

# Policy Briefs

## Building a learning profession\*

### INTRODUCTION

This paper falls into two main sections: (a) an overview of contemporary research on effective professional learning for practising educators, and (b) recommendations for action to promote effective learning for practising educators.

Recent research indicates that what teachers know and do is the most important influence on what students learn. Of all the options available to policy makers seeking to improve student learning outcomes, the most effective are those that invest in teacher knowledge and skill. For this reason, professional development is moving to centre stage as the primary policy vehicle for enhancing student learning outcomes.

Three central questions guide the paper:

- When does professional learning lead to improved learning outcomes for students?
- How can teachers' work be a site for on-going professional learning?

- What conditions need to be in place to ensure that all teachers engage in effective forms of PD?

While the necessity of professional development is widely recognised, current provision falls far short of what the research says is necessary to improve learning outcomes for all students. There are many individually effective professional development programs and activities operating at school and system levels, but the overall pattern of provision is brief, fragmentary and rarely sequential. The capacity of the profession to engage most of its members in effective modes of professional learning over the long term is weak.

This paper argues that we need to build capacity for learning, not only at teacher, school and system levels, but also at the level of the profession. Evidence is provided that the profession is ready and able to undertake this task. Policies are needed that will support the profession in

**Dr Lawrence Ingvarson**  
Director, Teaching and  
Learning Research Program

This paper can be downloaded at  
the ACER website [www.acer.edu.au](http://www.acer.edu.au)

\* This paper was commissioned and first published by the Australian College of Educators in 2002.

building a national framework for continuing learning, from registration to advanced certification, guided by professional standards and assessments, and supported by career paths that recognise the central importance of teachers' knowledge and skill to successful learning outcomes for students in our schools.

The central importance of teacher quality to student learning outcomes

Professional development has become the centrepiece among a range of instruments policy makers can use to promote change for one simple, inescapable reason. The quality of what teachers know and can do has the greatest impact on student learning (Ferguson, 1991; Ferguson and Ladd, 1996; Darling-Hammond, 2000, Wenglinsky, 2000; Muijs & Reynolds, 2000). Variation from classroom to classroom, from school to school, in what students learn is due primarily to variation in what their teachers know and can do. Greenwald, Hedges and Laine (1996) examined the impact of a range of investments designed to improve student learning outcomes. They summarised their research in terms of the relative increase in student achievement for every \$500 spent on the following strategies:

Lowering pupil-teacher ratio	0.04
Increasing teacher salaries	0.16
Increasing teacher experience	0.18
Increasing teacher education	0.22

Initial teacher education and professional development can have significant effects on of teacher quality. Teacher quality outweighs student background factors in explaining variation in student achievement (Ferguson, 1991; Ferguson and Ladd, 1996; Haycock, 1998; Darling-Hammond, 2000). Cohen and Hill (2000)

examined the impact of a large-scale professional development program to support implementation of new state standards and assessments for mathematics in California. They found that professional development policies paid off in terms of student performance on the state mathematics assessment when they “focused on learning and teaching academic content, and when curriculum for improving teaching overlaps with curriculum and assessment for students”, and, pertinent to this paper, when they built on standards and PD programs provided by professional organisations (p.330).

Supovitz (2001) reviewed several research studies examining the relationship between professional development and teaching practice and concluded:

Together, these studies provide a solid basis for concluding that professional development that is connected to specific standards for student performance, based upon intensive and sustained training around concrete tasks, focused on subject matter knowledge, and embedded in a systemic context is likely to be effective (p. 85).

A clear message from this research for policy makers is to invest first and most in policies that enhance teacher quality. Good teaching matters a lot to student achievement (Hanuschek, 1992; Ferguson, 1997; Ferguson & Ladd, 1996). However, it is evident that the system for professional development needs reinvention if it is to realise its potential as the main lever for improving student learning outcomes.

---

## CONTEMPORARY RESEARCH ON PROFESSIONAL LEARNING

The field of research on teacher professional development can be classified in many different ways. This brief review is organised around three categories: principles, strategies and contexts for effective professional learning. It identifies four main trends in recent research literature:

- A. Greater attention to identifying what teachers need to learn.
- B. Building more explicit links between teacher learning and student learning
- C. Making practice the site for professional learning
- D. Increasing use of teaching standards and performance assessments as a framework to guide professional learning

### A. Identifying what teachers need to learn to improve student learning outcomes

There is a clear evidence from recent research that the content of professional learning matters as much, if not more, than the process (Kennedy, 1998; Wilson & Berne, 1998; Sykes, 1999, 2001; Cohen & Hill, 2000). In summary, this research indicates that professional learning is most likely to improve student learning outcomes if it increases teachers' understanding of:

- the content they teach,
- how students learn that content,
- how to represent and convey that content in meaningful ways, and
- how well their students are doing in relation to how well they should be doing.

Many lists of principles for effective professional development can be found in the literature (Fullan, 1982; Little, 1993; Abdal-Haq, 1995). They usually claim, for example, that professional development is more effective when it is: extended in time, rather than once-off; school-based rather than course-based; collaborative rather than individual; based on teacher identified needs; and when it provides opportunities for follow-up support, coaching and reflection on practice; and so on.

These lists are useful, so far as they go. They will be very familiar to anyone who has ploughed through the professional development literature. However, most have been silent about what teachers should learn and how practice changes. They tend to focus on the design and structure of the PD course or activity. They are not based on theories of teacher development or the research on teacher change (Richardson, 2002). There are weak links, for example, between these lists of principles and research on the development of expertise. This research indicates that what distinguishes expert from less experienced teachers is the nature of the knowledge and beliefs they have about what they are teaching and how students learn it (Borko & Putnam 1997). Changing knowledge and beliefs is difficult, but it appears to be a necessary condition for teachers to use more effective pedagogical practices.

#### Principles for effective professional learning

Hawley & Valli (1999) provide a set of nine “design principles for effective professional development”, that reflects the shift from form to substance that has taken place over recent years. A useful review of relevant research and examples of programs based on those principles

([www.npeat.org](http://www.npeat.org)) accompanies each principle. Their first principle emphasises that:

1. The content of professional development (PD) focuses on what students are to learn and how to address the different problems students may have in learning the material.

The second principle is based on research indicating that collaborative examination by teachers of their student's work in relation to standards has significant effects of student achievement.

2. Professional development should be based on analyses of the differences between (a) actual student performance and (b) goals and standards for student learning.

The third flows from the first two principles and a growing confidence in an expanding knowledge base for teaching. If the first two principles are in operation, they help to define an agenda for a teacher's professional development. They imply a radical idea for the teaching profession; that professional development should be based in part on what teachers need – rather than want – to learn.

3. Professional development should involve teachers in the identification of what they need to learn and in the development of the learning experiences in which they will be involved.

Kennedy (1998) found ten research studies over the previous twenty years that specifically examined the impact of professional development programs on student learning. These programs varied in terms of their impact on student learning and the permanence of the effects on teacher practice. Kennedy teases out the presumed links between teacher and student learning for each program (the program "logic") and the factors that might

explain why the strength of the links varies between programs. Some programs focused on training teachers in generic teaching behaviours, or methods like cooperative group work. Others focussed mainly on providing teachers with research-based knowledge, say, about how student understanding of number develops in mathematics, but left teachers to use their teaching experience to devise appropriate teaching methods themselves.

As she looked across the ten programs Kennedy found that differences in program form did not account for differences in effects on student achievement. These forms include total contact hours, distributed time, in-class visitations, and whole-school approaches. Instead, what distinguished the most successful professional learning programs was the way each engaged teachers in the content of what was to be taught and provided research-based knowledge about how students learn that subject matter. The more successful PD programs focussed first on influencing teacher knowledge, not practice. The effects of programs that focussed first on promoting specific pedagogical practices were more likely to fade with time, because they did not deepen teachers' understanding about the content and how students learn it.

For example, one of the most successful programs in Kennedy's review was the Cognitively Guided Instruction (CGI) program developed by a team from the University of Wisconsin (Carpenter et al., 1996). Developed after extensive research in the 1980s, the CGI program enhances teachers understanding of research on the development of children's conception of whole number operations involving single-digit and multi-digit numbers. The focus throughout the program is on feedback

---

about children's mathematical thinking. A key characteristic of the program was that teachers listened to their students and built on what they already knew. Instead of advocating particular teaching methods or materials, the CGI team provided issues for teachers to consider as they planned their teaching programs. Several other studies now confirm Kennedy's findings (Clarke, et al., 2001; Bobis, 2001).

Why is the content of professional development so important? One reason is that this kind of learning is "generative". It enhances teachers' professional knowledge and understanding (Franke, 2002). Reviews of effective teaching (e.g. Hattie, 1992; 1993) highlight three major attributes of effective teachers: the quality of feedback, challenge, and structure they provide for students. While these attributes appear to be generic, in reality, the capacity to implement them necessarily depends on deep understanding of what is being taught. It is very difficult to run effective classroom discussion, build on students' ideas, provide timely and appropriate feedback without deep knowledge of what is being taught and how students learn it. Content knowledge and effective pedagogy can not be separated (Brophy, 1990; 2002).

The term "productive pedagogies" has become common in some areas. It appears to be a set of generic principles or standards for teaching. Recent research on professional learning indicates that the effects of direct training in such pedagogical principles may tend to be short-lived unless it is embedded in the context of teaching and learning specific content knowledge. It is worth noting that PD programs operating in Australia that have this embeddedness, such as the Count Me In Too program (Bobis, 2001), the

Early Literacy Research Project (Hill & Crevola, 1998) and Early Numeracy Research Project in Victoria (Clarke, 2001), can produce evidence that they improve student learning. Implications for the success of 'quickie' teacher education programs to fill shortages in certain curriculum areas are obvious.

## B. Linking teacher learning to student learning

The second trend in contemporary research on professional development is to investigate more closely strategies that link teacher learning to improved student learning outcomes. Professional development programs often have ambitious goals, but designs for achieving those goals may be quite unrealistic. A zone of wishful thinking characterises many PD programs; a zone of vagueness about how the program actually "works" to bring about change. PD providers can have difficulty in explaining the causal logic underpinning their program, their assumptions about teacher learning and how that learning will lead to improved student learning.

In extreme cases designs for educational reform through professional development can be equivalent to expecting the Sydney Harbour Bridge to be built with matchsticks – and in less than a month. A school system may use one-day workshops to implement a complex curriculum reform. A primary school may use several after-school sessions from an inspirational consultant to improve the teaching of science. How these activities will lead to teacher learning and changes in practice remains unclear. Programs may lack what some call a "program logic", or a "theory of action". This is often not the fault of those (sometimes left) with the task of providing the program. There can be a

severe mismatch between the goals of the program and the resources allocated to it.

### Strategies for Professional Learning

An important decision for any professional developer is to choose a method for teacher learning appropriate to the goals and context of the professional development program. Loucks-Horsley et al. (1998) provides a valuable classification of professional learning strategies in her book, *Designing Professional Development for Teachers of Science and Mathematics*. By “strategy” she means the learning experiences designed to promote specific professional development goals. Loucks-Horsley describes the elements necessary for the design and implementation of each strategy, as well as its underlying assumptions and beliefs. Case study examples of each strategy in action are provided, together with a brief review of related research.

Table 1 summarises fifteen strategies for professional learning identified by Loucks-Horsley. Even though its focus is on professional development for mathematics and science teachers, the strategies are generic and can readily be applied to any field of teaching. Anyone with professional development responsibilities will find Loucks-Horsley’s book an invaluable resource.

Loucks-Horsley classifies the strategies according to their core purposes. For example, Examining Practice strategies make practice the site for learning (Ball & Cohen, 1999) and are essential to attitudinal and conceptual change. Sometimes existing assumptions underlying practice have to be challenged; “disequilibrium” is necessary if development is to take place at a fundamental level. Most teachers, for example, increase their capacity to see learning from the students’ point of view

only slowly, over many years. Deep subject-specific pedagogical knowledge, similarly can only develop over time. There are significant things about teaching that can only, and will only, be learned in practice, and from peer review of practice.

These are among the most rewarding strategies for professional developers. They are necessary conditions for the development of higher levels of expertise in teaching (Berliner, 1992; Sternberg & Horvath, 1995). It is questionable whether the current pattern of professional development provision is well geared to promote this kind of long term learning. These strategies are also an effective means of making teaching a more accountable profession.

### Matching strategies to goals

Loucks-Horsley draws attention to the need to match the PD strategy to the purpose of the PD program and the stage participants are at in the process of change. Some strategies focus mainly on developing awareness at the early stages when reforms are being introduced. Some focus on building knowledge and understanding of content, through, for example immersion strategies. Strategies that aim to help teachers translate new knowledge into practice might for example, concentrate on bringing teachers together to plan teaching programs.

Others, such as coaching and mentoring might provide in-classroom support as teachers reach the stage of trying new ideas in their classrooms. And, as already mentioned, strategies such as action research and examining student work are suited to helping teachers analyse and reflect on the impact of their practice and generate ideas for improvement.

---

Table 1: Strategies for Professional Learning

**Immersion**

1. Immersion into Inquiry and Problem Solving:  
Engaging in the kinds of learning that teachers are expected to practice with their students, such as inquiry-based mathematics investigations.
2. Immersion into the World of Mathematics:  
Participating in an intensive experience in the day-to-day work of a mathematician, often in a laboratory, industry, or museum, with full engagement in research activities.

**Curriculum**

3. Curriculum Implementation:  
Learning, using, and refining use of a particular set of instructional materials in the classroom.
4. Curriculum Replacement Units:  
Implementing a unit of instruction that addresses one topic in a way that illustrates effective teaching techniques.
5. Curriculum Development and Adaptation:  
Creating new instructional materials and strategies or tailoring existing ones to better meet the learning needs of students.

**Examining Practice**

6. Action Research:  
Examining teachers' own teaching and their students' learning by engaging in a research project in the classroom.
7. Case Discussions:  
Examining written narratives or videotapes of classroom events and discussing the problems and issues
8. Examining Student Work and Thinking, and Scoring Assessments:  
Carefully examining students' work to understand their thinking so that appropriate instructional strategies and materials can be identified.

**Collaborative Work**

9. Study Groups:  
Engaging in regular collaborative interactions around topics identified by the group, with opportunities to examine new information, reflect on classroom practice, and analyse outcome data.
10. Coaching and Mentoring:  
Working one-on-one with another teacher to improve teaching and learning through a variety of activities, including classroom observation and feedback, problem solving, and co-planning.
11. Partnerships with Mathematicians in Business, Industry, and Universities:  
Working collaboratively with practicing mathematicians with the focus on improving teacher content knowledge, instructional materials, and access to facilities.
12. Professional Networks:  
Linking in person or through electronic means with other teachers to explore topics of interest, pursue shared goals, and address common problems.

**Vehicles and Mechanisms**

13. Workshops, Institutes, Courses, and Seminars:  
Using structured opportunities outside the classroom to focus intensely on topics of interest, including mathematics content, and learn from others with more expertise.
14. Technology for Professional Development:  
Using various kinds of technology, including computers, telecommunications, video, and CD-ROMs, to learn.
15. Developing Professional Developers:  
Building the skills and deep understanding of content pedagogy needed to create learning experiences.

### Case discussion methods

One example will have to suffice here to illustrate how researchers are investigating the links between professional development activities, teacher learning, and outcomes for students - that of case methods as developed by Barnett (1998) and others (e.g. Shulman, 1992). There is a long tradition of case methods in professional education and Merseth (1996) provides a comprehensive review of research on case methods as used in teacher education.

“Cases” are usually brief, first-hand, accounts that teachers have written about particular events or dilemmas that have arisen in teaching particular topics or ideas. They often include rough and ready evidence of what students have said, done or written in class. Barnett’s teachers used “difficult to teach” topics in elementary school mathematics, like fractions and decimals, as a starting point for their cases (Barnett et al., 1994). The cases usually described the context of the class, what the teacher intended to do, and what actually happened, with snippets of dialogue and student work where appropriate (the “vicissitudes of human intention”). In the final stages of a case, the case writer usually moves into a more analytic and reflective mode, using the evidence provided to identify a problem or dilemma in their practice for discussion.

Case methods provide an effective vehicle for de-privatising practice and reflective dialogue, characteristics of professional communities. They can be readily incorporated into normal staff meetings in schools. Case methods groups usually consist of teachers with a shared teaching interest who meet regularly to read each

others’ cases, or cases that other teachers have written. These groups require a focus for their deliberations. Teaching standards can provide an appropriate focus or “North Star” to guide the evaluation and reflection of case method groups. Barnett shows how teachers enhanced their ability to describe, analyse and evaluate their teaching, using the standards of the National Council for the Teaching of Mathematics (NCTM, 1991) and the National Board for Professional standards (NBPTS, 1989). The cases and the standards gave these groups something to be collegial about.

Heller (1995) developed a framework for conducting research on the impact of Barnett’s case discussions that makes explicit the links between PD activities and student outcomes. She identifies five critical features of the case discussion strategy: Exploration of mathematical meanings; Critical analysis of practice; Focus on student thinking; Experience in a learning community; and building a professional community. Table 2 spells out the links for two of the five features.

Undertaking this kind of analysis leads to greater clarity about the assumptions that underlie the change process and how a professional learning program is supposed to “work”. Barnett (1998) provides evidence that case methods have a deep impact on teachers’ pedagogical content knowledge. Heller (2002) investigated the effects of monthly science case-based discussions for primary teachers over a full school year. She found significant gains in teachers’ science content knowledge and pedagogical content knowledge, as well as improved teaching practices and gains in student learning higher than a comparison group. The most dramatic

---

<sup>1</sup> These include the Australian Association for Teachers of English, the Australian Literacy Educators Association, the Australian Association of Mathematics Teachers and the Australian Science Teachers Association.



gains in learning were among low-performing students.

Over the past ten to fifteen years or so, many more comprehensive PD programs have appeared in Australia with strong designs for promoting teacher learning (e.g. ELIC, Reading Recovery, the Early Literacy and Numeracy Projects in Victoria (e.g. Clarke, et al. 2001), Count Me In Too (Bobis & Gould, 1999). In fact Australia has become good at developing, and even exporting, these programs. Designers of these programs have drawn wisely on fundamental research on change (Hall & Loucks, 1977; Fullan, 1982); on the acquisition of new skills (Joyce & Showers, 1980) and combined it with research on student learning in specific content areas (e.g. Carpenter, Fennema, Peterson & Loef, 1989).

### C. Making evidence from practice the site for professional learning: building professional community

The third trend in contemporary research is to identify conditions that promote teacher learning in the workplace. The core message for professional developers is to create contexts and use any methods that increase the frequency and quality of conversations that teachers can have with each other about the content of what they are teaching and the learning that is going on in their own classrooms.

Many researchers have identified the existence of an active, accountable professional community within and across

Table 2

<b>Critical features of Maths Case Discussion Method</b>	<b>Related Teacher Outcomes</b>	<b>Opportunities to Learn for Students</b>	<b>Related Student Outcomes</b>
<p><b>Exploration of mathematical meanings</b> Teachers discuss and think carefully about the meaning of mathematical concepts and procedures in each case.</p>	<ul style="list-style-type: none"> <li>• Improvements in maths content knowledge, especially with respect to meaningfulness of procedures and concepts</li> <li>• Increase in confidence and more positive attitudes toward maths</li> </ul>	<ul style="list-style-type: none"> <li>• Mathematical content areas are included that were not previously</li> <li>• Richer exposure to mathematical meanings in classroom teaching</li> </ul>	<ul style="list-style-type: none"> <li>• Students learn mathematical content they would not have otherwise</li> <li>• Students learn more sophisticated mathematical ideas and ways of thinking, and learn in more depth</li> </ul>
<p><b>Focus on Student Thinking</b> Participants articulate and reflect on student thinking and understanding as well as their own and one another's thinking.</p>	<ul style="list-style-type: none"> <li>• Deliberate planning to support student understanding</li> <li>• More attention to student thinking and to solution processes</li> </ul>	<ul style="list-style-type: none"> <li>• Teaching geared more to student understanding</li> <li>• Increase in elicitation of student thinking.</li> </ul>	<ul style="list-style-type: none"> <li>• Students improve in quality of mathematical thinking</li> </ul>

schools as important for effective teacher development and high quality teaching. ‘The path to change in the classroom core lies within and through teachers’ professional communities’ (McLaughlin & Talbert, 1993, p.18).

Newmann (2000) argues that professional development policy should not only focus on building teacher capacity; it should deliberately aim to build school or organisational “capacity”. Newman defines school capacity as “the collective power of the school staff to improve student achievement schoolwide”.

Louis & Marks (1998) found higher levels of professional community to be associated with higher student achievement, though associations between classroom practices and achievement are much stronger. The defining elements of professional communities were shared norms and values, a collective focus on student learning, collaboration, deprivatised practice and reflective dialogue. The aim of building professional community has been at the heart of many successful PD initiatives in Australia (Hill & Crevola, 1998; McRae et al., 2000).

Harkreader & Wethersby (1998) compared staff development practices in high and low achieving schools in Georgia. There were clear differences. Staff development in low achieving schools had little connection to student performance and was more haphazard and individualistic. School leaders in high achieving schools promoted collaborative decisions among staff about professional development.

Elmore (2000) criticises those who believe recruiting, rewarding and retaining high quality teachers is enough to accomplish large-scale reform.

What’s missing in this view is any recognition that improvement is more a function of *learning to do the right things* in the setting where you work than it is of what you know when you start to do the work. Improvement at scale is largely a *property of organisations*, not of pre-existing traits of the individuals who work in them. Organisations that improve do so because they create and nurture agreement on what is worth achieving, and they set in motion the internal processes by which people progressively learn how to do what they need to do in order to achieve what is worthwhile (p. 25).

For Elmore, the key to effective professional learning is to build a new professional culture characterised by collective responsibility for teaching practice and student learning. Finding subtle ways to deprivatise practice appears to be the key to strengthening professional community; increasing opportunities for conversations based on concrete evidence from classroom practice and student progress. Effective teacher learning is data-driven. Teachers may not perceive these opportunities as professional development activities – in fact that may be a good thing – nevertheless, the evidence is that this is when some of the most effective professional learning happens.

Darling-Hammond (1992) emphasises that professional communities accept a mutual obligation to review their practices in the light of profession-defined standards. Case methods described above are a very effective method for promoting the development of professional community, as are all the strategies listed above by Loucks-Horsley under Examining Practice.

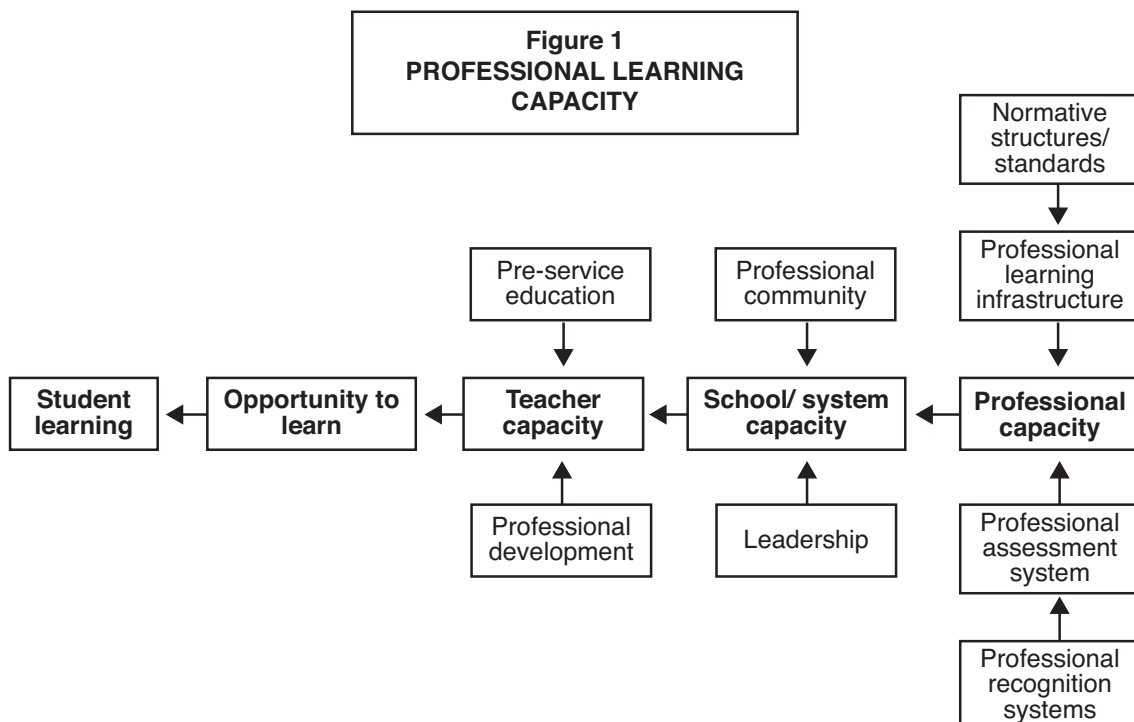
## D. Teaching standards as a framework for long term professional learning

The fourth trend is to use teaching standards to guide programs for teacher education, induction and on-going professional learning (Darling-Hammond, 1999). This trend integrates the previous three trends above, which emphasise that effective professional learning is more likely when teachers are active agents in their own continuing learning (Garet, 2001). Effective PD engages teachers in examining where they are in relation to what they might become as a teacher. Teaching standards aim to embody the deep educational values that teachers pursue. These values may take years to become manifest in one's practice: what it means, for example, to promote independent thinking; what it takes to

understand learning from the student's point of view; what it takes to make student assessment a vehicle for learning.

Effective professional learning starts with induction programs where young teachers learn to evaluate their performance in relation to standards expected of entrants to the profession. Most of the significant things that good teachers learn through experience take years of quiet pain and risk taking before bearing fruit. Effective professional learning starts to resemble a long-term, personal quest, rather than a course or a workshop on implementing the latest policy change, important though the latter can be. Standards aim to assist teachers in that personal-professional quest.

But questions remain. Even if these conditions were in place, how could a system for learning in the teaching profession engage all teachers in effective forms of on-going professional learning? Evidence is mounting that the best way to



ensure this is to build a system of induction, registration and advanced levels of professional certification based on profession-defined teaching standards (Ingvarson, 1998).

There have been rapid advances over recent years in the ability of the teaching profession to develop standards that teachers find exciting, useful and challenging. The trend began with the professional standards developed by the National Council for Teaching Mathematics (1989) and the National Board for the Professional Teaching Standards (1989). Many other teacher associations have followed, including several Australian associations.

These new profession-defined standards are a complete departure from the behavioural checklists and lists of generic competencies of the past, which teachers usually reject as an insult to the complexity of their work, especially when used to evaluate their teaching for merit pay. The new teaching standards reflect a major shift that took place in research on teaching during the 1980s. Following the work of people such as Shulman, Berliner and Leinhardt, researchers began to pay more attention to understanding what highly accomplished teachers know and do. The CGI program mentioned earlier showed that primary teachers become more effective with research-based knowledge about the development of children's mathematical concept and thinking in number. The challenge for standards development committees is to write statements that can capture this kind of professional knowledge about effective teaching practices in specific fields of teaching.

Two important things that have been learned if standards are to promote effective teacher learning.

(1) They must be *performance-based* standards. A complete set of standards should provide answers to the following questions:

- What is important about what we teach, and what is quality learning of what we teach?
- What should teachers know and be able to do to promote that kind of learning?
- What tasks should teachers perform to provide evidence of what they know and can do?
- How will that evidence be judged fairly and reliably?

(2) They need to be seen as one component of a standards-based professional development system, which includes:

- *teaching standards* that describe what teachers need to learn and what they should get better at;
- methods teachers can use to gather evidence about their work and *assess their performance* in relation to the standards that promote professional learning,
- an infrastructure for *professional learning* within schools and across the profession whose primary purpose is to enable teachers to gain the knowledge and skill embodied in the teaching standards; and
- a credible, voluntary system for providing *professional recognition* and *certification*, based on valid methods for assessing when teachers have attained the standards.

One example of a standards-based professional learning system is that being generated by the National Board for Professional Teaching Standards (NBPTS) in the USA. (Others include the Interstate New Teacher Assessment Consortium (INTASC), The Praxis System developed

---

by the Educational Testing Service and the teacher induction schemes run by state licensing bodies in Connecticut and California). The Level 3 Classroom Teacher Scheme in WA is the closest we have to this kind of system in Australia.

Recent research studies support the validity of the NBPTS standards and methods for assessing teacher performance (Bond, et al., 2000; Silver et al. 2002). Teachers undertake two types of task. One asks them to prepare a portfolio with four entries: one based on student work, two based on videotapes of classroom practice and one based on documented contributions to the school and professional community. The other uses an examination format to assess subject-specific pedagogical knowledge over one half day. (Ingvarson (1999) describes the certification process in some detail.)

As NBPTS certification gains credibility, governments and education authorities are creating a market for “National Board Certified Teachers”. Forty-four states now give tangible forms of recognition, such as salary increases. Many are reorganising their professional development resources to build an infrastructure of resource centres, teacher networks, university-school partnerships, and so on, to support teachers preparing for NBPTS certification and reallocating PD funds to cover costs of certification (Anderson et al. 2001). Certification is also redefining the nature of university masters courses that US teachers routinely take for salary progression (Unrau, 2002).

The NBPTS conducted a survey in 2001 of 10,000 teachers who had been through its process of certification ([www.nbpts.org](http://www.nbpts.org)). In summary, teachers reported that:

- the certification process had made them better teachers (92%),

- was an effective professional development experience (96%),
- equipped them to create better curricula (89%),
- improved their ability to evaluate student learning (89%),
- enhanced their interaction with students (82%), parents (82%) and colleagues (80%).

Some representative comments include:

*“The National Board Certification process was by far the best professional development I have been involved in. I did not realise how much I still needed to learn about impacting student learning. I learned so much through hours of analysing and reflecting.”*

*“I gained valuable insight of myself as a teacher. The process helped me to assess my teaching abilities as no administrator could have. Most importantly, my students benefit from my self-improvement.”*

*“Working with other teachers in my school who were also working on certification was rewarding”*

*“It was the hardest thing I have ever done and it is something I am so glad that I tried. I am immensely proud of the work I turned in – even if I did not make the needed grade. It has made me a better teacher and colleague.”*

It is evident that registration and certification processes have the capacity to engage all teachers in forms of PD consistent with the research on effective modes of teacher learning outlined above. When part of a long-term preparation process with colleagues, preparation for certification necessarily involves teachers in the kind of learning that is highly consistent with research on effective professional development. There are many studies reporting the positive effects of the certification process on professional development. (Tracz, 2001; Monte-Sano &

Sato, 2001; Areglado, 1999; Heller, 2002). The National Board assessments stipulate what teachers are to show they can do, but, like the content standards, the assessments are open, or non-prescriptive, about how teachers show they can do it. To illustrate, science teachers are asked to show in one of their portfolio entries that they can engage their students in analysis and interpretation of data the students have collected in a scientific investigation. That a science teacher should be able to do this in order to gain certification as accomplished is a non-negotiable, as far as the National Board is concerned. But how they choose to do this in their school context is completely up to the teacher.

When part of a long term preparation process with colleagues, preparation for certification, involves teachers in learning more about their students' understanding in relation to what they are teaching, strengthening their content knowledge, planning more coherent learning programs, selecting assessments more clearly linked to learning goals for their students, and analysing and reflecting more insightfully about their teaching. These are some of the fundamental dimensions of professional development, dimensions that valid professional standards must endeavour to capture.

Over forty Australian teachers have completed National Board portfolios adapted to the Australian context, using the standards developed by the Australian Science Teachers Association (2002). Semple and Ingvarson (forthcoming) found that Australian teachers had similarly enthusiastic responses to those of American teachers.

A standards-based professional development system linked to certification should be seen as complementary to, not a

replacement for, the professional development that employing authorities provide to support the implementation of changes and reforms they have initiated.

Ingvarson (2001a) compares the NBPTS approach to providing professional recognition for evidence of professional development with the UK "threshold" performance management reform relating pay to performance. Both aim to reform the teaching profession and provide stronger incentives and recognition for evidence of professional development. The NBPTS is turning out to be a professional capacity-building exercise on a massive scale, the other has turned out to be quite the opposite (Mahony, et al. 2002).

Haynes et al. (2001) surveyed English teachers who had prepared for the threshold promotion. In its first year of operation 97% "passed" over the threshold and gained access to higher steps on a new salary scale. In contrast, roughly only 40 to 50% of candidates gain National Board certification in the US in their first attempt. Haynes et al. found that 1% of English teachers reported that the experience had had a positive experience on their practice. 98% said it had had detrimental effect on their morale, almost the reverse of teachers' response to National Board certification.

What accounts for the stark differences between UK and US teachers in their attitudes to these reforms? No doubt there are many, but three stand out. The UK reform failed to delegate any meaningful responsibility to the profession for the design or the implementation of the scheme. The method for assessing teacher performance was breathtakingly crude and was introduced before any research to ensure its reliability or validity. It was neither a valid assessment process nor a

---

vehicle for professional learning. Consequently, the UK scheme could not provide a form of recognition that teachers respected, nor a credible basis for restructuring professional development.

## REINVENTING THE PROFESSIONAL LEARNING SYSTEM FOR TEACHERS

What would a professional development system look like if its main purpose were to improve learning outcomes for all students? Three things make it difficult for the current system for professional learning to be effective: the lack of clarity about what teachers should get better at, weak incentives for professional learning, and the lack of professional ownership and responsibility for the present system.

Surveys of teachers indicate that participation in professional development is very uneven (McRae et al., 2000). There is large variation between schools, and there is often large variation among teachers within the same school. McRae et al. report that 25% of Australian teachers spend less than one day annually in professional development activities out of school hours, but about the same percentage spend 6 or more days annually. Although there has been a significant shift to school-based activities over recent years, over 50% of teachers said that the total time spent per year on professional development activity in school hours was 2-3 days or less. This data needs to be put alongside research data indicating that significant change in teaching practice is more likely in programs with over 80 contact hours spread over extended periods of time (Garet, 2001; CPRE, 1999).

Opportunity explains only part of this

variation in participation levels. Attitudes to professional development vary. The same study reports that only 60% of teachers rated professional development as a high priority. Elmore (1996) looked at a series of major educational innovations over the 20th Century and estimates that on average they were implemented by about 25% of teachers only. He attributes the problem of “getting to scale” with educational reforms to a belief common among teachers that good teaching is a more a bundle of personality traits than something most people can learn to get better at. Getting to scale with educational reforms, Elmore argues, will depend on building new normative structures in the teaching profession.

The existence of external norms is important because it institutionalises the idea that professionals are responsible for looking outward at challenging conceptions of practice in addition to looking inward at their values and competencies (p. 319).

Unlike most professions, teaching places no obligation on its members to show evidence of participation in programs of on-going professional learning. When research indicates massive differences in the cumulative effects of good and poor teachers on student achievement (Sanders & Rivers, 1996), we have to re-examine some cultural norms that have dominated the teaching profession. The professional development research indicates that teacher effectiveness is not a fixed thing. Student achievement can climb significantly in schools and school systems that support effective professional learning.

In his latest book, Fullan (2001) argues that effective professional development will depend on recreating teaching as a profession. This means that our prevailing

assumptions about teachers as learners will need to shift radically. Sykes (1999) gives three images of teacher learning, as reflected in different systems for professional development.

In one, teachers operate as consumers within a quasi-regulated market structured by bureaucratic service provision. In another, teachers perform as independent artisans building up knowledge skill and materials around craft-based approaches to their work. In a third, teachers act as professionals who orient their work according to communal and collegial norms (p. 154).

Current PD provision in Australia has elements of all three images, but the first two are dominant. The third image is rare, where PD is an integral part of collegial work and something for which teachers may be accountable. The level of discretion exercised over engagement in professional development is a feature of teaching. An appropriate metaphor for current teacher professional development is the supermarket or shopping mall rather than a system with clear long-term goals and expectations matched to stages for teacher development.

Building professional capacity to support effective teacher learning

Figure 1 sets out three levels of capacity building that a professional learning system should address. The importance of building capacity at school as well as teacher (and school system) levels has been outlined earlier in this paper. At the first level, professional learning is about building individual teacher “capacity”. The focus is on the relationship between teacher capacity and student learning outcomes. Capacity in this case refers to the knowledge, skills and values essential to providing quality opportunities for

student learning. Capacity at the school level is also essential. Capacity here refers to conditions that build strong and accountable professional communities as described above.

What has not been so obvious is the importance of building capacity at the level of the profession, if we are to build a system capable of engaging all teachers in effective forms of professional learning. This is the level at which the teaching profession is relatively weak. There are four elements of professional capacity in Figure 1.

1. The capacity to build strong normative structures in the profession that provide teacher leadership and standards from entry to highly accomplished teaching across the profession,
2. The capacity to provide a credible professional certification, based on a rigorous system for assessing teacher performance in relation to standards,
3. The capacity to develop a new infrastructure to support professional development toward standards for each career stage, and
4. The development of new career structures and pay systems that provide incentives for professional development and tangible recognition of professional certification.

Wise policies that capitalise on the potential of professional learning to improve learning outcomes for all students will seek to strengthen these elements of professional capacity. These are emerging as the central elements of state and national policies to build teacher quality (National Commission on Teaching and America’s Future, 1997; Wilson, 2002; Berry, 2002, Meadows, 2002).



---

## Moving forward

Where are we in Australia in relation to the development of professional capacity in this sense? While stakeholders in education have their differences in other areas, they have a common interest in promoting the quality of teaching. Everyone has much to gain from a stable and effective professional learning system with capacity to engage all teachers. I believe we are close to creating a national alliance of interested parties who could make a standards-based professional learning system a reality.

The Commonwealth has given strong support to the development of professional standards through the QTP initiative and through ARC funding, which has enabled national teacher associations to learn how to develop standards and assessments for highly accomplished teaching. MCEETYA has established a Taskforce on Teacher Quality and Educational Leadership to prepare advice on a range of issues. These include: “the establishment of a fully integrated professional development regime involving preservice education and . . . inservice professional upgrading”, and “professional standards for teachers and principals, both for entry to the profession and to meet the ongoing needs of students over time”.

The Australian Education Union has policies endorsing the development of professional certification system by teachers and the Australian College of Education has played a critical role in facilitating national forums and furthering this debate.

Several teacher associations have proven their ability to develop professional standards (e.g. Australian Science Teachers’ Association, 2002) and some senior educational system officials have

commented that their standards are probably more challenging than they would dare to propose themselves. These associations are showing that the profession has the capacity to lay down its own long-term goals for the professional development of its members. These associations are also in the process of developing new methods for assessing teacher performance against their standards for professional certification.

Most state and territory employing authorities are undertaking initiatives to give greater recognition to teachers for evidence of professional development. The Level 3 Classroom Teacher initiative in WA, and new promotion procedures in Victorian government schools both recognise the need for valid state-wide standards and assessments external to the school. This requirement is build into the EBAs in those states. WA even contracts out the task of assessing teacher performance for the Level 3. It is proposed that the Victorian Institute of Teaching will provide advanced certification, assisted by “recognised” professional associations. Following the report, *Quality Matters*, NSW is considering recommendations for a three-tier “accreditation” system for teachers based on attainment of standards. Tasmania has a successful professional recognition program, which is heading toward being performance-based and the Northern Territory has its Teachers of Exemplary Practice.

These initiatives would only be reinforced by a national effort to build a performance-based professional certification system to promote professional learning. Professional recognition is an area ripe for inter-governmental co-operation, economy of scale and productive links with the current efforts of the profession to provide certification.

State teacher registration bodies have developed standards for entry to the profession. The effective use of these standards in induction programs would be greatly enhanced by inter-governmental support for the development of performance assessments for beginning teachers similar in form, though at a less demanding level, to those used by the NBPTS.

The 1998 Senate Report, *A Class Act*, called for a national system for professional certification in the following terms:

A system of professional recognition for teachers must be established which is based on the achievement of enhanced knowledge and skills and which retains teachers at the front line of student learning. Such knowledge and skills should be identified, classified and assessed according to criteria developed by expert panels drawn from the profession. Education authorities should structure remuneration accordingly (p. 7-8).

### A framework of professional standards

Taken together, the above trends indicate that at present we have a propitious set of circumstances for building such a system. Clearly there is a lot of “bottom up” activity going on among a range of teacher organisations and a demonstrated ability to develop high quality teaching standards. At the same time, there is widespread recognition from state and territory governments, teacher unions and the Commonwealth Government that advantages would be gained by all from the development of a national framework for teaching standards. It is increasingly common to hear senior government officials say that the development of teaching standards is not their business; rather, it is something they are looking for the profession to do.

A standards framework for the teaching profession would need to mirror the curriculum framework, and the different levels for which teachers are trained. In defining what students should know and be able to do, curriculum standards define, in part, what teachers need to know and be able to do. It would be a mistake to assume one generic set of standards could be a valid reflection of what teachers need to know and be able to do. Standards that describe what an early childhood teacher should be able to do will be different from those for an accomplished high school social studies teacher.

It would also compromise the credibility of professional certification to leave methods of implementation to determination by local jurisdictions. A national professional body is needed with an on-going capacity to develop standards and *responsibility for ensuring that the system for assessing teacher performance against those standards is rigorous*. It would be a serious error to delegate assessment to the local or school level, as the UK did when it left poorly trained principals to assess their own teachers. (This reform was conceived purely in terms of performance management, not professional certification.) There would be no need for a national body to be a provider of professional development programs itself. The only thing that such a body needs to be good at is providing a credible performance assessment system. The professional development benefits flow from providing certification that schools and school systems value highly.

New methods of performance assessment for certification provide powerful vehicles for engaging teachers in effective forms of professional development. When employing authorities give recognition, a certification

---

system quickly generates a wide range of professional development activity at school and local levels, directed to supporting teachers prepare for professional certification. This is precisely what is happening in states that provide recognition for NBPTS certification in the USA (Anderson et al., 2001).

#### Principles for strengthening professional capacity

Four elements of professional capacity were outlined above. Together, they form a professional learning system for which the profession, governments and education authorities have complementary responsibilities. Standards and certification might be the responsibility of a professional body, for example, but they will only serve their purpose effectively if governments, employing authorities and teacher unions provide support and recognition for professional learning toward those standards.

Strengthening professional capacity will also depend on recognition that professional standards, by definition, are not specific to schools or school systems. The same applies to professional certification, if certification means endorsement by a professional body that a member has reached advanced standards for professional development. Professional certification also, by definition, can not be a function specific to, or owned by, state jurisdictions or employing authorities. Certification depends on the creation of an agency or agencies with the capacity to operate *profession wide*. But methods for supporting professional learning will be decided locally, as will incentives and forms of recognition considered appropriate.

Independence will be critical for any agency with responsibility for a professional learning system, but it must

remain accountable for the rigour of its work. A professional agency will need to be sponsored, though not owned, by governments and employing authorities. The same applies to teacher organisations and associations. The operation of a professional learning system will rely deeply on professional expertise and commitment, yet, perhaps counter-intuitively, the validity of its certification will require the certification body to be independent of existing teacher associations and organisations. Such an agency will need to provide a balance between democratic and professional forms of authority and accountability over teaching standards and teacher evaluation (Strike, 1990). Professionalism means autonomy only in return for fulfilling the obligation of accountability. Professional bodies necessarily operate under authority delegated by democratically elected governments.

In other words, developing professional capacity needs to be seen as a joint professional and political responsibility, not a case of either-or. Development of a standards-guided professional learning system will need to be the responsibility of a stable agency where current “bottom-up” and “top-down” initiatives to promote quality teaching can coalesce and complement one another.

However, no existing organisation or agency has the capacity or acceptability across the professional educational community, to undertake such a role at present. Any serious attempt to introduce and operate a professional certification system will depend on the creation of an entirely new kind of body in Australian education.

### Options for developing professional capacity

What options are available for the development of a national professional agency? Two can be dismissed readily. The top down approach alone, as used in the UK, has proceeded down a predictable path of irrelevance to professional learning. Similarly, bottom up action alone is unlikely to lead to the kind of concerted and coordinated action needed to operate a standards-guided professional learning system across all fields of teaching.

We also have the Award Restructuring experience gained in the early 1990's. This demonstrated that the industrial bargaining arena is not an appropriate place to make complex decisions about standards for teaching or methods for making valid assessments of teacher performance.

Another option can be discerned through the development of professional standards bodies at the state level in Victoria, Tasmania and Western Australia. Queensland and South Australia have had teacher registration bodies since the 1970s. NSW is also considering the establishment of an Institute of Teaching. There may be room for coordinated action across these state level bodies in developing a national recognition system for advanced levels of professional learning. However, the primary functions of these state-level bodies are compulsory registration and approval of initial teacher education programs. These are constitutionally state-level functions. There is little indication that these bodies are ready to come together in the near future to develop of a common system of voluntary advanced professional certification.

### A national certification system?

The 1998 Senate Report conceived of a national body that would provide an umbrella organisation for the development and operation of a certification system, inclusive of all stakeholders. There would be a clear need for such a body to ensure comparability across the standards and the assessments for the different fields of teacher certification, if employers and unions were to give recognition. Teachers will rightly expect the standards and work required to be comparable across certification fields.

The clearest way forward in my view is for state and territory Ministers of Education to do what the Ministers of Health did in 1985; that was to establish an Australian Medical Council (AMC) as an incorporated body. An equivalent body for teaching, an "Australian Education Council" (AEC), might not have exactly the same functions, but it could have the same constitution as an incorporated body. The Health Ministers delegated considerable responsibility to the medical profession to carry out the AMC's functions, but the AMC is ultimately accountable to them. Since 1985, the AMC has played an increasingly important role in quality not only in accreditation, but also in the development of uniform registration standards and, latterly, in decisions about recognition of new specialist colleges (Ingvarson, 2001b).

MCEETYA provides a means of meeting the principles outlined above. It has the capacity to ensure the main stakeholders are around the table. It has the capacity to ensure there is a balance between democratic and professional forms of authority and accountability. MCEETYA has the capacity to ensure that an AEC would be independent, yet representative

---

of all stakeholders, and accountable finally to the public. MCEETYA provides a means to ensure that all teachers and teacher organisations are fully engaged at all levels in all its operations. None of the existing teacher associations has the capacity to do this. None has the legitimacy either to be the voice or conduit for the others in dealing with government bodies.

A national certification body could strengthen capacity at all three levels identified in this paper. If it had responsibility only for operating a voluntary professional certification system, it would still have the potential to reinvent professional learning for teachers. It would also strengthen the capacity of schools, school systems, professional associations and universities to provide effective professional learning opportunities. Although it would not be a provider of professional development programs, a national body of this kind could create a normative context within which many others would be able to provide more effective professional development.

Such a body has the potential to draw thousands of teachers into valuable learning activities at all levels of its operation. It could call on teachers and teacher associations to be part of standards development committees in particular fields of teaching. We know from the current standards development projects completed by the Australian Science Teachers Association, the Australian Association for Teachers of English, the Australian Literacy Educators Association and the Australian Association for Teachers of Mathematics that this is valuable professional learning. It would call upon many teachers to be involved in researching new forms of assessment. It would also call upon many teachers to be trained as

assessors, a role that has proven to be a valuable professional learning experience.

An Australian Education Council would only succeed under certain conditions. The most critical is the professional and public credibility of its certification. Certification is basically the only function it should have. The standards and assessments must be reliable and valid. It would have to be given time to do the research necessary to developing valid standards and assessments. Although it might seem counter-intuitive, the more valid the performance assessment, the greater its capacity will be for generating effective professional development. New forms of performance assessment, such as structured portfolio tasks, are designed to be powerful vehicles for analysis and reflection on teaching.

A national certification body would have to be genuinely independent of professional associations and stakeholders if it were to develop valid standards and performance assessments. But it would draw heavily on their existing work and expertise. At the same time, it must be representative of all interested parties, including governments and employing authorities, though accomplished teachers should constitute the majority of its membership.

A national certification system would provide a valuable service to employers and the public seeking to provide recognition to teachers for evidence of professional development. It would not supplant the roles of employers or unions. Professional certification should be distinguished from performance management procedures that are properly the responsibility of employing authorities.

It is unlikely that all employing authorities would want to use this service, at least not initially. This should be expected. Some

states and territories may feel ready to move in this direction, others have their own schemes. In fact it might be more manageable to start with just one or two states and territories and scale up to more states as the operation gains credibility. There will be a lot to learn about how to establish and operate a national certification before scaling up. But it will not be necessary to have total consensus before initiating action in this area.

### Developing a professional learning system

How might the establishment of a professional learning system be funded initially? It is probably more realistic to think in terms of redistribution rather than increases in funds. Current funding levels do not reflect the relative value of investment in teacher quality and teacher education over other investments to improve student outcomes. The balance between investment in more curriculum materials and information technology and investment in effective professional learning could do with examination.

My suggestion is that the Commonwealth Government's Quality Teacher Program, in collaboration with the MCEETYA Taskforce on Teacher Quality, could be reconceived as the foundation for a standards-based professional learning system. This would give the Program a character and purpose distinct from, yet complementary to, the professional development that state and territory education authorities provide themselves. The rationale underpinning the QTP, as set out in *Teachers for the 21st Century* statement (DETYA, 2000) specifically recognises the importance of strengthening the capacity of the profession to develop standards and links between professional development and student learning

outcomes. It also recognises that a system of voluntary professional certification is worth exploring as a means for enhancing the quality and status of the teaching profession (pages 5 and 8).

A professional certification system would provide a means by which the profession, governments and employers exercise joint responsibility for enhancing the quality of teaching. The research indicates that professional development can be effective and is worth greater investment. But more effective professional learning calls for the profession to expect greater accountability among its members for evidence of development toward high standards - and it calls for governments and employers to provide conditions support and reward that development.

Our education systems face the challenge of achieving more ambitious educational goals than ever. One factor alone will determine whether that happens, necessary though not sufficient. It will not be technology. It will not be curriculum resources, whether on-line or on paper. It will not be "new basics" or state or national student assessments. It will be the capacity - the knowledge, skills, values and sheer ingenuity - that each teacher can bring to bear in meet the needs of their students. If we value that capacity, we need to build a system of professional development fit for a learning profession.

---

## REFERENCES

- Abdal-Haqq, I. (1995). *Making time for teacher professional development*. (Digest 95-4). Washington, DC: Eric Clearinghouse on Teaching and Teacher Education.
- Anderson, K.M., Hancock, D., & Jaus, V.J. (2001). *Program evaluation report for the Charlotte Collaborative Project*. (Report available at [www.nbpts.org](http://www.nbpts.org))
- Areglado, N. (1999). I became convinced. *Journal of Staff Development*. 20(1), 35-37
- Australian Science Teachers Association. (2002). *Professional Standards for Highly Accomplished Teachers of Science*. Canberra: ASTA.
- Ball, D.L. & Cohen, D.K. (1999). Developing practice, developing practitioners: Toward a practice-based theory of professional education. In L. Darling-Hammond & G. Sykes (Eds.), *Teaching as the learning profession: Handbook of policy and practice*. San Francisco: Jossey-Bass.
- Barnett, C. (1998). Mathematics teaching cases. *Teaching and Teacher Education*, 14(1), 81-93.
- Barnett, C., D. Goldstein, & Jackson, B.(1994). *Mathematics Teaching Cases: Fractions, Decimals, Ratios, and Percents: Hard to Teach and Hard to Learn? Facilitator's Discussion Guide*. Portsmouth, NH: Heineman.
- Berliner, D.C. (1992). The nature of expertise in teaching. In F.K. Oser, A. Dick & J-L. Patry (Eds.), *Effective and responsible teaching: the new synthesis* (pp. 227-248). San Francisco: Jossey-Bass.
- Berry, B. (2002). *North Carolina's approach to the improvement of teaching: Heavy investment, apparent returns*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, April 2002.
- Bobis, J. & Gould, P. (1999). The mathematical achievement of children in the Count Me In Too Program. In J. Truran and K. Truran (Eds.), *Making the difference: Proceedings of the 22nd annual conference of the Mathematical Education Research Group of Australasia Incorporated*, Adelaide: MERGA.
- Bobis, J. (2001). *The effect of Count Me In Too on Year 3 Basic Skills Test Results*. A report prepared on behalf of the NSW Department of Education and Training.
- Bond, L., Smith, T., Baker, W., and Hattie, J. (2000). *The certification system of the National Board for Professional Teaching Standards: A construct and consequential validation study*. Greensboro, NC: Center for Educational Research and Evaluation, The University of North Carolina at Greensboro.
- Borko, H. & Putnam, R. (1996). Learning to teach. In D.C. Berliner & R.C. Calfee (Eds.), *Handbook of educational psychology* (pp. 673-708). New York: Macmillan.
- Brophy, J. (Ed.) (1990). *Teachers' knowledge of subject matter as it relates to their teaching practice. Volume 2. Advances in Research on Teaching*. Greenwich, Conn.: JAI Press
- Brophy, J. (Ed.) (2002). Brophy, J. (2001). *Subject-specific instructional methods and activities. Volume 8. Advances in Research on Teaching*. Amsterdam: JAI Press.

- Carpenter, T.P., Fennema, E., Peterson, P.L., Chiang, C., & Loef, M. (1989). Using knowledge of children's mathematical thinking in classroom teaching: An experimental study. *American Educational Research Journal*, 26, 499-532.
- Carpenter, T., Fennema, E., and Franke, M. (1996). Cognitively-guided instruction: A knowledge base for reform in primary mathematics instruction. *Elementary School Journal*, 97(1), 1-20.
- Clarke et al. (2001). *Understanding, assessing and developing young children's mathematical thinking: Research as a powerful tool for professional growth*. Keynote address to the annual conference of the Mathematical Education Research Group of Australasia.
- Cohen, D., and Hill, H. (2000). Instructional policy and classroom performance: The mathematics reform in California. *Teachers College Record*, 102(2), 294-343.
- Cohen, D.K. & Hill, H.C. (1998). State Policy and Classroom Performance, *CPRE Policy Briefs*, January.
- Darling-Hammond, L. (2000). Teacher quality and student achievement: A review of state policy evidence. *Education Policy Analysis Archives*, 8(1), 1-49.
- Darling-Hammond, L. (1992). Creating standards of practice and delivery for learner-centred schools. *Stanford Law and Policy Review*. 4, 37-52.
- Darling-Hammond, L. (1999). *Reshaping teaching policy, preparation and practice: Influences of the National Board for Professional Teaching Standards*. New York: American Association of Colleges for Teacher Education.
- Department of Education, Employment and Training (2000). *Teachers for the 21st Century: Making the difference*. Canberra: DETYA.
- Elmore, R. (2000). *Leadership of large-scale improvement in American education*. Washington, DC: Albert Shanker Institute, American Federation of Teachers.
- Elmore, R. (1996). Getting to scale with successful educational practices. In S.H. Fuhrman & J. O'Day (Eds.), *Rewards and reform: Creating educational incentives that work*. (pp. 294-329). San Francisco: Jossey-Bass.
- Ferguson, R. (1991). Paying for public education: New evidence on how and why money matters. *Harvard Journal on Legislation* 28(2), 465-498.
- Ferguson, R.F. & Ladd, H.F. (1996). "How and Why Money Matters: An Analysis of Alabama Schools," in *Holding Schools Accountable: Performance Based Reform in Education*, Brookings Institute: Washington, DC, 1996
- Franke, M. (2002). *Designing professional development to support generative growth in teachers with different knowledge, skills and identities*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, April 2002.
- Fullan, M. (1982). *The meaning of educational change*. New York: Teachers College Press.
- Fullan, M. (2001). *The new meaning of educational change. 3rd Edition*. New York: Teachers College Press.
- Garet, M.S., Porter, A.C., Desimone, L., Birman, B.F. & Yoon, K.S. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal*. 38(4), 915-940.



- Greenwald, R., Hedges, L.V., & Laine, R.D. (1996). The effects of school resources on student achievement. *Review of Educational Research*, 66, 361-396.
- Hall, G. & Loucks, S. (1977). A developmental model for determining whether the treatment is actually implemented. *American Educational Research Journal*, 14(3), 263-76.
- Hanushek, E.A (1992). The trade-off between child quantity and quality. *Journal of Political Economy*. 100, 84-118.
- Harkreader, S., & Wethersby, J. (1998). *Staff development and student achievement: Making the connection in Georgia schools*. Paper prepared for the Council for School Performance
- Hattie, J. (1992). Toward a model of schooling: A synthesis of meta-analyses. *Australian Journal of Education*, 36(5), 5-13.
- Hattie, J. (1993). Measuring the effects of schooling. *SET* (Australian Council for Educational Research), 2, 1-4.
- Hawley W. and Valli, L. (1999). The essentials of effective professional development: A new consensus. In L. Darling-Hammond and G. Sykes (Eds.). *Teaching as the learning profession. Handbook of policy and practice* (pp. 151-180). San Francisco: Jossey Bass.
- Haycock, K. (1998). Good teaching matters ... a lot. *Thinking K-12*. 3 (2), 1-14. ([www.edtrust.org](http://www.edtrust.org))
- Heller, J.I. (1995). *Entering and hall of mirrors: On building tools to assess the impact of case-based methods of teacher development*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, April 1995.
- Heller, J.I. & Kaskowitz, S.R. (2002). Science cases for teacher learning: Evaluation of impact on teachers, classrooms and students. Project Year 3, 2000-2001. Heller Research Associates.
- Heller, J. (2002). *Impact of the National Board certification process on teachers' pedagogical perception and teaching practices*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, April 2002.
- Hill, P.W., & Crevola, C.A. (1998). The role of standards in educational reform for the 21st century. In D.D. Marsh (Ed.), *Preparing our schools for the 21st century* (Association for Supervision and Curriculum Development Yearbook 1999, pp117-142. Alexandria, VA: ASCD.
- Ingvarson, L. (1998). Professional development as the pursuit of professional standards: The standards-based professional development system. *Teaching and Teacher Education*, 14(1), 127-140.
- Ingvarson L.C. (1999). The power of professional certification. *Unicorn*, 25(2), 52-70.
- Ingvarson, L.C. (2001a). *Strengthening the Profession: A comparison of recent reforms in the USA and the UK*. Australian College of Education Seminar Series, Canberra. ([acer.edu.au/research/TaL](http://acer.edu.au/research/TaL))
- Ingvarson, L. (2001b). *Development of a National Standards Framework for the Teaching Profession: An Issues paper prepared for the MCEETYA Taskforce on Teacher Quality and Educational Leadership*. ([www.acer.edu/research/TaL](http://www.acer.edu/research/TaL))

- Joyce, B. and Showers, B. (1980). Improving inservice training: The messages of research. *Educational Leadership*, 37(5), 379-85.
- Kennedy, M. (1998). *Form and substance in inservice teacher education* (Research monograph no. 13). Arlington, VA: National Science Foundation.
- Little, J. W. (1982). Norms of collegiality and experimentation: Workplace conditions of school success. *American Educational Research Journal*, 19(3), 325-40.
- Little, J. W. (1993). Teachers' professional development in a climate of educational reform. *Educational Evaluation and Policy Analysis*, 15(2), 129-151.
- Loucks-Horsley, S., Hewson, P., Love, N., and Stiles, K. (1998). *Designing professional development for teachers of mathematics and science*. Thousand Oaks, CA: Corwin Press.
- Louis, K. S., and Marks, H. (1998). Does professional community affect the classroom? Teachers' work and student experiences in restructuring schools. *American Educational Research Journal*, 106, 532-575.
- McLaughlin, M. & Talbert, J. (1993). *Contexts that matter for teaching and learning: Strategic opportunities for meeting the nation's educational goals*. Stanford University: Centre for Research on the Context of Secondary School Teaching.
- McRae, D. et al. (2000). *PD 2000 Australia: A National Mapping of School Teacher Professional Development*. Canberra: Commonwealth Department of Education, Training and Youth Affairs
- Mahony, P., Hextall, I., & Mentor, I. (2002). *Managing teachers' performance? A critical policy study of Threshold assessment in England*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, April 2002.
- Meadows, J.L., Knapp, M. (2002). *Standards-based reform meets teaching quality: Evolving strategies in New York, Washington and California*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, April 2002.
- Merseth, K. (1996). Cases and case methods in teacher education. In J. Sikula (Ed.), *Handbook of research on teacher education. Second Edition* (pp. 722-744). New York: Macmillan.
- Muijs, D. & Reynolds, D (2000). School effectiveness and teacher effectiveness in mathematics. Some preliminary findings from the evaluation of the Mathematics Enhancement Programme (Primary). *School Effectiveness and School Improvement*, 11(3), 273-303.
- National Board for Professional Teaching Standards (1989). *Toward high and rigorous standards for the teaching profession*. Detroit: NBPTS.
- National Commission on Teaching and America's Future. (1997). *What Matters Most: Teaching for America's Future*. Woodbridge, Virginia. (The Commission's World Wide Web site is at: <http://www.tc.columbia.edu/~teachcomm>)
- National Council of Teachers of Mathematics (1991). *Professional Standards for the Teaching of Mathematics*. Reston, Virginia: NCTM.

- Newmann, F., King, M.B., & Youngs, P. (2000). Professional development that addresses school capacity: Lessons from urban elementary schools. *American Journal of Education*, 108(4), 259-299.
- Ramsey, G. (2000). *Quality matters. Revitalising teaching: Critical times, critical choices*. (Report of the Review of Teacher Education.) Sydney: NSW Department of Education
- Richardson, V. (2002). Teacher change. In Richardson, V. (Ed.), *Handbook of Research on Teaching. Fourth Edition* (pp. 905-950). Washington, DC: American Educational Research Association.
- Rowe, K.J., Rowe, K.S., & Pollard, J. (2002). *The value of PD and Auditory Processing Screening by teachers of children in the early years of schooling*. Report to Department of Education, Employment and Training, Victoria. Melbourne, VIC: Department of General Paediatrics, Royal Children's Hospital, and Australian Council for Educational Research.
- Sanders, W.L. & Rivers, J.C. (1996). Cumulative and residual effects of teachers on future student achievement. Knoxville: University of Tennessee Value-added Research Centre
- Sato, M., & Monte-Sano, C. (2002). *The National Board certification process and its impact on teacher leadership*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, April 2002.
- Semple, A. & Ingvarson, L. (Forthcoming). Australian teachers' views of NBPTS portfolio entries as a method for assessing teacher performance. Melbourne: ACER
- Senate Employment, Education and Training Committee (1998). *A class act: Inquiry into the status of the teaching profession*. Canberra: AGPS.
- Shulman, J. H. (Ed.) (1992). *Case Methods in Teacher Education*. New York: Teachers College Press.
- Silver, E., Mesa, V., Benken, B.M., & Mairs, A. (2002). *Putting it together: What do the NBPTS data tell us about teaching and assessing mathematics for understanding in the middle grades?* Paper presented at the annual meeting of the American Educational Research Association, New Orleans, April 2002.
- Sternberg, R.J. & Horvath, J.A. (1995). A prototype of expert teaching. *Educational Researcher*, 24(6), 9-17.
- Supovitz, J. (2001). Translating teaching practice into improved student achievement. In S. Fuhrman (Ed.). *From the capitol to the classroom. Standards-based reforms in the states. The one hundredth yearbook of the National Society for the Study of Education, Part Two* (pp. 81-98). Chicago: University of Chicago Press.
- Sykes, G. (1999). Teacher and student learning: Strengthening their connection. In L. Darling-Hammond and G. Sykes (Eds.), *Teaching as the learning profession. Handbook of policy and practice* (pp. 151-180). San Francisco: Jossey Bass.
- Sykes, G. (2001). Professional Development for teachers: Principles, practices and contexts. Paper prepared for the Learning First Alliance (Draft).
- Talbert, J. and McLaughlin, M. (1994). Teacher professionalism in local school contexts. *American Journal of Education*, 102, 123-153.

- Unrau, N. (2002). *Lessons learned from MA candidates pursuing National Board certification*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, April 2002.
- Wenglinsky, H. (2000). *How teaching matters: Bringing the classroom back into the discussions about teacher quality*. Princeton, NJ: Educational Testing Service.
- Wilson, S. and Berne, J. (1999). Teacher learning and the acquisition of professional knowledge: An examination of research on contemporary professional development. In Iran-Nejad and P. D. Pearson (Eds.). *Review of Research in Education, Vol. 24* (pp.173-209). Washington, DC: American Educational Research Association.
- Wilson, S. (2002). *Connecticut's investment in the improvement of teaching: A standard for sustainable teaching policy?* Paper presented at the annual meeting of the American Educational Research Association, New Orleans, April 2002.
- Wolf , K. & Taylor, G. (Forthcoming). Effects of National Board for Professional Teaching Standards certification on teachers' perspectives and practices. In L.C. Ingvarson (Ed.), (Forthcoming) *Assessing Teachers for Professional Certification: The National Board for Professional Teaching Standards*. Amsterdam: Elsevier.