State Government Victoria
Department of Education and Early Childhood Development

Using student assessment for professional learning:

focusing on students' outcomes to identify teachers' needs

Paper No. 21 May 2011

About the author

Helen Timperley is Professor of Education at The University of Auckland in New Zealand. Her early career involved teaching in early childhood, primary and secondary education sectors. This experience formed the basis of a research career focused on making a difference to those student outcomes valued by the communities in which they live. A particular research emphasis has been on promoting leadership, organisational and professional learning in ways that improve the educational experience of students currently underachieving in our education systems.

She has recently completed a best evidence synthesis iteration on professional learning and development that has received major international attention. She has published widely in international academic journals such as *Review of Educational Research*, *Journal of Educational Change*, *Leadership and Policy in Schools* and the *Journal of Curriculum Studies*. She has written four books focusing on the professional practice implications of her research in her specialty areas and is currently writing one on school reform. Her services to the education community were recognised in 2010 when she was made a Companion to the New Zealand Order of Merit.

Professor Timperley developed this think-piece based on her research from the best evidence synthesis iteration on professional learning and development. This research was funded by the New Zealand Ministry of Education. Professor Timperley acknowledges the ongoing support of the New Zealand Ministry while at the same time acknowledging that the views expressed are not necessarily those of the Ministry. She also wishes to acknowledge the contribution of Learning Media Ltd who provided such high quality professional development, her colleague Associate Professor Judy Parr and the schools involved in the project.

Published by Education Policy and Research Division
Office for Policy, Research and Innovation
Department of Education and Early Childhood Development
Melbourne
May 2011

Authorised by the Department of Education and Early Childhood Development,
2 Treasury Place, East Melbourne, Victoria, 3002.

For more information contact:
Research Manager
Email: research@edumail.vic.gov.au

ISBN 978-0-7594-0655-1

Contents

Foreword

The *Melbourne Declaration on Educational Goals for Young Australians* (MCEETYA, 2008) has two clear goals:

- Australian schooling promotes equity and excellence.
- All young Australians become successful learners, confident and creative individuals, and active and informed citizens.

How do we know that young people are progressing towards these goals, and what we should do to assist them? Assessment is the ongoing process of gathering, analysing and reflecting on evidence to make informed and consistent judgments to improve future learning and development (Department of Education and Early Childhood Development, 2009b).

The Department of Education and Early Childhood Development (DEECD) recognises the important role of assessment in working towards the best outcomes for every child and young person. DEECD supports capacity building in the area of assessment literacy across all levels of the system. This includes supporting and developing teachers to use assessment in ways that lead to improved learning and development outcomes.

All those involved in designing and supporting learning and teaching have a role to play in assessment. In Victoria, the e[5] instructional model, particularly the 'evaluate' domain, asks teachers to support students to continually improve their work using assessment criteria, collection of evidence, and feedback on performance. To improve teaching practice, school leaders and coaches work with teachers and many professional development opportunities are provided: on the job, through regional networks and externally.

Professor Helen Timperley, of The University of Auckland, has conducted extensive research and professional development with teachers in New Zealand and Australia. Her work in professional development for teachers is grounded in students' needs identified through assessment. Using observations of practice and professional conversations, she has worked with teachers to improve their practice specifically in order to improve their students' learning outcomes. In this paper, she describes a model developed from this work that can be used to guide professional learning for better teaching. The evidence for this model comes from two main sources: a synthesis of the international research on approaches to professional learning that make a difference for students and a research and development project associated with high effect sizes for student learning.

This publication provides principals and teachers with a coherent way of identifying specific professional learning needs based on current research. It will also contribute to discussions about the future directions for assessment. I trust you will find it both informative and useful.

Chris Wardlaw
Deputy Secretary
Office for Policy, Research and Innovation

Introduction

Teachers [need] to move from perceiving assessment information as something separate from teaching and learning processes to seeing the information as an integral part of it for both themselves and their students.

A major challenge for policy makers is to influence the quality of classroom teaching and learning where there is strong evidence for the effectiveness of particular practices. There is consistent evidence, for example, that the introduction of assessment 'for' and 'as' learning leads to improvements in student motivation and engagement with large effects for student learning and achievement (e.g. Stiggins, 2002). Yet globally, adoption of its deeper principles into classroom teaching and learning remains elusive (Earl, 2009). This is not unusual as Cuban described 15 years ago:

> 'Hurricane winds sweep across the sea tossing up twenty foot waves; a fathom below the surface turbulent waters swirl, while on the ocean floor [of the classroom] there is unruffled calm' (Cuban, 1984).

Assessment 'of' learning usually happens at the end of a cycle of learning for summative purposes. Assessment 'for' learning usually refers to integrating assessment information into the teaching and learning process. Assessment 'as' learning has a stronger emphasis on students becoming adaptable and independent learners. Assessment 'as' and 'for' learning are sometimes referred to more generically as 'formative' assessment.[1]

In the case of assessment 'for' and 'as' learning, considerable shifts in teachers' beliefs, knowledge and practices are needed. Effective implementation requires teachers to move from perceiving assessment information as something separate from teaching and learning processes to seeing the information as an integral part of it for both themselves and their students. It also requires leaders to have the same understandings and to be prepared to support and challenge the teachers to enact these practices in their classrooms.

There is also good evidence that when these kinds of shifts in teacher beliefs and practices are implemented, the principles of assessment 'as' and 'for' learning are as applicable to leader and teacher professional learning as they are to student learning. Through a process of identifying their own professional learning needs based on an analysis of those for their students, and taking control of setting goals and monitoring progress towards them, leaders and teachers also become more motivated, with concomitant improvements in their own and their students' learning. The evidence for the power of this formative assessment for the professionals in schools comes from a synthesis of the international research on approaches to professional learning and development associated with high effect sizes on a range of measures of student learning and wellbeing, explained below (Timperley, Wilson, Barrar & Fung, 2008).

1 For further information see DEECD website: http://www.education.vic.gov.au/studentlearning/assessment/preptoyear10/research/

Purpose of the paper

The purpose of this paper is to describe how the principles and practices of assessment 'as' and 'for' learning, or more generically known as 'formative assessment', can be applied to professional learning. Through the application of these principles, implementation of teaching and learning practices improve resulting in better student outcomes.

The first section of this paper describes a cycle of inquiry and knowledge-building derived from the evidence in the synthesis of the research on teacher professional learning and development (explained further in Box 1 below). The focus of this section is on teachers. Examples will be drawn from the *Literacy Professional Development Project* (LPDP), 2004 – 09, that was based on formative assessment principles for both students and their teachers and has achieved consistently high gains in student literacy learning across three cohorts of more than 300 schools in total (explained further in Box 2 below).

Parallels will be drawn between using formative assessment principles for student learning and for professional learning. There is, however, potential for confusion given the same principles are being applied to two different groups. To assist in clarifying these distinctions, I will use 'formative assessment for student learning' when referring to students and 'formative assessment for professional learning' when referring to teachers.

The synthesis of the research evidence on which the formative approach to professional learning was based applies to a wide range of areas beyond student learning. The professional learning approach is based on the research that learning to improve practice in ways that make a difference to students involves developing an evidence-based inquiry frame of mind. This involves developing the ability to know when one's practice is ineffective and being able to do something about it (McDowall, Cameron, Dingle, Gilmore & MacGibbon, 2007). This is relevant to any systemic changes in teaching and learning practice.

Teachers, on their own, cannot achieve the kinds of deep changes in mindsets and practices required for successful implementation of initiatives such as formative assessment for student learning. The social contexts in which teachers practises become an integral part of teachers' opportunities to learn and what is learned. In a recent synthesis of the literature on school leadership, Robinson and colleagues (2008) identified that the dimension of leadership practice associated with the highest effect sizes for students was their promotion of and participation in teacher professional development.[2] How leaders can engage in this task most effectively within their schools and what they as leaders need to learn is discussed in the second section of the paper.

2 Effect size is a measure of the strength of the relationship between two variables.

The final section of this paper more directly addresses key questions for policy makers who wish to create change through professional learning and development. Policy makers are typically caught in a dilemma. If policy goals are to be realised, changes in teaching and learning practice need to happen. But teacher professional learning and development as a policy intervention for the purpose of creating these changes has often not realised its potential. Hanushek (2005), for example, while highlighting the importance of teacher quality, rejected in-service teacher education as the key policy lever, because 'despite some success in general they (professional development programs) have been disappointing'. This paper is designed to address this very issue.

The evidence base

The research underpinning the cycle of inquiry and knowledge-building (discussed in the first section of this paper) is outlined below.

Teacher Professional Learning and Development: Best Evidence Synthesis Iteration

The cycle of inquiry and knowledge-building was derived from research undertaken by Professor Helen Timperley and others from the University of Auckland in the *Teacher Professional Learning and Development: Best Evidence Synthesis Iteration [BES]*. This research was commissioned by the Ministry of Education, New Zealand and involved analysis of 97 studies of professional development that led to improved outcomes for the students of the participating teachers. Most studies came from the United States, New Zealand, the Netherlands, the United Kingdom, Canada, and Israel. The selected studies were mapped onto a theoretical framework to identify what works, for whom, and under what circumstances.

The synthesis found that opportunities for teachers to engage in professional learning and development can have a substantial impact on student learning. The research examined what is known to be effective in impacting on student outcomes. It found that models of professional development that focus on one-off activities, with external experts presenting prescribed practices to teachers have limited impact on student outcomes.

The synthesis identified a number of elements in professional learning and development that are important to achieving gains in student learning. These elements are interactive and include: grounding learning in the immediate problems of practice, deepening relevant pedagogical content and assessment knowledge, and engaging existing theories of practice on which to base on ongoing inquiry process. From these elements, a cycle of inquiry was developed, where teachers collectively and individually identify important issues, become the drivers for acquiring the knowledge they need to solve them, monitor the impact of their actions, and adjust their practice accordingly.

(Timperley et al., 2008)

From these elements, a cycle of inquiry was developed, where teachers collectively and individually identify important issues, become the drivers for acquiring the knowledge they need to solve them, monitor the impact of their actions, and adjust their practice accordingly.

The Literacy Professional Development Project – gains in student achievement

The *Literacy Professional Development Project* (LPDP) has achieved consistent gains in student learning. In this project, schools were provided with an evidence-based professional development program that aimed to improve student learning and achievement in literacy. It provided staff from over 300 schools with onsite literacy professional development running over two years. The project involved professional learning communities comprised of school staff (including leaders), external facilitators who coach school staff, and a national team of regional leaders, project directors, and project researchers. The project also conducted its own ongoing inquiry into the project's effectiveness, using data collected and discussed with the team.

The LPDP used an integrated theory of action and improvement, based on the theory that learning to improve practice involves developing an evidence-based inquiry habit of mind. The project included three phases that schools moved through at varying rates: phase 1 involved an inquiry into learning, phase 2 involved building knowledge and implementing change through active learning, and phase 3 included evaluating and sustaining change.

The project collected evidence of progress through a number of tools:

- *student achievement was monitored through the use of various assessment tools*
- *staff content knowledge and pedagogy was obtained from staff ratings to scenarios and classroom observations, and*
- *evidence of effectively-led professional learning communities was obtained from observations of school meetings, school leadership interviews and practitioner questionnaires.*

Substantive shifts in profiles of student achievement for each of the three cohorts have been a hallmark of the LPDP. In writing, the gains, on average, have been 2.5 to 3.2 times the expected rate over the two years schools were involved in the project. In reading, the gains, on average, have been between 1.5 and 1.9 times the expected rate. The gains were greatest for the students in the lowest 20% of the achievement band at the beginning of the project. For these students, gains in writing have been five to six times the expected rate and gains in reading more than three times the expected rate of progress in the third cohort. Moreover, a follow-up study of a sample of schools in the first cohort found that fourteen of the sixteen participating schools either maintained the rate of gain or exceeded it with new groups of students.

An evaluation of the LPDP was conducted in 2007 and it found positive results in gains in student achievement in participating schools. It also found that the inquiry approach adopted by the project team resulted in changes to improve the quality and focus of its work overall.

(Timperley et al., 2010; McDowall et al., 2007)

Cycles of inquiry and knowledge-building for teacher professional learning

For any learner, whether teacher or student, the effectiveness of any formative assessment process depends on the learner being able to answer three questions,

- Where am I going?
- How am I doing?
- Where to next?

From the synthesis of the evidence, Timperley and colleagues (2008) identified a cycle of inquiry and systematic building of teacher knowledge in ways that lead to more effective teaching practice. Assessment information is central to the cycle and includes both assessment of student learning and the effectiveness of their own teaching practice.

For any learner, whether teacher or student, the effectiveness of any formative assessment process depends on the learner being able to answer three questions, 'Where am I going?', 'How am I doing?' and 'Where to next?' (Hattie & Timperley, 2007). The first question relating to where the learner is going allows him/her to understand the goals or purposes of their learning, thus giving direction to their efforts. Given teachers' responsibility for student learning, they need to be able to answer this question both for their students in relation to curriculum goals, and for themselves in terms of effective teaching practices.

Seeking and receiving information about 'How am I doing' allows the learner to assess the kinds of gaps between their learning goals and their current levels of understanding and performance. They can also assess how effective their current efforts have been in achieving the goals. As in the first question, for teachers a parallel process involves thinking about this second question for both their students and themselves. For students, the question relates to the gaps between what students currently know, and what they need to learn and do to reach their learning goals. For the teachers, the question relates to the effectiveness of their current teaching practices in meeting the needs of all their students.

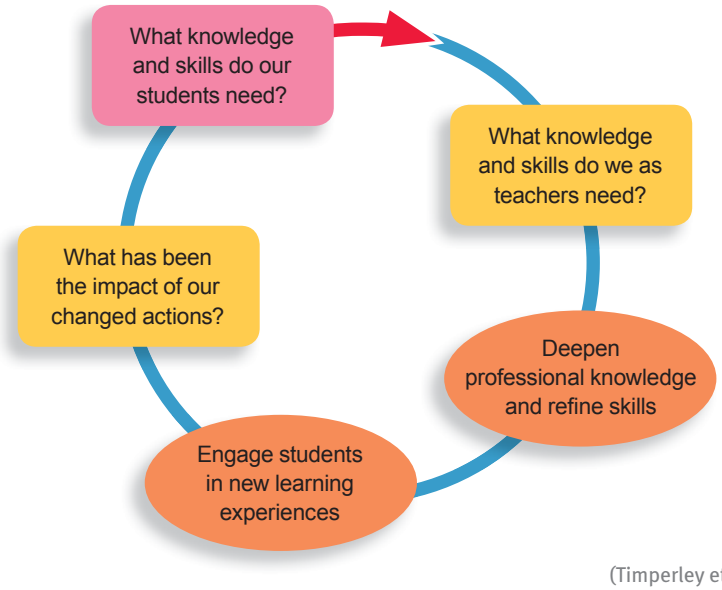
Information about 'Where to next' allows learners to identify where to direct their attention and learning efforts in order to achieve their learning goals. Students need to know very specifically what they can do to make progress. Teachers need to know how to address issues related to their students' progress through identifying specific foci for their own professional learning. Teacher knowledge of students and how to teach them is systematically developed through the process of answering the three questions for their students and themselves.

Engagement in these cycles of inquiry and knowledge-building can occur on a day-by-day basis using informal assessment information from students, and through longer term cycles when more formally analysed data on student learning are used.

Teacher inquiry and knowledge-building cycle

The framework applying these questions to cycles of inquiry and systematic knowledge-building for teacher professional learning and development is presented in Figure 1.

Figure 1: Teacher inquiry and knowledge-building cycle to promote valued student outcomes



(Timperley et al., 2008)

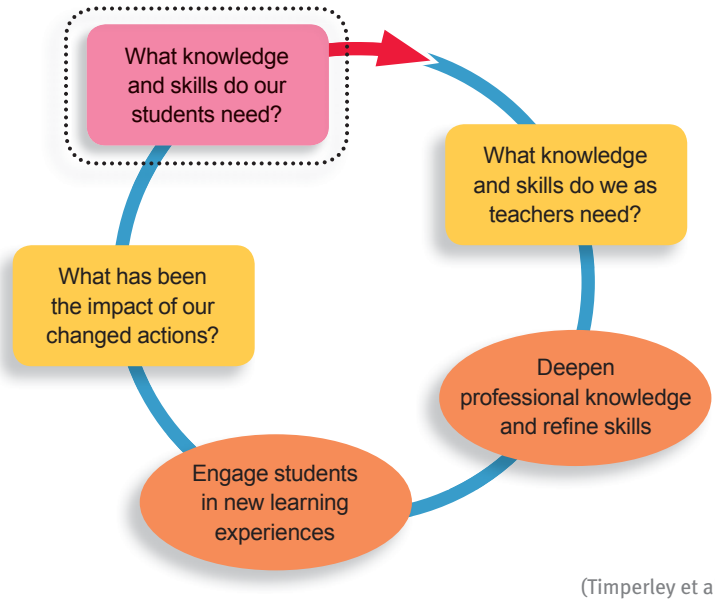
The cycle begins with identifying the knowledge and skills students need, given where they are currently at and what is expected of them. At the same time, teachers identify what they need to learn and do to improve the learning of their students. Through this identification process their engagement in professional learning is driven by an understanding of what it is they need to learn and do if their students are to make progress.

The next dimension of the cycle involves engaging students in new learning experiences as a result of the professional learning because without changes in teaching and learning practices, outcomes will change little. Information about practices forms the basis for interpreting the final dimension of the cycle that asks about the impact of changed practices on the original student learning goals. Further cycles of inquiry and knowledge-building are then engaged with the next focus depending on the impact of the original focus. Typically, a more focused inquiry takes place as information about student learning is unpacked to determine who is benefitting and who is not from the changes occurring as a result of engagement in the previous cycle of inquiry.

Engagement in these cycles of inquiry and knowledge-building can occur on a day-by-day basis using informal assessment information from students, and through longer term cycles when more formally analysed data on student learning are used. Initially, engagement in this kind of evidence-informed inquiry requires high levels of support, because few of us are able to identify what we do not know, and thus, what we need to learn. In the remainder of this paper, each of these dimensions will be described in turn with illustrations provided from actual cases.

Dimension 1: finding out about students' knowledge and skills

Figure 2: Teacher inquiry and knowledge-building cycle to promote valued student outcomes



(Timperley et al., 2008)

The cycle begins by identifying the knowledge and skills students need to close the gaps between what they know and can do, and what they need to know and do to satisfy the requirements of the curriculum, the standards or other outcomes valued by the community in which students live and learn. Key questions comprise:

- What do they already know?
- What sources of evidence have been used?
- What do they need to learn and do?
- How do we build on what they know?

The cycle begins by identifying the knowledge and skills students need ...

Sources of evidence

To answer these questions, it is important that the measures used meet the kinds of requirements outlined in *Current perspectives on assessment* (DEECD, 2005). These requirements include authenticity (contextualised, using skills in context), multiple measures and high levels of comprehension. The focus of this stage of the inquiry should be specific to a particular area with the assessment information providing sufficient diagnostic information for teachers to develop a detailed understanding of their students' profiles. For example, if the focus is on writing, then it could be expected that the assessment information would provide profiles of student achievement on both surface features of spelling, punctuation and grammar; and deeper features of structure, vocabulary, content and audience.

Possible sources of formal evidence:

- overall teacher judgment on Victorian Essential Learning Standards (VELS)
- NAPLAN data
- surveys of student engagement.

Possible sources of informal evidence:

- interviewing students about how they understand their learning
- analysing student work.

The evidence might come from both formal and informal sources but if student learning is the focus, it must relate to the curriculum so teachers can answer the questions 'What do students already know?' and 'What do they need to learn and do?'

Informal evidence collected by teachers as they observe students and mark their work can be just as powerful in this process as formal assessments. What is most important is that teachers know they are collecting it to identify their own professional learning needs. To do so, the analysis needs to look closely at profiles in specific curriculum areas across all students, and profiles of specific groups of students. For example, on average, writing might not seem to be an area of need in a school. On closer inspection, the middle and high achieving students might be doing well on sampled writing tasks, but the lower achieving 20% might not be making much progress on the deeper features. For these students, spelling and punctuation might be at expected levels for the state but vocabulary and structure much lower. The professional learning focus, therefore, becomes teaching these lower achieving students the deeper features of writing for particular purposes.

Many teachers need to learn how to undertake the kinds of diagnostic assessments described, in which case the first professional learning need in the next phase of the inquiry cycle is to select, collect and interpret assessment information.

Student interviews as a source of evidence

In the *Literacy Professional Development Project* in New Zealand, where formative assessment for student learning was a major focus, some teachers found the most powerful source of evidence consisted of asking the students the following questions because it gave them information on how well their students were understanding the purpose of their lessons and, therefore, what they themselves needed to learn to do in their own professional learning:

- What are you working on today?
  (*Purpose – general introduction on which to base other questions*)
- What are you learning about writing while you are doing this?
  (*Purpose – to find out if they were aware of the writing learning aims for the lesson*)
- Can you tell me what a good [type of writing focus of the lesson] looks like?
  E.g. ... what a good argument looks like?
  (*Purpose – to find out if they know the criteria for mastery*)
- Who are you writing this for?
  (*Purpose – to find out if they have an understanding of audience*)
- What does your teacher tell you to work on in your writing?
  (*Purpose - to find out students' understanding of any feedback/feed-forward received*)

(Timperley & Parr, 2009a)

Literacy and Numeracy in Victoria

The Victorian Department of Education and Early Childhood Development Literacy and Numeracy 6–18 Month Strategy (2009c) is based on the principles outlined in this paper.

The strategy begins with the school leadership team analysing key school-wide data and providing a summary analysis to all staff to inform learning and teaching. Data include:

- annual NAPLAN data, to cohort, individual student and item level
- annual VELS student data, trend data, all dimensions of English and Mathematics domains
- English Online Interview data
- Mathematics Online Interview data
- enrolment data for students, including ESL, refugee or Koorie status.

Details on recommended assessments are available in the *Key Characteristics for Effective Literacy and Numeracy Teaching* P–6 (DEECD, 2010a).

Based on the data analysis and the Annual Implementation Plan, the school leadership team ensures provision of the professional learning required for teachers. This includes:

- establishing or supporting Professional Learning Teams by ensuring regular meeting times are evident in the school meeting cycle, including APT time, if applicable. It is recommended that these times are used to reflect on assessment data and plan to meet the literacy and numeracy learning needs of student cohorts and individual students
- developing staff familiarity with the *Key Characteristics of Effective Literacy and Numeracy*
- building teacher knowledge and capacity to administer assessment tools that will be implemented with all students and to analyse the data to inform teaching
- building teacher knowledge and capacity to administer and analyse ESL assessments (ESL Developmental Continuum P–10 (DEECD, n.d.)
- building teacher capacity to support Koorie students when educational progress is not occurring , and
- building teacher understanding of the literacy and numeracy knowledge and skills students require for NAPLAN and other key assessment tasks.

Over the year, the school leadership team works with all teachers to review and refine *assessment schedules to ensure individual student learning is monitored, including:*

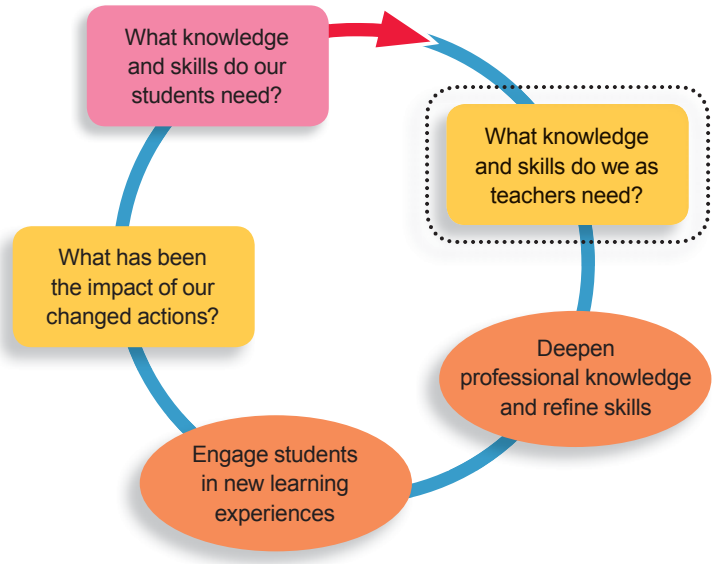
- individual student assessment to take place by the teacher during student independent reading, writing and mathematics, such as regular running records and the use of questions that probe understanding
- moderating selected student work samples (writing and mathematics) as part of Professional Learning Teams, with focused discussion to enable consistent, fair and reliable assessment
- continuing to build teachers' understanding of the learning needs of students from low socioeconomic backgrounds, including the wellbeing needs that may impact on learning, and
- strengthening teacher knowledge in literacy and numeracy and consistent assessment approaches.

The principal engages all leaders in moderating student work at least once prior to staff moderation to refine a school moderating process. This is to focus moderation on consistent, fair and reliable assessment of literacy and numeracy achievement.

(DEECD, 2009c)

Dimension 2: finding out about teachers' knowledge and skills

Figure 3: Teacher inquiry and knowledge-building cycle to promote valued student outcomes



(Timperley et al., 2008)

For teachers to understand the relationship between student profiles and their own teaching practices typically requires challenges to a mix of expectations, knowledge and skills.

The second dimension of the cycle asks teachers to identify what it is they need to know and do to be more effective in the areas of student need. It begins to answer the questions, 'Where am I going?' and 'How am I doing?' in relation to their own professional learning through identifying what their students need to learn, and thus what they need to focus on in their own professional learning. Given the likely complexity in arriving at the answers, teachers typically need expert support to identify their own learning needs in order to address that of their students.

This dimension of the cycle may occur concurrently with the first one, particularly if teachers do not have sufficient knowledge to assess their students in detail. Alternatively, it may be a next step in the cycle once the diagnosis of student needs has been undertaken. When teachers become accustomed to thinking through the cycle and are able to take control of their own learning, different parts often occur together. Teachers are able to do this when they have sufficient knowledge and skills to diagnose their students' learning needs throughout the teaching day, when they know enough to address the challenges in front of them and when they need to seek help to learn more.

Tools organised along progressions, such as e[5] and the Self-Assessment Tool for Assessment Professional Learning Modules in Victoria can help teachers to understand their capabilities.

Key questions in this dimension of the cycle comprise:

- How have we contributed to existing profiles of student outcomes?
- What do we *already know* that we can use to promote valued outcomes?
- What do we need to *learn to do* to promote valued outcomes?
- What sources of evidence/knowledge can we utilise?

Sources of evidence

The first source of evidence comes from the earlier dimension of the inquiry in the diagnosis of students' profiles of achievement. For teachers to understand the relationship between student profiles and their own teaching practices typically requires challenges to a mix of expectations, knowledge and skills. Answering the question, 'How have we contributed to existing profiles of student outcomes?', for example, may meet with denial that teachers are able to have any impact given students' backgrounds. Such denials need to be met with evidence that teachers can make a difference to student learning and achievement regardless of backgrounds if different teaching approaches are adopted (DEECD, 2009a). The involvement of facilitators with specific expertise is essential when challenging such beliefs and providing support to make the necessary changes. How some of these factors might come into play is illustrated in the following case.

Relating teaching emphases to student outcomes

Teachers from a school in a low socio-economic area where many students were new English language learners were asked to examine their students' reading profiles after a year at school. The assessments included knowledge of letters and letter/sound relationships, reading basic sight words, an open-ended writing vocabulary test and text reading. The teachers were asked to identify the areas in which their students were doing well and the areas in which they were not doing so well. What was obvious from the data was that the students were doing as well as others across the country in the basic skills of recognising letters and letter/sound relationships together with basic sight words. The areas in which they were achieving very poorly were the higher level tasks of writing vocabulary and text reading. They were then asked about their teaching emphases. Not surprisingly, they had taught what the students were mastering. When challenged about their practices, the teachers realised that their main learning focus needed to be how to teach writing vocabulary and text reading in meaningful ways to new English language learners.

(Timperley & Phillips, 2003)

A variety of sources of evidence can be used to address questions about what teachers already know and what they need to learn to do to promote valued student outcomes.

Fewer tools are available for assessing teacher needs than are available for assessing student needs but typically they include observations of classroom practice and discussions with teachers. Observations in the early stages are most effective when a standard rubric focused on a common student need is used so that the data can be collated and the implications discussed with the teachers involved. Self-assessment is common but inevitably comes up against the problem of not knowing what one doesn't know. For example, Timperley and Parr (2009a) found no relationship between self-confidence ratings by teachers about their use of formative assessment practices for students and observations of actual practice.

Tools organised along progressions, such as e[5] (DEECD, 2009b) and the Self-Assessment Tool for Assessment Professional Learning Modules (Department of Education and Training) in Victoria can help teachers to understand their capabilities through more precise descriptions of what novice practice looks like and what it means to be expert. Teachers can then actively place their practice at a particular level with a vision of what needs to change. These tools are most effective when specific evidence of placement at a particular level is required and the appropriateness of this placement is discussed with a knowledgeable other (Timperley & Parr, 2009b). These tools can serve to identify professional learning needs in ways that enhance student learning and achievement, when the focus of the tool (such as assessment for learning) has been identified as an area of professional learning need from the student profiles of learning and achievement.

Possible sources of evidence:

- observations of classroom practice using agreed rubrics
- ratings of hypothetical scenarios of practice
- written feedback to students
- self-ratings on descriptions of progressions from novice to expert.

Identifying teacher learning needs

In the *Literacy Professional Development Project* teacher learning needs are identified from profiles of student achievement in reading and writing, classroom observations using a standard rubric and a hypothetical scenario of teaching practice. The scenario was constructed to describe a series of teaching moves that on the surface looked to be effective but were actually misaligned to the lesson aims and assessment tasks. The teachers were asked to rate the effectiveness of various parts of the lesson (e.g. aims, activities, feedback) and to give reasons for their ratings. In the writing scenario, teachers were also asked to give feedback to a hypothetical piece of student writing from the lesson. The teachers then discussed their ratings (which usually varied considerably) and their reasons for them. The facilitated discussion highlighting the lack of agreement among the ratings and the variety of reasons given helps teachers to identify their own professional learning needs.

(Timperley & Parr, 2007)

By focusing on the questions in this dimension of the inquiry cycle, teachers further engage in assessment for learning processes that mirror those for students. Collectively the answers to these questions help teachers to identify 'Where am I going?' and 'How am I doing?' Through co-constructing the evidence with peers and relevant experts to answer the questions, teachers can identify what they need to know and do to improve outcomes for students. This process sets the scene (and motivation) to answer the question, 'Where to next?'

Coaching in Victorian schools

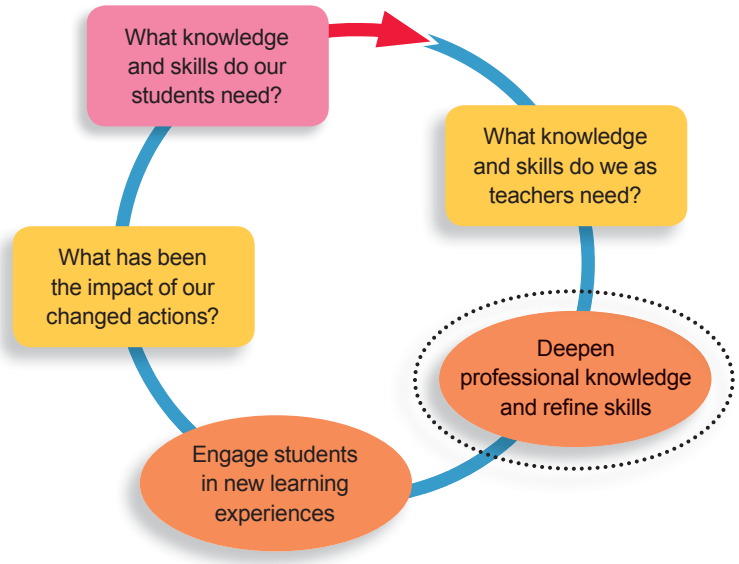
In Victoria, school leaders and coaches work with teachers to improve teaching practices in their schools. Coaches work with teachers for periods of time on specific topic areas. Coaching takes place in teacher's classrooms with the goal of improving the quality of teaching in literacy, mathematics and science and supporting high quality use of the Ultranet for planning and delivery of curriculum online.

Regional and school-level coaches learn from expert consultants and utilise the knowledge gained to influence teaching practices in their schools. They also support coaches in effective schools to share their knowledge with other schools. Coaching, in combination with efforts to build leadership capacity, has had a positive impact upon student learning and teaching practice in Victoria.

(DEECD, 2010b)

Dimension 3: deepening professional knowledge and refining skills

Figure 4: Teacher inquiry and knowledge-building cycle to promote valued student outcomes



(Timperley et al., 2008)

Traditional approaches to professional learning and development start at this point without engaging in earlier parts of the cycle. Identifying the need to learn particular knowledge and skills is often determined by some external body or school leader. The problem with policy makers or school leaders deciding what teachers need to learn independently of teachers engaging in an analysis of students' and their own learning needs is that it violates key principles of assessment for professional learning. Teachers become passive learners of someone else's agenda with concomitant problems of a lack of motivation and engagement. The processes involved in dimensions one and two that identify student and teacher learning needs allow activities in this third dimension of the cycle to be responsive to those needs.

Sources of evidence

In this dimension of the cycle three sources of evidence are brought together: evidence of student learning needs, evidence of teacher learning needs (from dimensions one and two) and the research evidence of what is most likely to meet those needs. The research evidence brings into focus what we know about teaching practices that are most likely to address the particular learning needs of students.

In this dimension of the cycle three sources of evidence are brought together: evidence of student learning needs, evidence of teacher learning needs and the research evidence of what is most likely to meet those needs.

Three sources of evidence:

- evidence of student learning needs (Dimension 1)
- evidence of teacher learning needs (Dimension 2)
- research evidence about what is most likely to meet those needs.

Part of the decision about whether or not to focus on formative assessment for student learning involves understanding which teaching practices have sufficiently high leverage to meet the identified student learning challenges. If the identified problem is, for example, low achievement among groups of students, poor understanding of what they are supposed to be learning or; lack of motivation to engage with teacher-determined learning aims etc, then a focus on formative assessment for student learning is likely to be effective. Different problem diagnoses in Dimensions one and two of the cycle lead to different solutions. If the decision is made to focus on such practices, teachers need to understand the connection between earlier parts of the cycle and this decision.

Another source of evidence:

- teachers' understandings of students and how they learn, what counts as valid knowledge and how best to teach it.

The beliefs and assumptions that teachers bring to the professional learning situation are an additional source of evidence. Teachers are as diverse as their students in what they know and believe and so shape how they respond to new information provided through professional learning experiences (Bransford et al., 2000). How they respond depends on the extent to which new information is consistent with, or dissonant from, current understandings about how students learn, what counts as valued knowledge, and how best to teach it.

Professional learning approaches that focus primarily on building new knowledge and skills are suitable when teachers' existing understandings are congruent with the new information and therefore can be integrated readily into their existing practice. But when teachers' personal theories about students, what is valued in the curriculum and effective teaching practices differ from those being promoted, a different professional learning approach is needed. For example, if teachers believe that the main purpose of assessment is to report summative information at the end of the year, then introducing assessment 'for' and 'as' learning will create serious dissonance for those teachers. Such beliefs will need to be engaged and challenged if teachers are to understand the limitations of their current understandings and how they are being redefined.

If this engagement with existing ideas does not happen then two reactions are typical. The first is that the teachers interpret new information in terms of their existing ideas and adopt new practices only superficially. Hammerness et al. (2005) refer to this problem as one of "over-assimilation". A typical example from the implementation of formative assessment practices is that teachers introduce learning goals and criteria for success that are solely teacher determined rather than developed in partnership with their students. Students have no more say in directing their learning than they did before.

The second reaction is that teachers are likely to reject new ideas that conflict with their current ideas. Coburn (2001) found, for example, that when teachers disagreed with policy recommendations on new approaches to teaching reading, they rejected them as unrealistic and inappropriate for their particular contexts. If teachers cannot be persuaded of the worth of a new approach and be certain of support if they implement it, they are unlikely to adopt it—at least, not without strong accountability pressures.

Knowledge and practices of focus

Quick solutions are likely to have limited impact on entrenched problems of student learning. Teachers constantly search for effective practices through sharing information with one another both within schools and across schools. In order to address the more difficult issues, such as the underachievement of particular student groups, much more is needed.

In the synthesis of the literature on professional learning and development, Timperley (2008) identified that approaches with the greatest impact on students combined different dimensions of knowledge and skills. The first dimension related to the content of what was learned. The content integrated knowledge of the curriculum, how to teach it effectively, and how to assess if students have learned what was intended.

The second dimension related to the integration of theory and practice. Knowledge on its own is insufficient unless teachers also have specific strategies to transfer the knowledge to practice. Helpful strategies for practice, on the other hand, do not provide teachers with sufficient theoretical knowledge to assist them to work out the appropriateness of a particular intervention with particular students at any given moment. The importance of this pedagogical content knowledge is described below.

Timperley (2008) identified that approaches with the greatest impact on students combined different dimensions of knowledge and skills.

Integrating assessment and pedagogical content knowledge

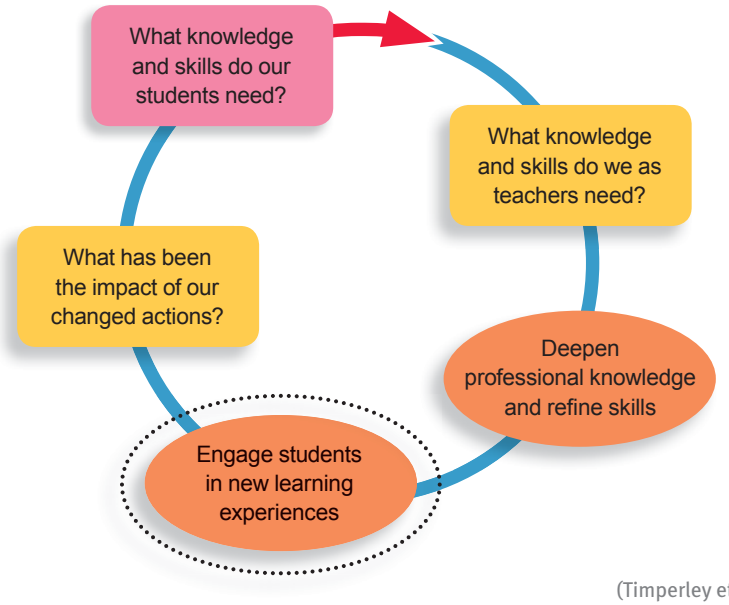
In the *Literacy Professional Development Project*, learning how to assess students for formative purposes was accompanied by deepening the teachers' pedagogical content knowledge in reading and writing. It was found that to use assessment information to improve the effectiveness of teaching and learning, teachers needed to know how to address students' misconceptions and identify their next learning steps by improving their knowledge of how texts work. An analysis of the quality of the feedback teachers gave to their students in the hypothetical lesson scenario (see dimension two) related significantly to gains in their students' achievement ($r=.685$, $p<.01$) during that year. Quality was determined by the extent to which the feedback linked to learning objectives and gave an indication of what action to take to improve; accuracy in terms of the writing sample provided; and the feedback referred to the deeper features of writing. The capability to give this level of feedback was dependent on teachers having deep pedagogical content knowledge related to specific writing purposes.

(Parr & Timperley, 2010)

Changes in teachers' beliefs and knowledge through professional learning and development must result in some kind of change to teaching practices.

Dimension 4: engaging students in new learning experiences

Figure 5: Teacher inquiry and knowledge-building cycle to promote valued student outcomes



(Timperley et al., 2008)

Little is likely to happen to student profiles of learning and achievement unless something different happens for them in class. Changes in teachers' beliefs and knowledge through professional learning and development must result in some kind of change to teaching practices. It is important, therefore, that both teachers and those assisting them have sound approaches to looking at what is happening during day-to-day teaching in this dimension of the cycle. While it may appear to be a simple issue of observing practice, in reality, it is more complex than this.

The first issue concerns the purpose of the observations. If a compliance approach is taken—'Are the teachers doing it right?'—problems arise around the reliability and validity of what is observed at any one time because teaching practices vary over time. Recent research (Croninger & Valli, 2009) established that a reliable evaluation of practice required between six and eight observations. The problem is accentuated when teachers believe that they are being judged and so put on their best 'performance'.

Another problem with compliance-type observations is to ensure that what is observed relates directly to professional learning goals of focus. Observations for performance management purposes, for example, may be too generic to capture the subtle elements of practice that form the specific focus for professional learning. Nor are they likely to contribute in any substantive way to assessment 'for' and 'as' learning for teachers.

These problems are largely overcome if a learning and problem-solving orientation is taken towards classroom observations. In these kinds of observations the practices of focus become those being addressed within the professional learning environment. Teachers, in partnership with those providing the professional learning, identify important practices to master and recognise that learning how to enact them takes time and persistence. The purpose of the observation becomes one of enhancing the teachers' capability to answer the three formative assessment questions, 'Where am I going?', 'How am I doing?' and 'Where to next?'

Identifying these sources of evidence and ensuring they are consistent with the principles underlying particular practices requires deep understanding of specific areas of pedagogical content knowledge. The more focused the observation of practice, the more demands are made on both observers' and teachers' knowledge.

Sources of evidence

Within a problem-solving formative assessment orientation to classroom observations, a number of sources of evidence are drawn on. First, the research evidence is used to determine criteria for effective practice so teachers can identify the goals towards which they are working. These criteria need to be discussed and understood by both the observer and the teacher so that teachers are able to generate feedback to monitor their own learning progress towards enacting key practices. The 'self-assessment tool for assessment professional learning modules' is an example of these kinds of criteria.

Possible sources of evidence:

- research evidence on which to base criteria for effective practice
- the specifics of practice that would count as evidence of the criteria
- the extent to which the specifics are evident in the teacher's practice
- how students respond to new practices.

Depending on teachers' levels of understanding of the description of expert practice, the meaning of some of the criteria in a teacher's specific practice context may need to be further unpacked. For example, if formative assessment practices for students are the area of professional learning, then the quality of feedback might become the observation focus. For feedback to be consistent with both assessment 'for' and 'as' learning, observations would need to focus on the types of feedback information the teacher provides to the students, and the extent to which the students themselves generate feedback to monitor progress on their own learning.

The second source of evidence comprises the specifics of teachers' practice in their classrooms with their students in relation to the criteria. For this reason, both observer and teacher need to agree on indicators that would count as evidence for the practice of focus. In the feedback example above, both teacher and observer would need to agree on how they will recognise when students are seeking opportunities to generate their own feedback and use it to monitor their progress.

The third source of evidence is the extent to which the agreed indicators are evident in the observed practice. At any point, the kinds of agreed evidence may require revision when practices consistent with underlying principles become apparent. The process should not be seen as one set in concrete but rather as one that is sufficiently flexible to allow revisions in any kind of the evidence but at the same time is sufficiently systematic to ensure that the practice of focus remains just that.

The final source of evidence must relate to students. There are no teaching practices that can be guaranteed to meet specific student needs in a particular context. The effectiveness of practice is influenced by many things, including teachers' prior conceptions of what it means to implement particular strategies together with the knowledge, skills and dispositions of the students themselves. If new practice is to address particular teaching and learning problems, effectiveness can only be determined by how students engage and learn as a result. This final source of evidence relates to the final dimension on the inquiry and knowledge-building cycle.

The e^5 Instructional Model

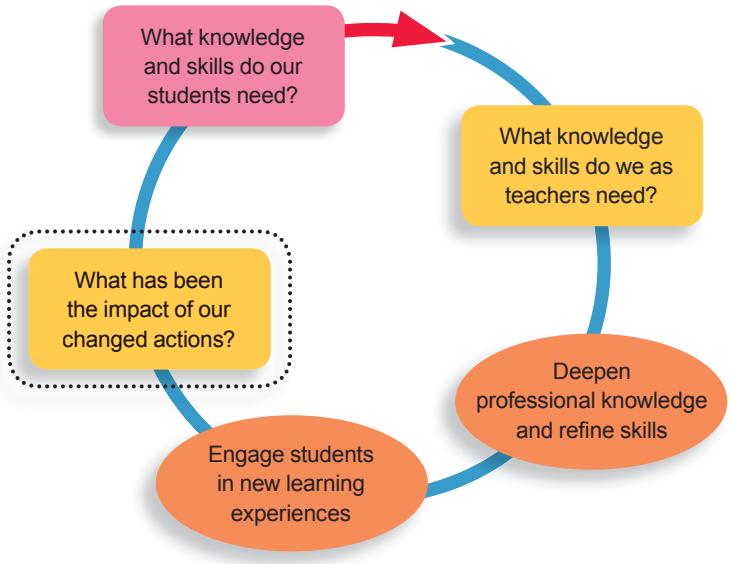
In Victoria, the *e^5 Instructional Model* is a reference point for school leaders and teachers to develop a deeper understanding of what constitutes high quality teacher practice in the classroom. The model defines effective teacher practice across five domains: engage, explore, explain, elaborate and evaluate. It serves as the basis for a developmental continuum that shows teachers how they can improve their teaching practice.

The *e^5 Instructional Model* is not a recipe for teacher practice but rather a framework to inform conversations and guide the observation, critique and reflection of classroom practice. In Victoria, it is recognised there are many different ways that teachers can vary in their approach and their behaviour and still be highly effective in the classroom. All teachers use their professional judgment to adapt their practice to the specific context they work in and to the particular cohort of students they teach. However, within this zone of discretion there are common practices that draw on a professional knowledge base in the classroom we can develop a great understanding of the nature of the professional learning teachers require to improve their practice.

(DEECD, 2009b)

Dimension 5: assessing impact of changed actions

Figure 6: Teacher inquiry and knowledge-building cycle to promote valued student outcomes



(Timperley et al., 2008)

Unquestionably some practices are more likely to be effective than others but none can guarantee success. If there is a generic principle of practice, it is probably that teaching must be responsive to the specific needs of the students being taught.

The key question in the final dimension of the cycle asks, 'How effective has what we have learned and done been in promoting our students' learning and wellbeing?' Underpinning this question is a vision of professional learning as a process of developing teachers' adaptive expertise. Adaptive experts know how to retrieve, organise and apply professional knowledge to specific teaching and learning problems. These experts have the capability to work out when known routines work and should be retained and when to seek new information because old problems persist or new challenges arise (Bransford et al., 2005).

Many approaches to professional learning are based on the idea that effective teachers become routine experts. Within this framing of teaching, what teachers need to learn are specific practices known to be effective in enhancing student learning and wellbeing. It is based on the idea that in order to move from novice to expert, teachers require information about effective practices and the opportunities to practice them until they can be applied flexibly and seamlessly. The flaw in this framing is the problem of context. The contextualised nature of teaching practice—this teacher with this group of students in this school—means there can be no guarantee that any specific practice will have the anticipated result. Unquestionably some practices are more likely to be effective than others but none can guarantee success.

Usually these cycles become more and more focused as teachers' assessment and pedagogical content knowledge deepens through continuously engaging in the cycle.

If there is a generic principle of practice, it is probably that teaching must be responsive to the specific needs of the students being taught. Thus, adaptive experts who have the skills to identify when practice is particularly effective in enhancing student learning and when it is not, are more likely to maximise their students' opportunities to learn.

The development of adaptive expertise is also consistent with a formative assessment approach to professional learning because through the process teachers develop the capacity to monitor the impact of their practice on students throughout the school day, and thus take control of their own learning.

Answering the question about impact needs to happen on both a lesson-by-lesson basis and more long-term. The lesson-by-lesson check assesses immediate understandings of the lesson. Longer term assessment ensures that the progress students make is adequate against agreed benchmarks, such as VELS, and identifies in which areas students need further work.

Sources of evidence

Possible sources of evidence:

- formal and informal evidence used in the first dimension of the cycle
- evidence of possible explanations for improvement or lack of it
- evidence of unintended consequences.

Assessing impact requires similar kinds of evidence as that used in the first dimension of the cycle. These include both informal and formal measures depending on the purpose. What typically happens, however, is that teachers develop greater depth of pedagogical content knowledge as a result of engaging in the inquiry cycle and so demand more specific and sophisticated assessment information in order to diagnose new areas of student need.

For this process to result in improved practice, explanations for improvement in student outcomes (or lack of it), need to be identified. This seeking of explanations is an integral part of developing adaptive expertise. Evidence from dimension four on classroom practices may be one such source of evidence. Others may include more detailed diagnostic information on students.

In this process of determining impact, it is also important to monitor likely unintended consequences. Has a focus on literacy, for example, resulted in a decline in numeracy achievement? Has an emphasis on achievement led to high levels of drop-out for those adolescents struggling to meet the standards?

Re-engaging in the cycle

Assessing impact is not the end of the cycle. As the figures show, the arrows keep cycling. If assessing impact shows old problems persisting, then different approaches to professional learning may need to be taken. On the other hand, if progress towards goals for students is evident, then new cycles need to be identified because the demands of teaching are rarely static. Most important is to analyse if all students are benefiting. Usually these cycles become more and more focused as teachers' assessment and pedagogical content knowledge deepens through continuously engaging in the cycle see below for an example.

Re-engaging in more focused cycles of inquiry

One school identified writing as their area of focus because indications were that their students' writing achievement was low. After collecting data on students and on their practice through classroom observations, they realised in discussion with the visiting facilitator that they needed to focus more on the deeper features of structure, content, vocabulary and audience. Although their lesson aims were focused on these deeper features, in reality their lessons gave greater emphasis to surface features. As they worked around the cycle, they became aware that they did not have sufficient pedagogical content knowledge (PCK) to teach the deeper features for specific writing purposes. Through building their PCK, they were able to assess the students' writing in greater detail and focused on recounts only because they realised that this was easiest for both themselves and their students. In their second formal cycle, they focused almost exclusively on the structure of recounts. In a third cycle, they then used their own and their students' improved knowledge of structure to examine how structure differed among different writing purposes.

(Interview with school leader, n.d.)

Through engaging in the inquiry cycles, assessment and professional learning is not an event in teachers' and students' educational lives but an integrated process of teaching and learning. Embedding the inquiry and knowledge-building process takes several facilitated iterations as teachers come to constantly ask themselves, 'Where am I going?', 'How am I doing?' and 'Where to next?'

Sustaining gains

The *Literacy Professional Development Project* not only resulted in substantial gains in student literacy achievement, but also in sustained gains in most of the participating schools when monitored over three years. O'Connell (2009) identified two important factors that contributed to sustainability. The first of these factors involved ongoing engagement in the kinds of evidence-informed inquiry and knowledge-building described above. The second involved ensuring coherence between new inquiries or foci for professional learning with previous foci. In the higher sustaining schools when introducing new foci, they sought to identify what was common between the literacy focus and the new focus and what was different. In this way, coherence across professional learning foci was developed. Just as teachers are expected to provide coherence for students in their learning journeys, coherence was established for teachers in theirs. What were the links they could make from reading into writing, into mathematics, into new communication technologies?

School leaders played a major part in helping teachers understand and engage in the inquiry and knowledge-building process and in developing coherence for teachers across professional learning foci. In higher sustaining schools, this process was not left to chance.

The role of school leaders

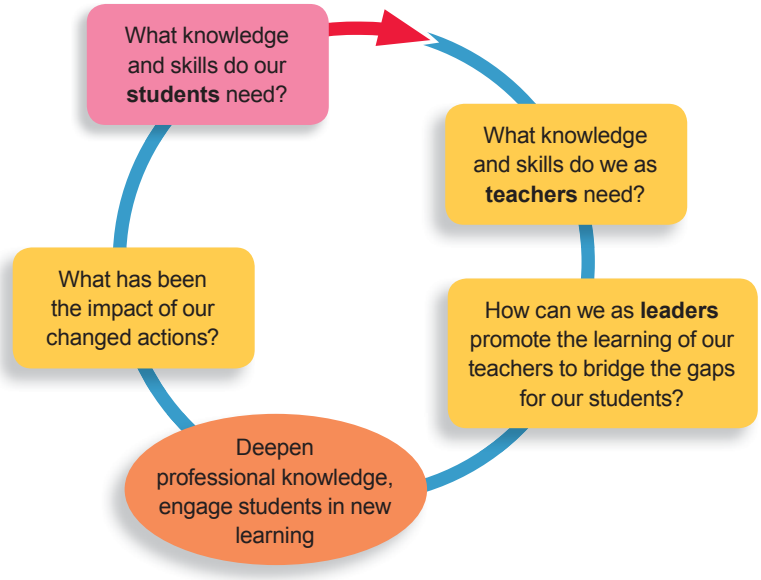
... leaders have the greatest influence on outcomes for students when they participate in and promote the professional learning of their teachers.

The contexts in which teachers practise become an integral part of what and how teachers learn. Leaders have an important role to play in shaping this context if professional learning is not to become a series of events with little impact on practice or student outcomes. Teachers cannot achieve the kinds of deep changes needed to address persistent problems of teaching and learning alone. Outside experts can achieve patches of brilliance in some classrooms without strong leader engagement as they work with the willing, but they cannot take responsibility for the unwilling and they cannot take responsibility for embedding the learning as the way the school does things on an everyday basis. Whole school improvement requires everyone within the school to be involved, including leaders. A recently published synthesis of the empirical literature on leadership (Robinson et al., 2008) shows that leaders have the greatest influence on outcomes for students when they participate in and promote the professional learning of their teachers.

For teachers to engage successfully in the dimensions of the inquiry and knowledge-building cycle, they clearly need close school leadership involvement, even when external facilitation is present. On a surface level these dimensions might include identifying the needs of students and ensuring they are priority needs for the school; working with teachers to unpack the current levels of knowledge and the skills they bring to their classroom practice; ensuring implementation in classrooms; and assessing the impact. Leadership engagement may also involve challenging those teachers who would prefer not to engage by focusing on outcomes for students and helping these teachers to solve teaching and learning problems. On a deeper level, it means understanding the formative assessment underpinnings of the inquiry and knowledge-building cycle and ensuring their leadership practice is consistent with them. It also means ensuring that meaningful change actually happens.

O'Connell's (2009) work on sustainability provides some additional indications of other important roles for leaders. Supporting teachers' professional learning requires them to embed cycles of evidence-informed inquiry and knowledge-building processes throughout the school's operations. This means staying with a single focus over a prolonged period of time and unpacking it in depth rather than dispersing teachers' energies across multiple foci. It means ensuring coherence of principles and practices with the next professional learning focus. These roles of support and challenge are illustrated in Figure 7.

Figure 7: Positioning leaders within teachers' inquiry and knowledge-building cycle



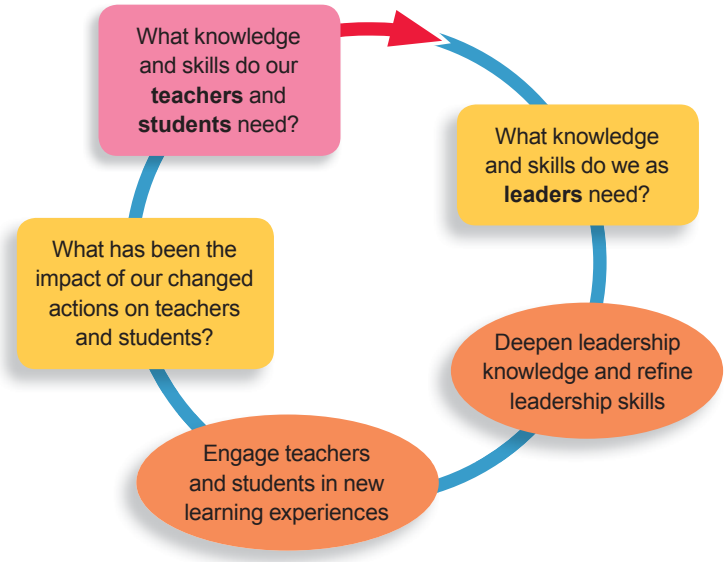
(Timperley et al., 2008)

These leaders developed their own cycles of inquiry and knowledge-building in order to promote the learning of their teachers.

A recent study of leadership (Timperley, 2010) within the *Literacy Professional Development Project* involved examining the practices of principals whose students made the greatest gains in achievement over the two year period of professional development in their schools and were nominated as effective by the visiting facilitators. This study showed that these leaders identified that they needed to do more than just support their teachers. They saw themselves as leaders of learning in ways that they both promoted their teachers' learning and developed their own assessment and pedagogical content knowledge and skills in order to enact this within their schools. These leaders developed their own cycles of inquiry and knowledge-building in order to promote the learning of their teachers (see Figure 8).

The leaders recognised their role as one of challenge and support for teachers' learning.

Figure 8: Leader inquiry and knowledge-building cycle to promote valued student outcomes



(Timperley, in press)

Sources of evidence

The kinds of evidence required at each dimension of the cycle paralleled that of their teachers. For example when identifying the kinds of knowledge and skills they as leaders needed to promote the learning of their teachers and students, they examined how their leadership practices were impacting on what was observed in classrooms. Like the teachers, they needed help to do this. When deepening their leadership knowledge and refining their skills, they drew on the literature related to the leadership of professional learning. When assessing impact of their leadership practices, they required assistance from those with expertise in the area about how to judge this.

The following example illustrates how the leaders in one school recognised what they needed to learn and how they went about it.

Leadership learning

Student achievement in reading comprehension was low. After struggling for a year to improve it, the school decided they needed to become more focused in the selection of their practices for professional learning. An analysis of classroom practice with the visiting literacy facilitator identified that teachers were not giving sufficiently descriptive feedback to their students to serve as a source of information about what they needed to do next to improve their writing. The feedback mostly took the form of personal praise. On the few occasions when the feedback related to the students' work, it was too generic to serve as a guide for students to know what to do next. The teachers agreed with the visiting facilitator and school leaders that learning about how to give descriptive feedback in reading comprehension would be the focus for the teachers' professional learning.

The leaders recognised their role as one of challenge and support for teachers' learning. They participated in the classroom observations with the visiting facilitator so they could give feedback to the teachers following the lesson observations. The quality of their feedback to the teachers mirrored that of the teachers to the students. It consisted primarily of personal praise with a few generic suggestions for how to change practice. The leaders soon realised that they needed to learn how to give more descriptive feedback to their teachers. As they attempted to provide this kind of feedback it became apparent that they also needed to deepen their own pedagogical content knowledge of both writing and effective feedback if they were to seriously adopt the role of learning leaders.

(Timperley, 2010)

The role of system leaders

The role of policymakers as system leaders is central to success.

While being essential to changing practice, teacher professional learning and development has been described as a relatively weak policy intervention (Hanushek, 2005). However, the evidence provided by the Best Evidence Synthesis of Professional Learning and Development (Timperley et al., 2008) and from the *Literacy Professional Development Project* over three cohorts of schools demonstrates that under the right circumstances it can be a very powerful intervention. The role of policymakers as system leaders is central to success.

An analysis of the reciprocal chain of influence between policy and practice in the *Literacy Professional Development Project* (Timperley & Parr, 2009b) revealed that policy makers were also learning throughout the project. They were clear about the goals they wanted to achieve. They also wanted to know how participants in each system layer (visiting facilitators, leaders and teachers) were responding to the intervention and if their responses were likely to achieve the goals. Their focus was not on compliance but rather they took a more formative assessment approach towards all system players. One described her focus as the need for participants at each system level, "... to be clear about their own learning needs, to receive quality information about them, and to be involved in relevant decisions" (Timperley & Parr, 2009b). They constantly checked how the interpretive space was being filled through all system layers.

Sources of evidence

Possible sources of evidence:

- contracts that focus on important learning aims for students and teachers
- milestone reports focused on information for formative purposes
- research investigating challenges throughout the system layers.

Project reporting processes and tools were consistent with conveying key policy messages throughout the system to ensure everyone knew the purpose to answer the 'Where am I going' question. The contract with the providers focused on improving students' literacy achievement, primarily through the development of teacher pedagogical content knowledge and within-school professional learning communities.

Both the content and process of milestone reporting occurred within an assessment for learning framework in that questions were asked of the data with solutions jointly constructed and tested. The work of the facilitators was monitored to ensure the flexible approach designed to meet schools' needs also remained consistent with the underpinning principles and aims of the project. The tools and the routines surrounding them developed within the project were effective in conveying these policy and project messages. Thus the interpretive space between the policy intent and teachers' existing knowledge and understandings (Spillane, 2004) was bridged by the project tools and the flexible but principled activities of the visiting facilitators.

Research commissioned to investigate the challenges through the project layers provided those responsible for the policy and its implementation with formative evidence of what was working well and not so well. The information in these reports was consistently acted on.

By engaging with project leaders and researchers and ensuring their reporting processes provided the information they needed to be responsive to needs identified throughout the system, the policy makers responsible for the project were able to identify the kinds of challenge and support required throughout the system. Examples include both challenges provided by the policy makers and how they, in turn, adjusted their own practices in response to the evidence of specific difficulties within the project. One example is presented below.

An example of policy learning

When the student achievement data from the first cohort was analysed, it was presented in the form of effect sizes for the whole cohort and the lowest 20%. Both looked very promising in achieving the kinds of shifts hoped for through the policy intervention. In order to check profiles of achievement more carefully, they asked the project leaders to analyse the lower 20% in greater detail. This analysis revealed that those students towards the lower end of this distribution had, in reality, made little progress. They faced a choice: require that the project facilitators meet the needs of these students more specifically, or consider the possibility that some students required more specialist intervention than the classroom teacher could be expected to provide. The latter possibility seemed more reasonable, and while the focus remained on the students in the lowest 20% of the cohort, it was also accepted that realistically these very needy students needed more specialist intervention.

(Timperley & Parr, 2009b)

Implications

More recent evidence indicates that [professional learning] can be a powerful intervention but traditional approaches need to be rethought.

A major challenge for policy makers is to ensure that pedagogically sound practices permeate the learning environments within their educational jurisdictions so that all students benefit from the instruction provided. It is apparent from statistics provided at regular intervals by the Organisation for Economic Co-operation and Development (e.g. OECD, 2005) that many groups of students do not benefit as much as others from the education offered. While professional learning and development should be effective in promoting such practices, historically it has been shown to be a relatively weak intervention in terms of its impact on students (Hanushek, 2005). More recent evidence (Timperley et al., 2008) indicates that it can be a powerful intervention but traditional approaches need to be rethought. Telling teachers what to do has been shown to be little more effective than telling students what they should learn.

It should not be surprising that the principles underpinning effective pedagogical approaches for students are equally effective for their teachers. The power of assessment 'for' and 'as' learning approaches to improve student outcomes in particular, is equally effective in promoting the kinds of teaching and learning and practices that have positive outcomes for their students. In both situations, learners need to be able to answer the questions, 'Where am I going?', 'How am I doing?' and 'Where to next?' Teachers need to be able to answer the questions for both their students and themselves.

To do so, teachers need to be assisted to engage in evidence-informed cycles of inquiry and knowledge-building that have as their focus progress improved outcomes for students. These outcomes may be academic, personal or social depending on what is valued by the communities in which students live and learn. The important point is they answer the first question at the student level by providing focused learning goals. In order to understand where the students are at in terms of the outcomes valued, and thus answer the second question about how I am doing, detailed diagnosis of students needs is required. Many teachers need assistance to learn how to do this kind of diagnosis before they are able to engage in the rest of the cycle.

From the diagnosis of student needs, teachers are able to begin to answer the three questions for themselves by identifying how their teaching practices have contributed to the students' existing profiles of learning and achievement. Teachers find this process challenging and it usually requires external expertise in the initial stages. As teachers become more fluent in their engagement in the cycle, they are able to relate teaching practices to student responses more independently. They also need to ask what they as teachers need to learn and do to promote better outcomes for their students in the area of focus. In doing so, they take control of their own learning and begin to answer the question, 'Where to next?'

Once teachers understand what it is they need to learn to promote better outcomes for their students, knowledge is deepened and teaching skills are refined. It is important that the new focus of practice is strongly supported by research as being effective in addressing the students' identified needs. Spending time learning about curriculum and pedagogical approaches that have little impact on student learning and achievement is unlikely to bring about the shifts in profiles of achievement sought. An integrated approach to professional learning promotes better outcomes for students. The kinds of integration include: theory and practice; curriculum content, pedagogical content and assessment knowledge; and knowledge of students.

What is learned must result in changes to classroom practice if better outcomes are to occur for students. Approaches to checking and promoting those changes that adopt a learning and problem-solving orientation are more effective than checking for compliance in the adoption of specific practices. Jointly determining the area of focus, criteria for effectiveness and the extent to which the criteria are evident in practice is more effective than observers deciding what they observe because this places teachers in the position of being the passive recipient of others' decisions.

The final dimension of the cycle involves checking both formally and informally whether new practices are more effective than those previously enacted and why that might be so. No practice can be considered effective if it fails to engage students and promote their learning more effectively than before. Through this process teachers are able to assess the impact of their efforts and determine the nature of the next cycle of inquiry and knowledge-building. Usually teachers find that the development of their pedagogical content and assessment knowledge through engaging in the cycle makes them more focused and self-critical of what they did before. Thus, new cycles delve more deeply into explanations for student learning problems and how they might be addressed.

Teachers cannot do this work alone. A recent synthesis of evidence on leadership practices that make a difference to student outcomes (Robinson et al., 2008) identified that leaders promoting and participating in teacher professional learning and development had the greatest impact on student achievement. When many leaders seriously engage in this support role, they find they too need to engage in similar cycles of inquiry and knowledge-building to those of their teachers. Their focus may be assessment or developing their pedagogical content knowledge. Thus, leaders cannot do this alone but require the support of external expertise. They need support to engage in the kind of learning that brings about meaningful change.

The implications for policy makers are that if they wish to address entrenched problems of student learning and achievement, they must address entrenched problems of leader and teacher learning and development. Telling professionals in schools how to do things differently typically meets with limited success because it fails to engage teachers' existing theories about what constitutes an appropriate curriculum, how best to teach it and whether students are capable or not of learning it. Telling leaders how to run their schools also fails to engage their personal theories about how to lead effectively to bring about desired changes. Alternatively, approaches that engage them in a formative assessment process related to their own learning have greater demonstrated success.

But this approach requires policy makers to take a learning orientation and to monitor the effectiveness of their own efforts to bring about the changes they desire as they come to understand the mind-shifts required through the system layers. Engaging in their own inquiry and knowledge-building cycles to find out if each system player is taking greater responsibility for their own learning and improving the learning of others can be a challenging task. As with other system players, policy makers also need the appropriate information to ensure their efforts are having the desired impact through the system layers.

The implications for policy makers are that if they wish to address entrenched problems of student learning and achievement, they must address entrenched problems of leader and teacher learning and development.

References

Bransford, J., Brown, A. & Cocking, R. 2000, *How people learn: Brain, mind, experience, and school*, National Academy Press, Washington, D.C.

Bransford, J., Derry, S., Berliner, D. & Hammerness, K. 2005, 'Theories of learning and their roles in teaching', in L. Darling-Hammond & J. Bransford (eds), *Preparing teachers for a changing world*, John Wiley & Sons, San Francisco.

Coburn, C. E. 2001, 'Collective sense making about reading: How teachers mediate reading policy in their professional communities', *Educational Evaluation and Policy Analysis*, vol. 23, no. 2, pp. 145-170.

Croninger, R. G. & Valli, L. 2009, 'Where is the action?: Challenges to studying the teaching of reading in elementary classrooms', *Educational Researcher*, vol. 38, no. 2, pp. 100-108.

Cuban, L. 1984,'How teachers taught: Constancy and change in American classrooms, 1890-1980', *Research on Teaching Monograph Series*, Longman, New York.

Department of Education and Early Childhood Development 2009a, *Signposts: Research points to how Victorian government schools have improved student performance*, Melbourne. Available at: ‹http://www.eduweb.vic.gov.au/edulibrary/public/publ/research/nws/Signposts_report.pdf›

____ 2009b, *The e[5] instructional model*, Melbourne. Available at: ‹http://www.education.vic.gov.au/proflearning/e5/›

____ 2009c, *Literacy and Numeracy 6-18 month strategy*, Melbourne. Available at: ‹http://www.eduweb.vic.gov.au/edulibrary/public/teachlearn/student/litnumstrat6-18prim.pdf›

____ 2010a, *Key characteristics for effective literacy and numeracy teaching P–6*, Melbourne. Available at: ‹http://www.education.vic.gov.au/studentlearning/litnum›

____ 2010b, *Coaching teachers in effective instruction*, Melbourne. Available at: ‹http://www.eduweb.vic.gov.au/edulibrary/public/teachlearn/student/coachteacheffectiveinstruction.pdf›

____ (n.d.), *ESL developmental continuum P–10*, Melbourne. Available at: ‹http://www.education.vic.gov.au/studentlearning/teachingresources/esl/default.htm›

Department of Education and Training 2005, *Current perspectives on assessment*, Melbourne. Available at: ‹http://www.eduweb.vic.gov.au/edulibrary/public/teachlearn/student/assessment_current_per.pdf›

____ (n.d.), *Self assessment tool for assessment professional learning modules*, Melbourne. Available at: ‹http://www.eduweb.vic.gov.au/edulibrary/public/teachlearn/student/selfassesstool.pdf›

Earl, L. 2009, 'How should we assess students? : A research interview', *Shine*, issue. 5, pp. 61-63. Available at: ‹http://www.eduweb.vic.gov.au/edulibrary/public/publ/research/publ/researchinterview_lorna_earl.pdf›

Hammerness, K., Darling-Hammond, L., Bransford, J., Berliner, D., Cochran-Smith, M., McDonald, M. & Zeichner, K. 2005, 'How teachers learn and develop', in L. Darling-Hammond (ed), *Preparing teachers for a changing world: What teachers should learn and be able to do*, John Wiley & Sons, San Francisco.

Hanushek, E. 2005, 'Economic outcomes and school quality', *Education Policy Series*, International Academy of Education & International Institute for Educational Planning, UNESCO. Available at: ‹http://edpro.stanford.edu/Hanushek/admin/pages/files/uploads/quality.IIEP.pdf›

Hattie, J. & Timperley, H. 2007, 'The power of feedback', *Review of Educational Research*, vol. 77, no. 1, pp. 81-112.

Ministerial Council on Education, Employment, Training and Youth Affairs 2008, *Melbourne Declaration on Educational Goals for Young Australians*, MCEETYA, Australia.

McDowall, S., Cameron, M., Dingle, R., Gilmore, A. & MacGibbon, L. 2007, *Evaluation of the Literacy Professional Development Project*, Report to the Ministry of Education, Wellington.

O'Connell, P. 2009, *Is sustainability of school improvement an article of faith or can it be deliberately crafted?*, Unpublished PhD Thesis, University of Auckland, New Zealand.

Organisation for Economic Co-operation and Development 2005, *Education at a glance: OECD Indicators 2005*, OECD, Paris.

Parr, J. M. & Timperley, H. 2010, 'Feedback to writing, assessment for teaching and learning and student progress', *Assessing Writing*, vol. 15, no. 2, pp. 68-85.

Phillips, G., McNaughton, S. & MacDonald, S. 2001, *Picking of the Pace*, Report to the New Zealand Ministry of Education, Wellington, New Zealand

Robinson, V. M. J., Lloyd, C. & Rowe, K. J. 2008, 'The impact of leadership on student outcomes: An analysis of the differential effects of leadership type', *Educational Administration Quarterly*, vol. 44, no. 5, pp. 635-674.

Spillane, J. P. 2004, *Standards deviation: How schools misunderstand education policy*, Harvard University Press, Cambridge, MA.

Stiggins, R. 2002, 'Assessment crisis: The absence of assessment for learning', *Phi Delta Kappan*, vol. 83, no. 10, pp. 758-765.

Timperley, H. 2008, *Teacher professional learning and development*, Educational Practices Series-18, International Bureau of Education, UNESCO.

Timperley, H. 2010, 'Instructional leadership in action', *Change through conversations: Instructional leadership in action*, AERA, Denver.

Timperley, H. (in press), *Realising the power of professional learning*, Open University Press, London.

Timperley, H. & Parr, J. 2007, 'Closing the achievement gap through evidence-based inquiry at multiple levels', *Journal of Advanced Academics*, vol. 19, no. 1, pp. 99-115.

Timperley, H. & Parr, J. 2009a, 'What is this lesson about?: Instructional processes and student understandings in writing classrooms', *The Curriculum Journal*, vol. 20, no. 1, pp. 43-60.

Timperley, H. & Parr, J. 2009b, 'Chain of Influence from policy to practice in the New Zealand literacy strategy', *Research Papers in Education*, vol. 24, no. 2, pp. 135-154.

Timperley, H., Parr, J., Meissel, K. & O'Connell, P. 2010, *Making a difference to student achievement in literacy: Final research report on the Literacy Professional Development Project*, Report to Learning Media Ltd, Wellington.

Timperley, H. & Phillips, G. 2003, 'Changing and sustaining teachers' expectations through professional development in literacy', *Journal of Teaching and Teacher Education*, vol. 19, no. 6, pp. 627-641.

Timperley, H., Wilson, A., Barrar, H. & Fung, I. 2008, *Teacher professional learning and development: Best evidence synthesis on professional learning and development*, Report to the Ministry of Education, Wellington.