, so it is important that the conversations themselves serve to develop it in ways that enable them to approach the evidence with curiosity and the motivation to solve a problem (Earl & Timperley, 2008).

When the conversational processes do not succeed in creating these attitudes and attributions, little appears to be gained through examining evidence. When leaders do not have the skills to manage the process, they may blame teachers who in turn blame the students (Schildkamp & Poortman, in press). Leaders, like the teachers, need to take agency to examine their own interactions with teachers to ensure they have the skills to foster productive conversations that focus on evidence.

Focus two: observation and improvement-oriented feedback

There is a plethora of writing on the process of teachers being observed and receiving feedback from a leader, peer or a specialist coach. The process has a variety of names, including peer coaching, cognitive or reflective coaching, evaluation and feedback, practice analysis or mentoring. It is increasing as a form of professional development in many Australian educational jurisdictions (Anstey & Clarke, 2010; Helmer, Bartlett, Wolgemuth and Lea, 2011). This section provides a detailed analysis of studies that involved observations of practice accompanied by conversations about that observation and reported outcomes for teachers and / or student learners. In some studies the conversations included a pre-observation conversation as well as one following the observation.

The research on feedback is of particular relevance to the analysis of these conversations. In a meta-analysis of the feedback literature, Hattie and Timperley (2007) identified that learners needed to be able to answer three questions for feedback to be effective. The first, "Where am I going?" requires the learner to have goals. The more challenging the goal, the more important feedback becomes. The second, "How am I going?" requires the learner to have information about their current performance in relation to the goals. The third, "Where to next?" asks the learner to identify strategies to close the gap between current performance and the goals. These questions form the essence of self-regulated learning outlined in the introduction.

In subsequent writing Timperley (2011a) has argued that if teacher learning is to make a difference to student learning, then teachers need to be able to answer each of these questions from the perspectives of both themselves and their student learners. This relationship highlights what teachers need to learn in order to address what their students need to learn.

Feedback does not have to come from another professional and Hattie (2012) argues that the most important source of feedback for a teacher is his or her student learners. Particular attention was paid in this analysis, therefore, to whether the professional conversations included information about student learning and whether it was framed in terms of feedback for the teacher on their progress towards their goals.

Despite the volume of opinion written on the subject, the review found only a small number of studies that included an analysis of the actual conversation plus some kind of outcome in relation to coaching. I have divided them into three types of conversations that were qualitatively different from one another. The first group of three studies analysed peer coaching. The second group of three studies focused on reflective coaching and included studies on cognitive coaching. The third group comprised two studies on practice analysis conversations. The evidence of positive outcomes for teachers and students was strongest for these practice analysis conversations. This section then concludes with an analysis of conversation enablers and barriers that not only helped the teachers to answer the three feedback questions, but also had positive outcomes for teachers and their students.

Peer coaching among teachers

I have used the definition of peer coaching provided by Murray, Ma and Mazur (2008) as "a mutual consultation between teachers of equal status" (p. 203). In this section, the focus on peer coaching involves peers observing one another, either in person or through video, and discussing these observations with one another. In a review of the literature on coaching, Cornett and Knight (2008) conclude that peer coaching can promote the transfer of skills from workshops to classrooms. Given the ineffectiveness of workshops alone in creating changes in teacher practice, this finding is not surprising. These authors also note the paucity of rigorous research on the actual coaching processes that make a difference.

Leat, Lofthouse and Towler (2012) take a different perspective on the worth of peer coaching. These authors argue that in England, where "teachers often work in a culture in which their professional identity is compromised by overbearing managerialism" (p. 44), this more collegial coaching model should be privileged.

In this brief review of peer coaching, I have included the work of three groups of authors. The first is from England and is described in Lofthouse and Hall (2014) and Leat et al., (2012). The second, located in New Zealand, is described in Charteris and Smardon (2013). These studies only partially met the criteria for inclusion in this review. They did analyse theoretically informed resources brought to the conversations, but they did not examine whether the peer coaching had any impact on teaching practice, solving problems or outcomes for students beyond providing teachers an opportunity for reflection. Lofthouse and Hall (2014) argue that an emphasis on short term outcomes can militate against a longer term commitment to a culture which encourages professional inquiry so for this reason I have included them.

The third study by Murray et al. (2008) in the United States analysed peers' in-school conversations following a summer institute and used a control group to examine the impact of the conversations on students' maths achievement. Unfortunately, the in-school peer coaching had no impact on this achievement compared with the control group. Further details of these three groups of studies are provided below.

The English studies by Lofthouse & Hall (2014) and Leat et al. (2012) report on the analysis of 27 coaching conversations from secondary schools in England that based their practice on an "ethic of respect". The authors supervised the coaches over a number of reflective cycles as they coached teachers. The format involved a pre-lesson meeting followed by lesson observation with video-recording and post-lesson coaching. The authors encouraged the video recording of lessons to capture the "unique ecological wholeness of a lesson" (Leat et al., 2012, p. 45). They worked through iterative cycles of inquiry with the coaches, using an analytical frame based in socio-cultural theory as a scaffold for coaches to analyse their practice and as a source of feedback.

The authors identified four levels of coaching development over the iterative coaching cycles using the framework. The beginning stages evident in most of the coaches' early practice involved the coach asking questions which lead the teacher to give a descriptive account of features of the lesson by drawing on recall and anecdotal evidence. By the fourth level, which few coaches reached over the reflective cycles, the coaching conversation was more co-constructed, analytical and challenging. The authors note that only two coaches had any interactions that were coded as challenging, with others saying they shied away from challenge.

The authors report two main outcomes which they considered justified the process. The teachers found the coaching "fun" in comparison to other professional development experiences. It also gave them a chance to stand back and reflect on the specifics of practice and to explore meaning in relation to their classrooms but they did not provide evidence of the impact of this reflection in terms of their future actions.

The second study by Charteris and Smardon (2013) took a similar format to that of the English studies described above. Thirteen teachers worked in groups of 2-3 teachers in five schools over two years with the researchers as participant observers. Again, video footage was used by the peer coaches because it allowed the coaches to transform the subjective into an object for examination. The community of inquiry was designed for teacher coaches to become co-constructors of knowledge. Their reflection was guided by specific questions focused on decision-making.

The teachers reported that they became aware of pivotal moments in their thinking and more aware of their peer coaching role. The use of the video allowed them a second look and gave them a chance for a "second think" (Charteris & Smardon, 2013, p. 179). The authors argue that the process enabled the teachers to become explicitly aware of their own and others' processes for learning as they could see themselves thinking and clarifying their ideas. They also note the potential for positive impact on classroom teaching.

In the third study by Murray, Ma & Mazur (2008) in the United States, teachers worked in partnership to support and learn from each other to implement teaching activities and strategies from a summer institute designed to improve teaching practices and mathematics achievement in algebra. The coaches were trained in coaching techniques and the authors analysed audio-tapes of the post-observation conference.

Forty percent of the recorded conversations involved teachers sharing techniques and strategies centring around the organisation of learning and management of their classrooms. Levels of self-disclosure and support were high, but the conversations showed a lack of analysis or challenge and only brief reference to mathematical content or pedagogy.

As in the two other peer coaching studies described above, the teachers reported very positively on the experience. However, improvement in students' mathematics achievement was also monitored and no impact was found.

Enablers and barriers: peer coaching

The studies in England (Leat et al., 2012; Lofthouse & Hall, 2014) and New Zealand (Charteris & Smardon, 2013) demonstrate that mediated and trained peer coaching can help coaching pairs to become more reflective about their practice and potentially more meta-cognitive about their own learning. Their focus was not on changing teaching practice, although one study mentioned this possibility. All three studies show that, even with training, teachers are more likely to focus their conversations on supporting their colleagues rather than challenging their ideas or their practice.

If the desired outcome is for teachers to have positive opportunities to reflect without an expectation that this reflection will result in changes in practice or student outcomes, then the following enablers are important:

- Training and the use of protocols or questions against which coaching pairs can analyse their coaching interactions
- Time to engage with one another.

If the outcome is to include changes in teaching practice and improved learning opportunities for students, then this small collection of studies indicates that more than peer coaching is needed. Few of the learning resources outlined in the introduction were brought to the conversation. The barriers appear to be reluctance by peers to challenge one another or to talk deeply about pedagogy or its relationship to student learning. Guskey and Yoon (2009), in their extensive analysis of the professional development literature, conclude that peer coaching did not feature in any studies with improved outcomes for students.

Lofhouse and Hall (2014) argue that a focus on outcomes can militate against developing a longer term commitment to a culture of professional inquiry. They do not provide evidence that this outcome was achieved through the process.

Reflective coaching for teachers

In this section, I have focused on conversations designed to help teachers reflect on their practice with an emphasis on coaches asking questions of teachers whose practice has been observed.

Most of these approaches have their origins in cognitive coaching (Costa & Garmston, 1994, 2015). Both the English (Leat et al., 2012) and New Zealand (Charteris & Smardon, 2013) studies described above in relation to peer coaching have synergies with cognitive coaching. I have given greater attention to this section on cognitive coaching because of its widespread use in Australia. Cognitive coaching was first developed by Costa and Garmston (1994, 2015) and they provide a rich description in these books. At the risk of simplifying a complex process, it has a strong theoretical basis in the educational understandings about adult learning of the 1970's and 1980's, and has been subsequently developed to incorporate more recent understandings in the field. In essence, it is "the nonjudgmental mediation of thinking" (Costa & Garmston, 2015, p.12) comprising in its simplest form a Planning Conference, a Lesson Observation, and a Reflecting Conference. Three goals are emphasised: establishing and maintaining trust; facilitating self-directed learning; and enhancing growth toward holomony in which individuals act both autonomously and interdependently with the group. The reason for the focus on cognition is because the authors consider that "changing the overt behaviours of instruction requires the alteration and rearrangement of inner, invisible cognitive processes" (Costa & Garmston, 2015, p.9).

As noted in the section on peer coaching, cognitive coaching can form a counter-balance to managerialism. The authors differentiate between interactions which focus on overt behaviours and tasks (which they term 'consulting'), and cognitive coaching, which "differs from other forms of mentoring, supervision and peer review in that it mediates invisible, internal mental resources and intellectual functions" (Costa & Garmston, 2015, p.12). For this reason, they do not need to be a more expert performer than those they coach because technical expertise is less important than the ability to empower people to reflect. Coaches adopt a mediation role in which they must attend carefully to both the non-verbal and verbal cues provided by the person being coached because the authors claim that "assuming the stance of the expert establishes one's responsibility to share one's greater knowledge and experience and to help others develop correct and appropriate performance …. The mediator evokes dispositions for reflection and self-directed learning on the part of the coachee" (Costa & Garmston, 2015, p.38).

Assessing the outcomes of cognitive coaching from the work of Costa and Garmston (1994, 2015) was more difficult than identifying its theoretical underpinnings. The 2015 edition contains a comprehensive literature review of studies assessing the impact of cognitive coaching, but a significant proportion of the studies are unpublished and their findings rely largely on self-report. The summary of research does not provide methodological detail, and it is beyond the scope of this review to examine the findings of this body of research in greater depth.

In the search for studies that met the criteria for inclusion in this review, two were located by Yow and Lotter (2014) and Batt (2010), both in the United States. I have described these studies together because they followed similar processes. Both engaged teachers in a summer institute specifically designed to build particular knowledge and skills. In the case of Yow & Lotter, 16 middle school mathematics and science teachers were helped to develop as teacher leaders through improving their teaching practice. The focus of the study by Batt (2010) was on professional development in a Sheltered Instruction Observation Protocol (SIOP) developed by Echevarria, Vogt, and Short (2004) for helping teachers with linguistically diverse students.

Both followed the experiences in the institute with additional workshops. In the study by Yow and Lotter (2014), the cognitive coaching phase occurred during the institute in the form of practice sessions. In the study by Batt (2010), the coaching occurred in the teachers' regular teaching contexts which involved a pre-observation conversation and an observation of practice followed by feedback.

The cognitive coaching models in these two studies differed from that described by Costa and Garmston (1994) in some important ways. The coaches were more skilled in teaching practice than those they coached, and they used rubrics describing progressions in teaching practice to guide the teachers' reflections and to identify and document progress. The examples of feedback provided indicated that it was not entirely non-evaluative, in that the coaches commented on how well the teachers implemented the techniques selected for observation as described in the rubrics.

Specific knowledge building also formed part of the process in that, as Batt (2010) explained, the teachers "benefited from one-on-one direct (re)teaching of second language acquisition principles and additional demonstrations of SIOP strategies for working with second language learners" (p. 1004). However, the emphasis of the coaching was on questioning rather than telling.

In both studies the teachers made progress on the rubrics related to teaching practice. However, no evidence was collected related to student learning beyond teacher reports and anecdotal comments. The teachers in the study by Batt (2010) also gave higher self-ratings of improved knowledge and skills, confidence and implementation, with some expressing the wish to become peer coaches. Batt also observed that the coaching served as a catalyst incentive for some teachers to read and use resources and lesson preparations provided in the summer institute because the coaching was designed around the protocol.

A reflective coaching study with much stronger evidence of positive outcomes for students was undertaken in relation to the Minnesota Reading First Professional Development Program (Peterson, Taylor, Burnham & Schock, 2009). The schools and coaches were selected on the basis that good progress had been made on the schools' reform efforts and students had made accelerated progress in reading comprehension. Eight coaches in four schools were shadowed for six to eight hours by one of two observers. Coaches had between two and three classroom observations and coaching conversations on the days they were shadowed.

The coaches were typically experienced teachers who were given additional training on teaching reading as well as facilitating coaching conversations. Part of this training was to view video clips of each other's teaching followed by a coaching conversation that was observed and analysed by a third coach. They were also provided with several protocols to collect data on instruction as a basis for their subsequent coaching conversation with the teachers. The protocols were based on current research about reading instruction that maximises students' cognitive engagement, and directed the data collection to linking teaching practice with students' level of cognitive engagement.

The analysis of the shadowed coaches' conversations with the teachers showed that all the coaches asked questions in their conversations with teachers. The authors provided examples, such as: *"What were the students doing well as you were working on the strategy of predicting?"* (p. 505); *"Are your students engaged in active as opposed to passive responding?"*(p. 506); *"Did you clearly state the purpose?"* (p. 506). In their illustrations of interactions between the coaches and teachers they supplemented their questions with evaluative comments (mostly positive), for example: *"You asked students to make predictions at the right time"* (p. 505). The coaches also gave advice, such as: *"Perhaps when the students reread the story on their own, you could model how to consider the theme"* (p. 505).

There were also instances where the use of protocols generated knowledge exchange and, from this exchange, teachers developed professional goals. For example, one excerpt begins with: "Here is your goal sheet from last fall listing your goals for this year. You said you were going to work on instruction that would have more active responding from the students…" (p. 505). The coach and teacher then evaluated the progress students had made in active responding as a result of the teachers' efforts.

Practice analysis conversations

Practice analysis conversations have their origin in recordings of feedback between coaches or school leaders and teachers followed by interviews of the teachers about their experience (Timperley, Parr & Hulsbosch, 2008; Timperley, Parr & Meissel, 2010; Timperley, 2012). The initial phase of the research revealed that leaders or coaches typically asked a series of questions of the teachers or told the teacher (in the form of advice) what changes they should make to their teaching. Follow-up interviews with the teachers revealed that they typically did not understand the reasons for particular questions and often interpreted them as a criticism. In most instances they reported that they could not make the changes suggested because they did not have sufficient depth of understanding about what to do, or did not agree with the advice.

The research evolved over two more phases that involved training prior to each phase. In the first phase the training focused on interpersonal effectiveness. It was strongly influenced by the original work of Argyris and Schon (1974) and further developed by Robinson (2011) and Timperley (2001). The values and practices underpinning these theories are described in more detail in the section of this review on "Addressing Problems When Others Don't Agree" in relation to the work of Robinson and colleagues, so only a brief summary is provided here. The conversations are underpinned by the values of respect, valid information and developing internal commitment. The emphasis is on a co-constructed process where the coach's theories about particular practices are revealed and discussed as well as those of the teacher. An inquiry orientation demands that relevant evidence and reasoning are brought to the discussion, with inquiry and openness to learning from one another being key values.

The transcripts of the second round of recorded feedback conversations showed interpersonal processes more consistent with these values. Respect was demonstrated through the coach and teacher seeking to understand each other's viewpoints with coaches checking their assumptions, such as the usefulness of their advice. Teachers rated the usefulness of these conversations highly, but a closer analysis of transcripts of 50 conversations showed limited engagement of teachers' existing beliefs and a primary focus on practical advice in the form of helpful hints rather than deepening the teachers' knowledge of particular practices. Consistent with this practical orientation was a focus on "next steps", rather than the development of self-regulated learning focused on how the teacher would know if these steps were more effective than what they did before.

The new protocols described here were developed to include these aspects and implemented by literacy coaches and school leaders in a cohort of 100 schools involved in a Ministry of Education- funded literacy professional development. This more co-constructed analysis and emphasis on knowledge-building led to a change in name from "Observation and feedback" to "Practice analysis". The theories of learning on which the latest iteration of the conversations were based included those identified in the introduction, such as providing both support and challenge, engaging teachers' existing theories of practice, promoting deep transferrable knowledge, and fostering metacognition and self-regulated learning.

Large gains in students' literacy achievement were evident across the schools. After taking into account the average expected gain, the average effect size for this cohort of schools was 0.44 for reading and 0.88 for writing on a nationally normed assessment. The rate of progress for students starting in the lowest 20% of the same was even greater (Timperley, Parr & Meissel, 2010). While the professional development work in the schools was multifaceted, as are most of the situations in which professional conversations occur, the participating teachers consistently rated the conversations they had with coaches and leaders around observations of their practice as being the most powerful lever for improvement (Timperley, Parr & Hulsbosch, 2008).

I will illustrate how these theories apply in practice in relation to the dichotomy set up in the descriptions of peer and reflective coaching above between "telling" (usually in the form of helpful hints) and "asking questions". In terms of what we know about learning, telling someone something is unlikely to be interpreted as the teller intends. It fails to take into account what the listener already believes, their level of understanding about a particular concept or practice, and the context in which the idea or practice is enacted. It is also disrespectful of the listener's views. Overcoming these difficulties of "telling" by substituting "asking questions" also creates difficulties. It limits the resources brought to the conversation when the coach has knowledge that could be brought to enhance the teacher's understandings and skills, and can be perceived by the person being coached as manipulative when the coach does not reveal the reasons for asking the questions.

The value of openness to learning means the coach approaches the interaction with an orientation of deep inquiry that involves both inquiry into the teachers' point of view and inquiry into whether their own views are valid or useful, for example: *"Can we clarify what each of us means by meta-cognitive, because I'm not sure we are on the same page?"* At appropriate times, the coach may reveal his or her point of view (or theory of practice), but accompanies this with reasons or evidence for that point of view and checks through questioning whether the teacher sees this point of view as valid. In a situation involving a focus on the teacher modelling being a writer for the students, the coach said: *"The way you modelled being a writer did fit the criteria we worked out but the group didn't seem to get it, so there must be something else going on that we need to figure out. What do you think?"* The person being coached is invited to engage in a similar process by disclosing their point of view, and the reasoning on which it is based, so if there are differences they are openly discussed with a resolution sought.

Another difference between the descriptions of reflective conversations above and practice analysis conversations is establishing agreement around explicit criteria against which the observed practice will be analysed. The studies by Yow and Lotter (2014) and Batt (2010) used protocols against which to analyse the teachers' practice. It appeared these protocols were set by the coach and that the teachers' job was to enact them, rather than to contribute to their construction. Prior to an observation in a practice analysis conversation, the coach and teacher agree on the teacher's goal for their practice in relation to addressing identified student challenges, then both discuss criteria for the practice and refer to student responses which would be reflective of progress towards achieving the goals for themselves and their students. In this way the teacher's knowledge is deepened as each give their reasons for particular criteria. For example, in the situation where the coach and teacher had agreed to focus on the teacher's modelling of being a writer, the coach said: *"Let's work out what counts as effective modelling. I'm sure you've got some ideas and I have some too. Firstly, you might …"*

Given the importance of establishing learning goals for teachers and students and co-constructing criteria for effectiveness, a conversation between the coach and the teacher prior to the observation is essential.

A summary of the key elements of this conversation includes:

- Developing the purpose and process of the whole process
- Identifying the specifics of the students' learning goals during the observed activity and how the teacher and the observer will know if they are making progress
- Identifying what the teacher has done so far to meet the students' learning goals with the evidence of effectiveness
- Co-constructing the teachers' goal for his / her own learning and the criteria for effective practice (linked to promoting student learning)
- Identifying what the criteria will look like in the observed lesson and what evidence will be collected.

The observation of practice involves:

- Using the identified criteria to collect evidence of practice
- Finding out from students how they are experiencing the new practice.

The following steps take place during the analysis phase of the post-observation conversation:

- Revisiting the criteria for effective practice in relation to the teachers' goals
- Jointly analysing illustrative parts of the lesson using the criteria and students' responses as a guide
- Probing and examining what led teachers to do what they did during the analysis
- Determining effectiveness in relation to impact on how well the teachers' practice promoted student learning.

The identification of new practice then follows:

- Co-constructing new practice based on previous analysis and criteria for effectiveness
- Referencing reasons for new practice to underpinning theoretical ideas
- Checking understanding / feasibility of suggestions for new practice
- Linking new practice to other students / other areas of the curriculum for transfer

- Identifying how the teacher will know if new practice is more effective with students than previous practice to promote self-regulated learning
- Developing new professional learning goals in light of the analysis.

Further evidence of the effectiveness of practice analysis conversations in raising the literacy achievement of Pasifika learners, who typically do not do well in New Zealand schools, is provided by Si'ilata (2014). In this study, many of the coaches were school leaders.

When these conversations complemented professional learning about ways to be linguistically and culturally responsive, and helped teachers to deepen their knowledge and refine their teaching skills in these ways, the achievement of their Pasifika learners accelerated.

Enablers and barriers: observations and improvement oriented feedback

In these conclusions I have drawn on the studies reviewed in detail above and the wider literature on feedback and the observation of practice, often referred to as coaching. Overall, the analysis supports Hattie's (2012) description that:

"coaching is specific to working towards student outcomes. It is not counselling for adults; it is not reflection; it is not self-awareness; it is not mentoring or working alongside. Coaching is deliberate actions to help the adults to get the results from students." (p. 64)

Conversations situated in a wider professional learning context

The analysis of the above studies indicates that the process of observing practice and providing feedback is most effective when it is located within a wider learning context and the conversations are explicitly linked to that context (e.g. Peterson et al., 2009; Timperley, 2012). Kuijpers, Houtveen & Wubbels (2010) examined approaches to school improvement, and from their analysis offered an integrated nested model that has at its centre coherent goals for the students, teachers and the school. The next layer in this model identifies individual learning through pre-conference, observation and feedback sessions. This individual learning is nested within a team learning environment where theory is presented, skills demonstrated, practice engaged with an evaluation and monitoring conference and monitoring. The outer layer of the integrated nested model offered by Kuijpers, Houtveen & Wubbels identifies broader facilitative conditions. While the specific attributes of this model is beyond the scope of this review, what is important is to consider how the conversations around observation and feedback link to other learning opportunities for teachers. Do they reinforce one another? Do they detract from one another? Deep learning is transferrable learning (Pellegrino & Hilton, 2012) and transferrable learning is enhanced when it is reinforced across contexts.

Resources include criteria for effective practice

All the studies that demonstrated changes in teachers' practice or student outcomes used supporting tools. Some (Batt, 2010; Yow & Lotter, 2014) had protocols that described desired practice. These kinds of descriptions are typically based on recent research in the area of focus and can provide clarity to the participants in a conversation about the specific dimensions of practice. It is not surprising that, with practice described in detail, the protocols enable progress to be made towards the specified practices as a result of the conversations.

There are, however, two potential problems with the use of protocols in this way. The first is that the protocols may constrain practice in ways that do not embrace the wider dimensions of practice. The second is that the underlying theoretical rationale for those descriptions may not be well understood by the participating teachers. If new practice is to become deeply embedded, it is as important to know why as to know how.

The more theoretically based and negotiated criteria for effective practice in the practice analysis conversations overcame these difficulties to a large extent when the development of the criteria included a discussion about the reasons why some practices were more effective than others. A potential barrier, however, was the level of knowledge and skill the participants brought to the conversation. With limited knowledge, the criteria can also be reduced to practical trivia.

The other related issue is that protocols focused on teaching practice, rather than on how well students are learning in relation to that practice, can constrain improvement. In both the studies with positive outcomes for student learning, the protocols specifically drew attention to student learning.

Relationships focused on co-constructing meaning

All reviewed conversations were designed to be supportive and respectful of teachers' professionalism consistent with developing adaptive expertise. The difference was in how respect was enacted and the degree of challenge evident. The peer coaching studies described were almost entirely supportive with no evident challenge. The only outcomes reported from the studies were:

- coaching was perceived by teachers as fun compared with other professional development experiences
- coaching gave teachers a chance to reflect on the specifics of practice and explore meaning in relation to their classrooms.

A skilled coach co-constructs deep meaning with a teacher by discussing the coaches' and teachers' theories of practice, with reference to relevant research, and how well they are working to promote their students' learning. Anderson (2014), in her study of feedback, found that teachers indicated much higher levels of intention to change their practice when both their theories of practice and those of the coach were revealed and discussed.

Processes that promote deep inquiry and metacognition

All the reviewed studies also identified structured processes. Whether they focused on outcomes or not, all approaches aimed to promote teachers' metacognition through reflection on practice within the teachers' own contexts. Metacognition can be enhanced under these circumstances, as Sawyer (2008) described for those learning to teach: "Articulating and learning go hand in hand in a mutually reinforcing feedback loop. In many cases, learners do not actually learn something until they start to articulate it – in other words, while thinking out loud, they learn more rapidly and deeply" (p. 53). This is a particular strength of peer and cognitive coaching with an emphasis on coaches developing questioning skills for this purpose. A study by Rosemary (2005) in the United States used transcripts of video excerpts in a similar way but did not report on outcomes.

The issue is whether or not these opportunities are sufficient to promote teacher learning in ways that lead to changed practice and better outcomes for students. Those studies with strongest outcomes for students (Si'ilata, 2014; Timperley, 2012) used these processes to promote deep inquiry into teachers' own beliefs together with those of their coaches and the relevant research to inform those deliberations. These conversations also explicitly sought information from the students about their learning as a source of feedback to their teachers (Hattie, 2012). This information was used as evidence in the conversation to support or question the effectiveness of particular actions.

While the study by Peterson et al. (2009) mentioned professional goals in an illustrative quote used in the study, only the practice analysis conversations explicitly included the development of professional learning goals related to the learning goals of their students. These processes allowed teachers to be able to answer all three questions for themselves and their students: "Where am I going?", "How am I going?" and "Where to next?" (Hattie & Timperley, 2007).

New transferrable knowledge of practice in context

The studies reviewed above that showed changes in teaching practice (Batt, 2010; Peterson et al., 2009; Timperley, 2012; Yow & Lotter, 2014) explicitly brought knowledge resources to the conversations through protocols for effective practice or the development of criteria. These resources were designed to refine, revise or develop the teachers' knowledge and skills in identified areas of practice.

These conversations also sought to connect knowledge from other professional learning contexts to the learning within the conversations. Only the practice analysis conversations (Timperley, 2012), however, explicitly considered the development of deep transferrable knowledge in this way.

A school culture of ongoing teacher learning and problem-solving

Lofthouse & Hall (2014) justify their peer coaching approach by arguing that a focus on short term measurable outcomes can militate against a longer term commitment to a culture which encourages professional inquiry. However, they do not present any evidence that the inquiry culture in their schools was any stronger than those where the focus was more strongly on outcomes. A sustainability study that tracked schools involved in the practice analysis conversations (O'Connell, 2010) identified that an ongoing culture of inquiry was sustained in nearly all of the schools for at least three years after the direct support was withdrawn. What was particularly evident in O'Connell's study was that schools continued to focus on the links between teaching and student learning and to make relevant changes when necessary.

Barriers

The greatest barrier to these kinds of conversations is the lack of time. Finding the time to have a considered pre-observation conversation, to observe, then to follow-up with a post-observation conversation is time-resource heavy. Given this time demand, it is important that the process and content of the conversations make good use of the time.

Time alone, however, will not necessarily achieve outcomes in terms of improved teacher practice or better student learning. The second barrier to effective conversations is an insufficient skill level among participants. Participants need to have deep knowledge of effective practice, to know how to access information about student learning to bring it to the conversation, and to know how to have productive conversations that are supportive, respectful and challenging of the professionalism of teachers.

Another potential barrier particularly relevant to Australia was identified in a study by Helmer et al. (2011). They recorded their experiences as coaches when offering teachers the opportunity to be observed and receive feedback in relation to a web-based literacy programme in remote schools with a high proportion of Indigenous students. They found that teacher expectations of students and concerns about confidentiality affected the extent to which teachers engaged in these opportunities. They found these issues were more prevalent among experienced teachers who showed greater reluctance to engage than their less experienced colleagues.

Focus three: solving problems and developing new practices

All professionals experience problems in the course of their practice, and a common strategy to solve them is to engage in conversations with colleagues or leaders. In this context, a problem is not a deficit or negative, but simply a gap between the current situation and one that is desired (Hattie, 2012). It may, for example, include developing a new curriculum because the existing curriculum does not sufficiently meet changing conceptions of knowledge. New practice is included in this section because it is typically a solution to an existing problem (Robinson, 1993). Horn and Little (2010) contend that focusing on the analysis of conversations in these circumstances "presents a significant barometer of a group's collective capacity to support professional learning and stimulate instructional improvement" (p. 189).

Many of these conversations occur in professional communities, with a key rationale for such communities being to provide an ongoing venue for learning (Cochran-Smith & Lytle, 1993; McLaughlin & Talbert, 2001). While general support for such communities as a way to promote teacher learning is strong (e.g. Grossman, Wineburg, & Woolworth, 2001; Timperley & Alton-Lee, 2008), evidence of impact on teaching practice or student outcomes is limited (Vescio et al., 2007). Evidence about the impact of conversations in these communities is even more limited, with the conversations themselves rarely researched systematically (Little & Horn, 2007; McLaughlin & Talbert, 2001).

There are two main groups of studies in this section of the review. The first focuses on learning in and from teaching practice. It compares conversations among teachers in professional communities in the United States in two papers by Horn and Little (2007) and Little and Horn (2010) in which teachers address problems of practice in ways that are consistent with the central tenets of adaptive expertise, that is, focused on improving outcomes for students, taking agency for their own professional learning and questioning the effectiveness of existing assumptions. In another study by Grossman, Wineburg and Woolworth (2001) teachers develop a new integrated curriculum in a professional community. The authors analysed the quality of the resources that teachers brought to their conversations to determine which conversations were effective.

This section of the review finishes with another group of studies located in Australia and New Zealand by New Zealand researchers (Le Fevre & Robinson, 2015; Robinson & Le Fevre, 2011; Robinson, Sinnema & Le Fevre, 2014; Sinnema, Le Fevre, Robinson & Pope, 2013), where the focus was on addressing conflicts with other leaders, teachers and parents through open-to-learning conversations, rather than within professional communities. The identified enablers and barriers to effective conversations are related to each area of focus.

Discussing teaching and learning problems

In the two year study described in Little and Horn (2007) and Horn and Little (2010), a problem of practice was considered to be "classroom interactions experienced as troublesome, challenging, confusing, unexpectedly interesting, or otherwise worthy of comment." (Little & Horn, 2007, p. 80). Professional conversations about these kinds of problems are typical of those in school professional learning communities, but are not restricted to them.

This group of studies describes the conversational routines of two collegial groups focused on resolving problems of practice related to teaching algebra and academic literacy. Both groups were located in the same high school in the United States. The authors were participant observers as they sought to understand how naturally occurring conversations generate learning.

The analysis of the conversational routines in the two groups found that the process in the algebra group led to a high quality analysis and resolution of the problem for Alice, a beginning teacher who had just experienced 'mayhem' in class. Conversely, Leigh, who was struggling with implementation of a new curriculum in the academic literacy group, became the passive recipient of others' advice.

Both groups engaged in what the authors referred to as 'normalizing' responses to the teachers' problems, in that they defined the problems as normal and acted to be supportive through reassurances. One of Alice's colleagues said, in response to her distress about the mayhem when she introduced geoboards to her class:

> *Jill: Reality check, is that we all know what it can look like, we all know what we're striving for. But my God – we're just like this all the time. After 10 years, after 2 years, after 5 years, every day is like that because we don't know what's walking into our classroom. On a daily basis.*
>
> ***(Horn & Little, 2010, p. 194).***

Over a number of conversational turns, the responses from teachers in the algebra group turned the conversation away from the mayhem created by the students, to the planning and materials the teacher used in this lesson by asking for greater specification of the problem. The leader began this shift by asking: *"Alice, can you identify the source of the squirreliness? Like [fear is] that they, they wanted to play with the geoboards but didn't have time to do it"* (p. 195). After more normalising responses from her colleagues and Alice admitting she became angry and punished the students with a detention, she started to realise that the task she had set might not have been set at an appropriate level:

> *So I got angry too at what they wouldn't do. I think a large part of that is inevitable first-time-through things. For me it's first-time-through like fall Math 2, given what they had last semester for Math 1 and some of these frustrations and um – I just don't know what's reasonable for them in terms of expectations.*
>
> ***(Horn & Little, 2010, p. 198)***

The more experienced teachers offered possible interpretations (their theories) for the problem. For example, later in the conversation, a teacher explained:

> *When they get upset and they seem to be off task and acting goofy, it usually is motivated by 'I'm so confused and the last thing I want to do is admit I'm confused … So I'm instead I'm going to find a way to distract myself or distract others so that I don't have to face the fact'.*
>
> ***(Horn & Little, 2010, p. 200)***

This shift in focus towards the teaching helped to create agency for Alice, and formed an anchor for the analysis and advice. Throughout, she was "the ultimate interpreter of the events in her classroom as she revised her account of the mayhem" (Horn & Little, 2010, p. 195). As the diagnosis progressed, the leaders of the group made links from the specific accounts of the situation to more general actionable principles for teaching. In doing so, they made their pedagogical reasoning transparent and brought a wider range of conceptual resources to the analysis and resolution of the problem for Alice. This process served to challenge Alice's earlier explanation of the problem and deepen her understanding about possible solutions. They also "explicitly relieve one another from blame, but not from responsibility for problems of practice, conveying the expectation that they will all consistently learn in and from their teaching practice" (Little & Horn, 2007, p. 87). The authors note that normalising is common in most groups they have observed, but typically the responses turn the problem away from the teaching, thus limiting teachers' agency in addressing it and the further opportunities for professional learning.

In an interview, Alice summed up her reaction to the process:

> *You also have a sense that it's ok to try things and have it not work – why didn't that work? What we do differently? Because I think for me, I mean I'm kind of a perfectionist, so to do something and fail is really frustrating for me and if I didn't have the support of people who kept saying, "That's not failure, it's trying things"…*
>
> ***(Horn & Little, 2010, p. 201)***

The task of the Literacy Academic group was to jointly plan the semester's three main units in the new curriculum. Leigh's problem was that she was unable to personally relate to the task set by the leader of one of the groups so did not believe she could teach it. Rather than engage with her concerns, they were pushed aside, met with a joke, and she was told how she could overcome the problem. Leigh remained silent and unpersuaded. In a later attempt to take the floor, she re-gained the attention of the group by relating her reaction to the potential reaction of the students. Others normalised the problem to the extent that they agreed it was likely to arise with some students. The problem itself went unexamined and the leader followed up by telling her the solution without inviting further contribution from Leigh. She was positioned as the passive recipient of others' advice, with further analysis or discussion of problems deflected towards action. Collective frames of reference and principled talk were absent, thus limiting the learning resources brought to the group for describing, analysing and resolving problems of practice.

The authors identified contributing factors to these differences, in particular, the different orientations of the leaders of the two groups. The leaders of the algebra group saw themselves as responsible for maintaining an ethos of professional learning: "They took a visible role in posing questions, eliciting specific accounts of classroom practice, preserving a focus on both student and teacher learning, and encouraging initiative of these sorts by others" (Horn & Little, 2010, p. 210-211). In the literacy group, the dominant pattern of teacher leadership was characterized by "a division of labor focused on improving curriculum at each of the grade levels" (Horn & Little, 2010, p. 211). Minimizing the demand on teachers' time was a major motivator.

Developing an interdisciplinary curriculum

In this study by Grossman, Wineburg and Woolworth (2001), the conversations were among 22 teachers from the English and Social Studies departments, together with a special education and ESL teacher in a secondary school in the United States. They met to develop an interdisciplinary curriculum in History and English. The researchers convened the group and took a leadership role with the help of the two department heads. Their aim was to provide opportunities for continued learning around the subject matter of History and English. They recorded the teachers' conversations for an entire day, once a month, over 18 months.

The teachers' different disciplinary backgrounds led to differences in beliefs about the nature of worthwhile knowledge and how students should learn it. These differences contributed in the early stages to an ongoing tension within the group. Some wanted to focus on improving pedagogical practices in the interdisciplinary curriculum that directly applied to their work. Others wanted to spend time engaging intellectually within the subject matter content to develop deeper understanding. The authors refer to these differences as creating 'fault lines' in the professional communities and proposed that, before they could develop an inter-disciplinary curriculum, they needed to understand each other as thinkers and learners.

Initially the teachers' interactions were labelled as 'pseudo-learning' with norms of behaving as if everyone agreed that conflict should be suppressed and an illusion of consensus maintained. Grossman et al. (2001) suggest it is relatively easy to maintain these norms when teachers meet infrequently but that deep learning is sacrificed. Because the teachers in their study continued to meet over an extended period of time around a serious task, these norms were not maintained and after four months the group became divided into competing factions that, to a large extent, followed curriculum lines.

These difficulties were rarely discussed in the group but rather met with eye-rolling and negative side comments. They were the subject of private conversations outside of the group. It wasn't until they acknowledged the dysfunction of the group and named the differences that the participants were able to engage in a meaningful learning process by trying to understand one another's disciplinary base and points of view. To do so, they needed to learn to seek clarification from one another, rather than gloss over differences, and to search for common ground. For example, Rhonda, a student teacher in the history department, asked about an author's responsibility in relation to a book they had read. She queried whether *"authors of fiction have responsibility for giving us something that is absolutely true and accurate."* The conversation continued:

> Leader: *Lee had some things to say about that.*
>
> Lee: *What's that mean?*
>
> Leader: *I just volunteered you to address yourself to Rhonda's comment about the validity --- and his voice.*
>
> Lee: *Yeah, I mean, I just thought that – why is the expectation of validity different in this case than in any other fictional work? And if that is the major question why did we read the book?*
>
> ***(Grossman et al., 2001, pp. 982-983)***

As the authors acknowledge, "Pressing colleagues in this way for clarification in a public setting requires not only a particular intellectual stance but a set of social skills and careful negotiation to prevent hurt feelings and possible shutdown. Learning to argue productively about ideas that cut to the core of personal and professional identity involves the skilful orchestration of multiple social and intellectual capacities" (Grossman et al. 2001, p. 980).

Over time the teachers recognised their responsibility for each other's learning, which went hand in hand with recognising that their colleagues could be a resource for their own learning and a truly interdisciplinary curriculum.

Enablers and barriers: solving problems and developing new practices

In these conclusions, I have returned to the relevant parts of the theoretical framework in the introduction to provide a common analysis frame across conversation foci. I have also introduced other literature on conversations addressing problems of practice to elucidate the key themes identified in these very detailed but specific studies.

Successful relationships engage multiple views

Navigating relationships among groups, particularly cross-disciplinary groups, is particularly challenging. Different players may view the nature of knowledge and how to learn it very differently (Grossman et al., 2001). In these situations, challenge without mutual understanding may indicate a lack of trust in one another's definition of what constitutes important work. In order for the conversation to be productive, these differences need to be acknowledged and understanding deepened through engagement that respects the differing views of the participants.

Both groups in the Horn and Little (2010) studies described their relationships as supportive of one another. However, the ways in which they showed respect and challenge differed. The more successful group showed respect by engaging the teacher's view about the problem and including her views in its resolution. At the same time, they were not reticent about expressing their own views, but did so in ways that were expressed as possibilities and points for discussion, rather than a definitive answer. The less successful group failed to do this but rather prescribed a solution.

Expertise in content and leadership of the process

Both the studies reviewed above (Horn & Little, 2010; Grossman et al., 2001) highlighted the importance of expertise and leadership of the process to deepen the discussion and make progress on the tasks. To move conversational norms from polite generalities, through the stages of snide comments and eye-rolling, to deep engagement, Grossman et al. found that leaders needed high levels of skill to navigate the differing views and personal interactions. It turned out that those who were able to do this task were not necessarily the formal leaders holding a leadership position, but sometimes included teachers. In the studies by Horn and Little, the more successful leaders actively sought to create an ethos of professional learning and took a visible role in promoting it. The less successful interactions were a distributed leadership model in which teachers led different areas, became the authority on those areas, and taught their colleagues in a "show and tell" approach.

The study by Grossman et al. (2001) highlighted the dual expertise required of leaders in their situation. The collective leadership required high levels of expertise in both the subject content and in navigating the social interactions across disciplines. This expertise grew over time with more successful outcomes resulting.

This theme is evident in other studies of conversations in professional communities that did not meet the criteria for detailed analysis. For example, in a study of a video club where teachers analysed video clips of each other's mathematics lessons (Sherin & Han, 2004), the discussion, facilitated by a researcher, deepened over time to focus on complex issues related to student concepts of mathematics. Stevens and Kahne (2006), in their study of professional communities and instructional improvement in Chicago, found that teachers were typically supportive of one another, but required deliberate leadership intervention to shift their focus to one more sustained on teacher development.

Developing this kind of expertise is neither easy nor quick. In a study by Langdon (2014), 13 mentors of beginning teachers analysed their own transcripts according to theoretically-informed criteria to promote learning. While all mentors increased their cognitive awareness, those who analysed between eight and eleven conversations showed greater shifts in practice and more congruence between their goals and their practice than those who analysed fewer than eight. The former group gave greater attention to non-affective domains, showed less knowledge transmission and more engagement with the teachers' theories.

Learning processes that normalise problems in teaching practice

In the Little and Horn (Horn & Little, 2010; Little & Horn, 2007) studies, the two groups followed established patterns that led to different processes and outcomes. By normalising the problem in terms of teaching practices in the algebra group, the conversation opened up further possibilities for problem investigation and gave the teacher concerned agency in addressing it. She was able to answer the three questions central to self-regulated learning, "Where am I going?", "How am I going?" and "Where to next?" (Hattie & Timperley, 2007). In contrast, by telling the teacher in the literacy group how she should overcome her problem, she became the passive recipient of others' opinions. She remained unconvinced.

In another detailed study of professional conversations by Little and Curry (2008), the teachers found protocols were useful in guiding conversations about problems of practice, but at the same time constrained the depth of problem solutions. Protocols act as an affordance when they provide a scaffold to deepen conversations and the associated inquiry and development of shared meanings. They act as a constraint when they lead teachers to focus on the task (e.g. completing a form, finishing the protocol) rather than having more meaningful discussions (Datnow et al., 2013; Little & Curry, 2008).

Developing knowledge by making pedagogical reasoning transparent

The knowledge resources brought to the two groups in the Little and Horn (2007) studies were very different. The more successful group made their pedagogical reasoning transparent as they discussed how the specifics of the teacher's problem and its possible resolution linked to more general principles of teaching and learning, thus developing deep transferrable knowledge. Talk beyond the specifics of the task was absent in the less successful group and has been noted as a difficulty in other conversations in professional communities. For example, Stevens and Kahne (2006), in their study of professional communities in Chicago, identified that a focus on instructional priorities rarely occurred spontaneously.

In the cross disciplinary group, Grossman et al., (2001) found that the teachers took several months to start to negotiate the worth of particular kinds of knowledge. It wasn't until they realised they needed to understand one another's disciplinary base that they were able to engage in a meaningful learning process.

A culture that focuses attributions on teaching/ learning interactions

Unsurprisingly, a culture of factionalism and disrespect was not conducive to developing the new inter-disciplinary curriculum in the Grossman et al (2001) study. In a similar way Coburn (2001), in a reading reform in California, found that teachers migrated to those who thought like them. Those who resented the reform built on each other's disbeliefs about its effectiveness, while others helped their peers to deepen their knowledge. Intervening in these kinds of cultures and dynamics takes skilled leadership.

In the Horn and Little (2010) study, the key attribute of the culture developed by leaders in the successful group was to keep the focus on solving the identified problem in a way that shifted attributions towards interactions between teaching and student learning. In doing so, they developed the teacher's agency in addressing it. The importance of developing this collective focus on student learning was a key finding of two reviews of effective professional communities that had an impact on teaching practice and student outcomes (Little, 2006; Vescio et al., 2008).

Addressing problems when others don't agree

An integral part of the increasing pressure across the globe to improve educational outcomes is the expectation that educational leaders will address persistent teaching and learning problems in ways that progress the issues while at the same time building staff trust and commitment to continued improvement (Bryk & Schneider, 2002; Robinson, Sinnema, & Le Fevre, 2014). This is not an easy task with leaders finding such conversations stressful and frequently ineffective, particularly when the participants hold differing views of the nature of problems, the causes, and possible solutions. Typically, either the relationship suffers or the problems remain unaddressed (Sinnema, Le Fevre, Robinson & Pope, 2013). Resolving these kinds of problems requires skills of negotiation through which the communication between parties with perceived divergent interests reaches agreement. This agreement may relate to work procedures, the interpretation of facts, or some commonly held opinion or belief (Pruitt, 1998).

The main systematic research in education on conversations that achieve these kinds of solutions has been undertaken by Robinson and colleagues on open-to-learning conversations. A group of studies (Le Fevre & Robinson, 2015; Robinson & Le Fevre, 2011; Sinnema, Le Fevre, Robinson & Pope, 2013) identified the difficulties school leaders had in resolving a parent complaint about a teacher or addressing the issues about the teacher's performance related to that complaint. I have used these studies as theoretical background and context, but not described them in detail because they did not report progress or outcomes on resolving these issues. The study described below by Robinson, Sinnema and Le Fevre (2014) was an intervention with South Australian school directors in their attempts to resolve long standing issues. The outcomes included satisfactory relationship outcomes and progress on the problem that was the focus of the conversation.

This study is theoretically underpinned by work in social and organisational psychology on interpersonal effectiveness (Argyris & Schon, 1974), and negotiation and conflict resolution (De Dreu et al., 2007). Robinson et al. (2014) identify two typical approaches to challenging situations in which there is disagreement that have parallels with the "telling / transmission" versus "asking questions". I have noted this dichotomy with respect to the feedback studies described in this area of focus. Robinson et al. refer to them as the 'hard sell' and 'soft sell' approaches (Robinson et al., 2014, p. 262).

In the hard sell approach, "winning is achieved through persuasion in which the leader's views are strongly advocated with little inquiry into the reactions and views of other parties. Anticipated difference or disagreement is managed by ignoring it, repeating or elaborating one's own position, and avoiding inquiry into the other's position" (Robinson et al., 2014, p. 262). This description fits very closely with that of the teachers in the Horn and Little (2010) study and the unsuccessful attempts to solve problems using data in the Schildkamp and Poortman (in press) study.

In the soft sell approach, questions predominate with the questioner rarely expressing his or her own views directly in fear of upsetting others (Le Fevre & Robinson, 2015). This description has parallels with the feedback studies that had limited outcomes in relation to changes in practice or student learning. The work of Robinson et al. (2014) seeks more integrative agreements that involve meeting both parties' needs and integrate both parties' aspirations.

I have given particular attention to this issue because of its recurrence in all the types of conversations discussed so far. Robinson et al. (2014) describe the governing variables of open-to-learning conversations as "respect for self and other, valid information, and internal commitment" (p. 265). The associated action strategies include advocacy, inquiry and problem solving. Advocacy means communicating one's views clearly and honestly, together with the grounds for them, in ways that do not assume their truth. At its essence, views and their grounds are stated in a way that invites checking for the validity of the assumptions underpinning them.

Inquiry is genuine rather than manipulative or loaded and "difference triggers curiosity rather than persuasion" (Robinson et al., 2014, p. 265). Curiosity means respectful probing of the other's thinking. This inquiry process has close parallels to the work of Lai and McNaughton (2008) and Schildkamp and Poortman (in press) described in earlier parts of this review.

Their groups successfully solved problems through the way they used evidence to test a range of hypotheses to find out what was leading to the problem, so they were able to integrate these causes into the solution.

Robinson et al.'s (2014) third strategy for solving problems involves "a genuine search for common ground that enables decisions and resolutions that serve the interests of both parties. The conversation is jointly rather than unilaterally managed". (p. 265). Again this description fits closely with the successful conversations described in other sections of this review. The problem-solving group described in Horn and Little (2010) ensured the teacher's agency by including her views throughout the problem-solving process, with others expressing their views, to come to a resolution.

Robinson et al. (2014) worked with 18 South Australian regional directors and assistant directors (directors) with responsibility for up to 30 schools and preschools in their region. The authors asked each director to identify problems they found to be challenging in their work with school principals and heads of preschools (school leaders), and to audio-record two conversations with their director colleagues who took the role of the school leader. The directors filled in a reflection about these conversations. They then attended three days of workshops on open-to-learning conversations over a three month period. This was followed by real conversations with school leaders involved in the two problems originally selected, as well as an additional three problems where possible. Directors and school leaders filled in online surveys rating their skills and outcomes for these conversations.

Prior to the workshops, the directors' average self-rating was two on a five-point scale on open-to-learning behaviours. They saw themselves as being more effective in advocacy of their own point of view than in inquiry into others' viewpoints, which is consistent with a "telling / transmission" approach to solving problems. Their problem-solving effectiveness ratings were also low, which is not surprising given their problems were self-identified as challenging and long-standing.

In this early stage, strong advocacy without testing assumptions was evident in Director 13's conversation with a kindergarten principal (played by Kerry). The director "began by reminding the kindergarten principal of the region's priorities to focus on the link between instructional leaders, improved pedagogy, and increased student achievement" (Robinson et al., 2014, p. 277). The director then expressed her concern about her instructional leadership.

> D13: *… No, from the feedback, the written feedback that I've given you, you would know the area that I've wanted to follow up with you. And look, it might be because my questioning techniques are not right. It could be that I lack clarity of purpose when I, you know, in the conversations we've had, but I'm just not getting a clear sense of you as an instructional leader, and, or even the student achievement and how pedagogy has improved over the two years that we've been working together. So …*
>
> Kerry: *You really just have to look around the centre, [D13], I think you can see that when you're here. The kids are happy, they're engaged, the teachers are busy, we're just so busy, that's the thing.*
>
> ***(Robinson et al., 2014 pp. 277-278)***

The authors point out that the director acted on the assumptions (without checking with the kindergarten principal) that instructional leadership was desirable and that Kerry was not doing enough of it. The director continued to bring the conversation back to this issue without checking these important assumptions.

Following the intervention, the directors and school leaders rated their real conversations as significantly higher on both the open-to-learning behaviours and the problem-solving outcomes. The largest gains were inquiry into the other person's point of view and testing responses to difference. The greatest improvements in outcomes were on items integrating relationships and progress on solving the identified problem. Typical responses from the directors were that the conversation had been easier or more positive than anticipated; the school leader had been more open and collaborative than expected; and how, by being more open about their own concerns and more respectful of the views of others, they had developed a more trusting relationship. In Director 13's recorded conversation with the kindergarten principal, she began differently and demonstrated careful checking for shared understandings and agreement.

D13: *Thank you very much for coming in. I really appreciate your time. The reason I asked you to come in is because, as you know, as a region we've had a real focus on instructional leadership, and what that means around planning, coordinating evaluating teaching in the curriculum, participating in the PD with teachers, and what I'm not getting is a sense in my view of you as an instructional leader at your site. So I'm just wondering how you're feeling about what I just said.*

Kindergarten principal: *I think that we probably need some clarification around "instructional leadership," [Yeah] what you actually mean by that. Because my understanding of instructional leadership might be different [Yeah] to yours. So...*

D13: *Yeah, and that's a very good point – thank you for that. So when we talk about it at our leaders' days, what [the facilitator] has focused on has been leaders leading the curriculum, leading the learning, making sure the resources are all in place and helping to bring about change in the pedagogy and teaching.*

Kindergarten principal: *Mm-mmm*

D13: *Does that make sense?*

Kindergarten principal: *Yes, that makes sense, yeah.*

D13: *And when we meet, generally, what I've found is that our conversations focus on the nuts and bolts of running a site, particularly in your case where you've got two campuses, and I know you talk a lot about well-being and just the difficulty of operating across two sites. So what I really want to investigate with you today is the notion of you as an instructional leader.*

(Robinson et al., 2014 pp. 279-280)

Enablers and barriers: addressing problems when others don't agree

The enablers and barriers in these situations are similar to those identified above. When the viewpoints of the different participants are openly shared in ways that invite inquiry into their validity with the aim of achieving integrative solutions, better outcomes are achieved. The attributes of particular importance to open-to-learning conversations are highlighted below.

Relationships of respect for own and others' views

After the intervention, relationships focused on mutual respect for one's own and others' views that sought an integrative solution to the problem that served the interests of both parties. These relationships were developed through the conversations and were not a pre-condition.

Processes of inquiry into others' thinking

Processes shifted primarily from a "telling" approach involving persuasion, to one that combined communicating one's views clearly and honestly, together with the grounds for holding them in ways that did not assume their truth. This communication was accompanied by inquiry into the other person's thinking, and seeking solutions that involved a search for common ground that served the interests of both parties.

Knowledge grows from seeking integrated solutions

New knowledge arose from the inquiry processes where each understood the other's view of the problem and sought an integrated solution that supported the relationship and made progress on solving the problem.

Barriers

Initially, the directors' inability to integrate respectful relationships with making progress on solving the problem acted as a barrier. The emphasis was on 'telling' the site-leaders what to do, with the underlying assumption that their advice was based on an accurate diagnosis and an appropriate solution to the problem.

8. Conclusions and recommendations: Enablers and barriers to professional conversations to develop adaptive expertise

In the conclusion, I bring together the themes from the three areas of focus that have been reviewed in detail. These three areas were selected because there was sufficient evidence from which to draw conclusions. They comprised conversations focused on:

- the interpretation and use of evidence
- observation and improvement-oriented feedback
- solving problems and developing new practices.

The analysis of the conversations was framed in terms of the kind of professionalism the conversations were designed to promote. AITSL (2010; 2011) has identified sets of professional standards for teachers and principals that go beyond technical competencies. The standards describe professionals who are focused on the welfare of students and who continue to learn and improve their knowledge and skills. These standards are consistent with the development of adaptive expertise, the essential features of which include:

- being focused on the moral imperative of improving a range of valued outcomes for students
- taking agency for the continued development of their knowledge and skills through self- and co-regulated learning as new evidence comes to light or new students present new challenges
- creating self-awareness in terms of existing assumptions and when they might be helpful or unhelpful, and in this way becoming highly metacognitive.

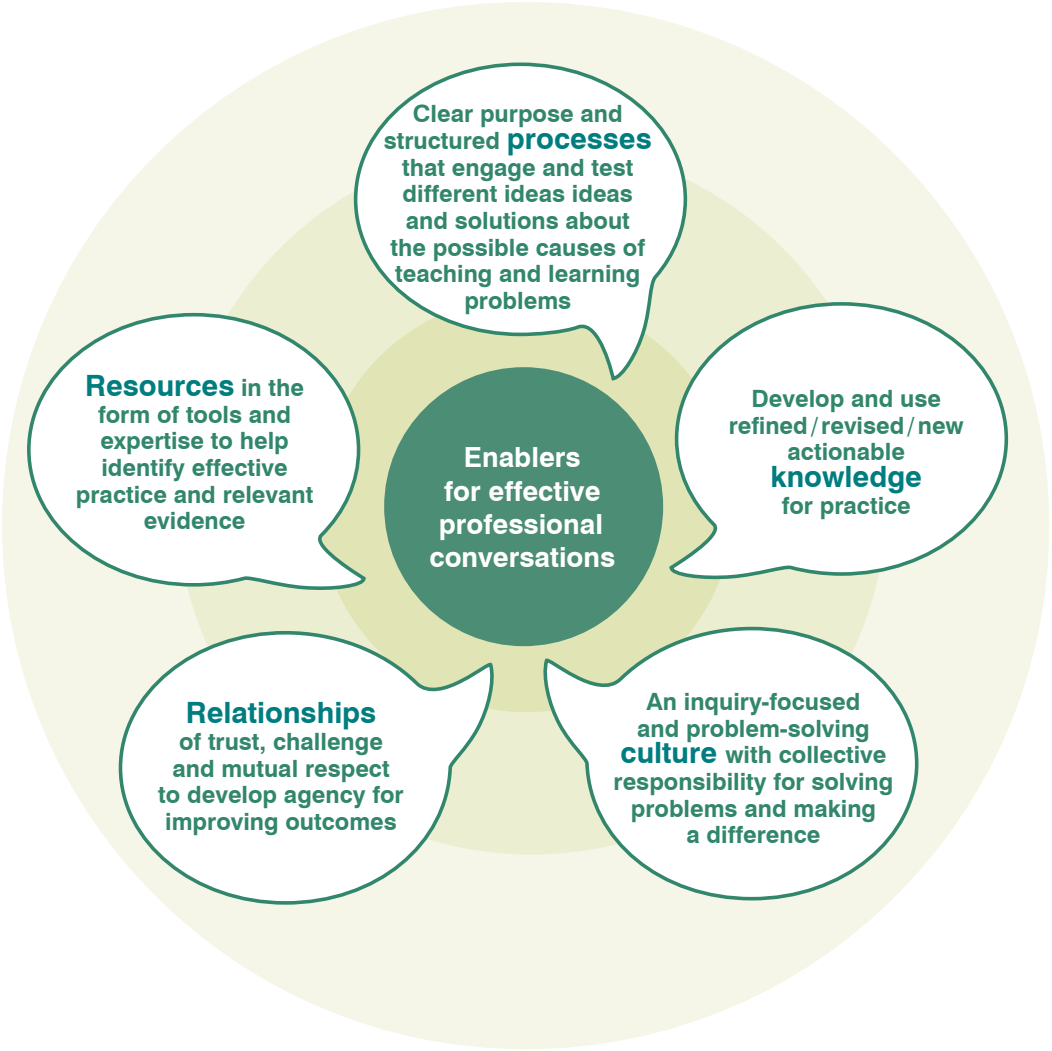
The review's conclusions summarise the important enablers identified from the studies that support teachers to have effective professional conversations. Enablers are those conditions and processes that support education professionals to:

- examine the effectiveness of their practice in relation to its impact on others, particularly students
- be committed to make appropriate changes for improvement.

The conclusions also summarise the important barriers that prevent effective conversations occurring. Barriers are those conditions and processes that either act against such learning occurring or are not sufficiently robust to make it happen.

The enablers are brought together and illustrated in Figure 1. Although they are identified as separate conditions and processes, they inevitably intersect with each one influencing the others. Neither does any particular condition or process occur in any particular order because change in one immediately and inevitably impacts on some or all of the others.

A large selection of literature has been drawn on in the identification of these enablers and barriers. This literature is carefully and extensively referenced in the body of this review and to reference each point here would reduce the readability of these conclusions. In addition, at times I have interpreted the evidence presented in particular papers differently from the original authors because my interpretation has been shaped by the specific purposes of this review. For this reason, I have decided not to reference individual points in these conclusions. At the same time, I wish to acknowledge those authors who have provided me with new insights as a result of their detailed work, challenged a great deal of my initial thinking, and contributed to the robustness of these conclusions.



Context

Context forms the wallpaper for all the other conditions and processes and serves to shape the professional conversations but at the same time is shaped by them.

Contexts include national, jurisdictional, sector, region and school contexts, as well as the professional learning context in which the conversations are situated.

Figure 1. Enablers for effective professional conversations

Summary of the key enablers for effective professional conversations

The following section summarises the literature review's findings and conclusions about the key enablers for effective professional conversations that emerged from the studies examined in this review. The enablers are divided into the categories outlined earlier in the theoretical framing section: context, relationships, resources, processes, knowledge, and culture. Each category focuses mainly on the enablers for effective professional conversations and improvement-focused feedback, with reference also given to the barriers to these.

Contexts

Contexts include national, jurisdictional, sectoral, regional and school contexts, as well as the professional learning context in which the conversations are situated. Context forms the wallpaper for the other enablers and both shapes and is shaped *by* the professional conversations.

The review found that enabling contexts are those that place high expectations on participants to improve and solve problems, and provide the support to do so. The different contexts build on, rather than interfere with, one another.

It was also found that some contexts prevent effective conversations among teachers. These contextual barriers include high accountability without support, or little accountability with few or vague expectations to improve. Another barrier develops when there is simply too much going on, particularly in situations of stress where things are not working for the professionals or the students they serve.

Relationships

Navigating the relational space among professionals trying to create new realities is not an easy task. Professional conversations usually take place within existing relationships, but the process of the conversations themselves develops particular kinds of relationships.

The review found that enabling relationships are those that integrate trust, openness, challenge and mutual respect in ways that develop the agency of the participants to improve and change outcomes. Agency implies commitment and a belief that it is within either an individual's or a group's capacity to make a difference. The development of agency is central to adaptive expertise. Clarity of purpose for the conversations and shared understanding of the roles people have within them contribute to trust and mutual respect.

Clearly, relationships of threat, blame and suspicion are a barrier to learning and the development of agency, and are the antithesis of adaptive expertise. The review found that conversations characterised by these negative relationships were more likely to result in compliance and superficial change in teacher practice at best. Concerns from teachers about confidentiality rose when trust was low. At the same time, the review found that when teachers prioritised supporting each other over challenging the status quo, there was very little evidence of them changing their classroom practice.

Resources

Resources in the form of tools and expertise are often in the background of descriptions of conversations, but they play an essential function in shaping the conversations. In most of the conversations analysed in this review, the participants interacted with a variety of tools. One of the most powerful was evidence of student learning, particularly when it was linked to evidence of teaching practice. Other tools described aspects of effective practice or research readings in a relevant domain.

A second resource took the form of expertise about both the content of the conversation (e.g. how to interpret evidence, the pedagogical strategies that promote reading comprehension) and the process of the conversation itself (e.g. how to express competing views in ways that are respectful of all participants). Sometimes this expertise was provided by school leaders. At other times, it was provided by external experts. The important issue is not who provides the expertise, but whether it is available to the participants.

The review found that the lack of resources or expertise beyond an individual's personal beliefs acted as barriers to effective professional conversations. Some conversations focused on clarifying teachers' thinking. However, there was little evidence that this was sufficient to result in changes in teacher practice towards those more widely recognised as effective. Nor was it sufficient to improve outcomes for students. Other resources reported as constraining conversations were highly prescribed protocols for practice based on technical assumptions about teaching, but none of these were evident in the conversations analysed.

Processes

Most often, conversations are framed in terms of processes, and these are clearly central to promoting adaptive expertise and learning. The review found enabling processes were those that made the purpose for the conversation explicit. The processes were structured but sufficiently flexible for the participants to express, engage and test different ideas or theories about what was causing what and possible ways forward. Whether the conversation involved analysing a teacher's practice, planning a new curriculum, or resolving differences, a range of ideas and theories were brought to the table for testing. Engaging theories means treating all views as possible hypotheses, undertaking deep inquiry to test their validity, and collecting relevant evidence to come to a warranted conclusion about appropriate action.

The solutions were integrative in the sense of searching for common ground that served collective interests, particularly those of students. The review found that these processes took time and developed over many conversations. They resolved the dichotomy between 'asking questions' and 'transmission' or 'telling' that was an underlying assumption in many of the reviewed studies for which there was less evidence of effectiveness in changing practice.

Another key enabling process was having a clear purpose for the conversation and setting and working towards particular goals related to that purpose. To make a difference for students, the purpose and related professional goals needed to refer to challenges faced by students, and to changes to be made by leaders and teachers to meet these challenges. In these situations, the professionals were able to answer individually and collectively the following questions in relation to themselves and their students: "Where are we going?", "How are we going?" and "Where to next?"

The review found that in some situations protocols were used to guide the conversations. These protocols were enabling when they provided guidance to attend to important aspects of a situation (e.g. student learning) but could also be constraining, particularly when completing the protocol became the task instead of the professional learning.

The review found no evidence that telling teachers what to do made much of a difference. This process of "telling" fails to respect or engage the teachers' ideas in a co-constructed process.

There was little evidence that processes which focused on asking neutral questions, or which excluded the questioner's beliefs or reasons for asking the questions, made a difference beyond providing an opportunity for teachers to clarify their thinking. This approach did not appear to bring sufficient resources to the conversation to make a difference to practice, although it needs to be noted that the teachers reported enjoying the experience in studies taking this approach.

Another frequently mentioned barrier was lack of time. Sufficient time is clearly a necessary condition for effective conversations. However, it needs to be accompanied by other enabling conditions and processes so that the time is used in such a way that it facilitates the learning needed for teachers to develop adaptive expertise.

Knowledge

Unless the conversation participants refine or revise their existing knowledge, or understand something in new ways, their classroom practice is unlikely to change. The review found enabling conditions that created new knowledge were typically a mix of context-specific personal theories of the participants, together with more formal theories based on relevant research, as identified in Figure 2 (below). The emphasis was on actionable knowledge, or knowledge of practice, because it needed to be directly applicable to the participants' practice contexts to make a difference. While knowledge can be seen as an outcome of the conversation, it is also a resource brought to it as those involved come to see things in different ways. Knowledge and processes interact throughout any conversation.

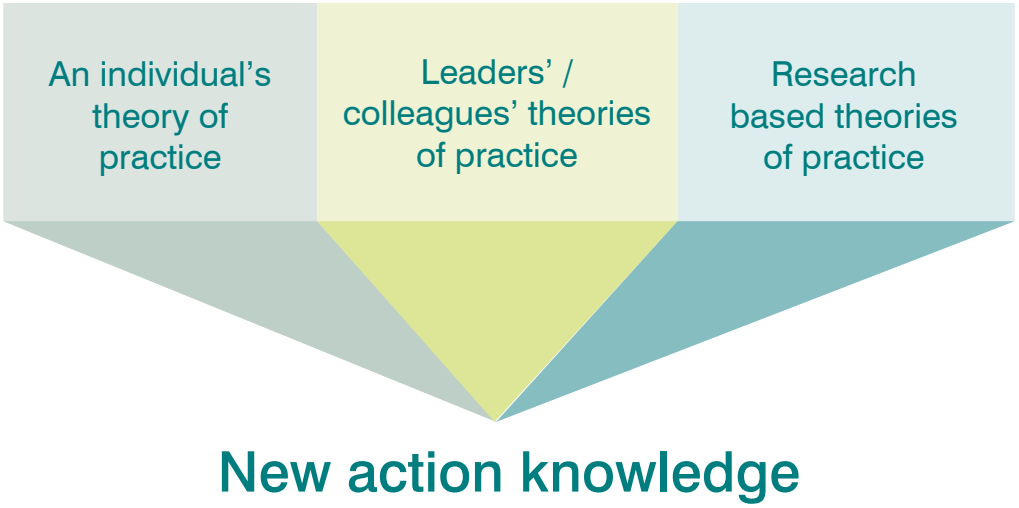


Figure 2. The Integration of Theories of Practice to Develop New Knowledge or Refine Existing Knowledge

Culture

An inquiry-focused and problem-solving culture committed to achieving particular outcomes was both an enabler of effective conversations and a product of conversations as they developed over time. The review found that in the most effective conversations, collective responsibility for solving problems to achieve particular outcomes was evident across multiple conversations.

An important attribute of a positive culture involved teachers focusing on teacher practice to determine the cause of a particular student-related problem. This enabled teachers and leaders to shift their focus from external factors about students or their families and to look internally and frame causes in terms of their own actions or interactions with others. For teachers, this typically meant examining their interactions with students and how they promoted learning. For leaders, this meant examining their contribution to difficult situations, particularly how they interacted with others, instead of assuming other people were the problem. It was not a shift in blame, but a shift in responsibility. By changing attributions, the conversations created agency to make progress towards particular outcomes.

Barriers typically included different participants pursing different outcomes that were often unstated in the conversation (but talked about elsewhere), and ongoing references to external causes of student problems which removed the agency of the professionals in making a difference.

9. Future research directions

A recurrent theme in many of the studies reviewed is the paucity of high quality and detailed research on professional conversations or their outcomes. In each of the three focus areas analysed for this review, the authors of different studies commented on the limitations of current research. For example, Coburn and Turner (2011) observe that few studies of data use by teachers connect process to outcomes in either teacher practice or student learning. Cornett & Knight (2009) sum up the state of much of the research on coaching in the following way: "In truth, to say that, 'research shows that coaching works' is a bit like saying 'research shows that teaching works'" (p. 193). Similar comments are made about the quality of the research into teachers working together to solve problems and develop new practices in professional communities. In this focus area, Little and Horn (2007) note that conversations in professional communities are rarely researched systematically. Vescio et al. (2007) similarly contend that evidence about the impact of conversations in professional communities is limited.

Given the importance of conversations and improvement-focused feedback in promoting professional learning, there is an urgent need to improve the quality of the research in this area. Considerable resources in both Australia and internationally are committed to promoting high quality professional conversations, often with a very limited research base to support them. A focus on process in the absence of outcomes is not sufficient to develop a nuanced understanding of the kinds of conversations that change professional beliefs and practices or student learning. A focus on outcomes in the absence of process in not sufficient to identify the kinds of processes that really make a difference.

Making connections between processes and outcomes requires rigorous research to be undertaken over time. The high impact studies identified in this review all involved the development of professional conversations over one or two years. They were not one-off events and usually involved someone with expertise working alongside the professional participants in an intervention role.

An improvement science approach (Bryk, 2015), the process of determining which improvement strategies work, allows researchers to work alongside professionals as they collaboratively study in detailed and rigorous ways how particular conversations impact on different intermediate and long term outcomes. The involvement of professionals means evidence is collected in real situations and interpreted with those participating in the conversations as they solve problems, improve practice and make a difference to student outcomes. The involvement of researchers helps to identify underlying and generalisable theoretical principles as they study and work alongside those learning to improve and to test the effectiveness of their efforts.

For example, a potential research study could focus on how leaders and teachers learn to use evidence of student learning in their conversations to identify the impact of their practice and the changes they need to make to improve student outcomes. The theoretical framing for such a study could start with the five enablers identified in Figure 1 with questions framed in terms of:

- the resources needed to support the conversation
- the relationships that develop agency for improving outcomes
- the purposes and processes that engage and test different ideas about possible causes and the way forward
- the ways in which new actionable knowledge is developed
- the ways in which an inquiry-focused problem-solving culture is achieved.

Such research would lead to the refinement and further development of the contributors and processes involved in effective conversations than has been possible from the research cited in this review.

An alternative approach could take the form of an experimental design. For example, there is greater advocacy for coaching than evidence to support the identification of either effective conversational processes or outcomes for different coaching models. Different training designs could be provided to different groups of professionals who are otherwise similar and work in similar contexts. Testing the impact of the conversations on a range of outcomes would help to ascertain if the outcomes claimed actually eventuate. Such outcomes might include teacher practice, agency and meta-cognition, together with students' social-emotional well-being and academic progress. A mixed methods design would involve a qualitative analysis of the conversations and quantification of intermediate and longer term outcomes to identify the differential impact of peer coaching, reflective or cognitive coaching, and practice analysis conversations.

Smaller scale studies could focus primarily on one of the dimensions identified in Figure 1 and further unpack what is required to make a difference. For example, what combinations of resources in the form of tools and expertise lead to productive conversations with positive outcomes? How can professionals work together to engage and test different ideas about possible causes underlying particular situations and how can these processes lead to productive ways forward?

In any approach a high quality research base requires clear theoretical framing for the empirical work, a detailed analysis of the conversations themselves, and robust evidence of outcomes. All this research needs to be underpinned by a vision of professionalism that the conversations seek to promote.

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