

QUEENSLAND COLLEGE OF TEACHERS RESEARCH DIGEST

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IN THIS EDITION

The characteristics of effective professional development	2
Teachers as content experts	5
Impact of professional learning	8
Comment: the crucial role of professional learning	10
Useful websites	11
References	12

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The Research Digests

This Digest is one of a series of periodic digests produced by the Australian Council for Educational Research (ACER) for the Queensland College of Teachers.

Each digest focuses on a single topical issue, and provides a review of major messages from research on the issue. A key feature of the digests is an emphasis on what the research means for teachers and teaching. Over the course of several editions, a wide range of issues will be covered, so that teachers from different areas of schooling will find topics of relevance to their needs and interests.

Previous Issues

- 1 (Oct 2007) *Writing to learn*
- 2 (Apr 2008) *Managing student behaviour in the classroom*
- 3 (Oct 2008) *Using Data to Improve Learning*
- 4 (Apr 2009) *The use of ICT in schools in the digital age: what does the research say?*
- 5 (Aug 2009) *Talking to learn: Dialogue in the classroom*

Research Digest

Number 6

Successful professional learning

This edition of The Digest is focused on research into teacher learning and professional development. Teacher learning includes not only activities such as conferences and workshops, but also includes participation in many formal and informal learning activities. Recent research has focussed, amongst other things, on characteristics of successful professional learning, and on the connections between teachers' professional learning and improvements in student learning.

This research has the potential to assist teachers and schools in selecting and planning for professional learning, so that it will maximise the benefits for participants.

The first section of this digest presents some research findings on effective professional learning. The next section draws on studies of content-specific professional learning programs. The third section reports some of the research on the impact of professional learning.

The digest draws on searches of a number of databases and bibliographic resources, including the Australian Education Index, Education Resources Information Center (ERIC), Education Research Complete, British Education Index and Scopus.

A selection of relevant websites is listed, and a full reference list is provided. Links to those references for which full-text online access is freely available are also included.



The characteristics of effective professional development

2



Research has demonstrated the importance of quality teaching for students' learning.

The importance of teachers' access to high quality professional learning opportunities throughout their careers, and of improving professional learning for teachers has been widely recognised. A recent major review of professional development (Darling-Hammond, Wei, Andree, Richardson & Orphanos, 2009) notes that, in the last two decades, the research on effective professional development has begun to identify a consensus about key principles in the design of learning experiences that can impact on teachers' knowledge and practices.

In this review, high quality or effective professional development was defined as that which

... results in improvements in teachers' knowledge and instructional practice, as well as improved student learning outcomes. We emphasize research that links teacher development to student learning. While the impact on student achievement is a critical indicator of the effectiveness of professional development, we believe the impact of professional development on teacher knowledge and instructional practice is also relevant, as these are worthwhile outcomes in themselves that support increased learning for students. (Darling-Hammond et al., 2009)

Research on studies about the conditions that foster effective professional learning was summarised in 1999 by Hawley and Valli as a list of nine design principles.

Principles for the Design of Effective Professional Development (Hawley & Valli, 1999)

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.
2. Professional development should be based on analyses of the differences between (a) actual student performance and (b) goals and standards for student learning.
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.
4. Professional development should be primarily schoolbased and built into the day-to-day work of teaching.
5. Professional development should be organized around collaborative problem solving.
6. Professional development should be continuous and ongoing, involving follow-up and support for further learning - including support from sources external to the school that can provide necessary resources and new perspectives.
7. Professional development should incorporate evaluation of multiple sources of information on (a) outcomes for students and (b) the instruction and other processes that are involved in implementing the lessons learned through professional development.
8. Professional development should provide opportunities to gain an understanding of the theory underlying the knowledge and skills being learned.
9. Professional development should be connected to a comprehensive change process focused on improving student learning.

Each of these statements is supported by an explanation of the basis for the principle. For example, the fourth principle highlights school-based professional development, and explains that:

Teachers learn from their work. Learning how to teach more effectively on the basis of experience requires that such learning be planned for and evaluated. Learning needs arise and should be met in real contexts. Curriculum development, assessment, and decision-making processes are all occasions for learning. When built into these routine practices, PD powerfully addresses real needs. (Hawley & Valli, 1999)

The importance of continuous and ongoing professional learning, with follow-up and support, as stated in the sixth principle is supported by this argument:

Adoption and implementation of effective practices requires continued learning. Therefore the design of PD must provide time to apply new ideas and, sometimes, must draw on additional outside expertise. Such follow-up and support ensures PD contributes to real change and continuous improvement. (Hawley & Valli, 1999)

An Australian study analysed the features of professional development programs that had been examined in four evaluation studies (Ingvarson, Meiers & Beavis, 2005). The model for the analysis included contextual factors (e.g., school support), structural features of programs (e.g., length), process features (e.g., emphasis on content; active learning; examination of student work; feedback; followup), a mediating variable (level of professional community generated), and four outcome measures (knowledge; practice; student learning and efficacy).

a consensus about key principles in the design of learning experiences that can impact on teachers' knowledge and practices

The findings from this study indicated that the most effective programs, in terms of their impact on teachers' knowledge and practice, were consistent with research such as that summarised by Hawley and Valli (1999). The study found consistent significant direct effects across the four studies for the impact of content focus, active learning, and follow-up on knowledge and professional community (Ingvarson et al., 2005). The most effective programs identified in this study shared the following features:

They provided opportunities for teachers to focus on what students were to learn and how to deal with the problems students may have in learning that subject matter. They focused on research-based knowledge about student learning of content. They included opportunities for teachers to examine student work collaboratively – and in relation to standards for what the students in question should know and be able to do. They led teachers to actively reflect on their practice and compare it with high standards for professional practice. They engaged them in identifying what they needed to learn, and in planning the learning experiences that would help them meet those needs. They provided time for teachers to test new teaching methods and to receive follow-up support and coaching in their classrooms as they faced problems of implementing changes. They included activities that led teachers to deprivatise their practice and gain feedback about their teaching from colleagues.

there is an empirical research base to support the identification of a core set of features of effective professional development

This Australian study used a similar methodology to an earlier study that also explored the relationship of features of professional development to teacher outcomes, and provided empirical confirmation in support of some of the characteristics of effective professional development identified in the literature. The results of that study indicated

that sustained and intensive professional development is more likely to have an impact, as reported by teachers, than is shorter professional development [and also] that professional development that focuses on academic subject matter (content), gives teachers opportunities for ‘hands on’ work (active learning), and is integrated into the daily life of school (coherence), is more likely to produce enhanced knowledge and skills. (Garet, Porter, Desimone, Birman & Yoon, 2001)

Desimone (2009) argues that there is an empirical research base to support the identification of a core set of features of effective professional development and a core conceptual framework for studying the effects of professional development. She found a consensus of five core features, suggesting that the first feature may be the most influential feature:

1. the content focus of teacher learning;
2. opportunities for teachers to engage in active learning are also related to the effectiveness of professional development;
3. coherence, the extent to which learning is consistent with teachers' knowledge and beliefs;
4. intellectual and pedagogic change requires professional development activities to be of sufficient duration, including both span of time over which the activity is spread and the number of hours spent in the activity;
5. collective participation of teachers from the same school, grade or department, setting up interaction and discourse which can be a powerful form of teacher learning.

A recent review (Darling-Hammond et al., 2009) investigated what research has revealed about professional learning that improves teachers' practice and student learning. This review drew on methodologically strong studies that pointed to some basic principles for designing professional learning:

1. Professional development should be intensive, ongoing, and connected to practice.
2. Professional development should focus on student learning and address the teaching of specific curriculum content.
3. Professional development should align with school improvement priorities and goals.
4. Professional development should build strong relationships among teachers.

A key finding of this research is the need for professional development to operate within content areas, thereby allowing teachers to develop their content expertise. ■

Teachers as content experts

5



While some professional learning programs function at the broader, cross-curricular level, research has shown that programs targeted at specific content areas are more effective.

The New Zealand Ministry of Education completed a review in 2007 of studies investigating professional learning and development. This review clearly illustrated the benefits of content-specific programs. A study that specifically examined the impact of professional development on teachers' knowledge showed that subject-matter expertise promotes higher quality practice and better learning outcomes (Neuman & Cunningham, 2009). These trends point towards the need for a greater emphasis on depth, rather than breadth, in the design of professional development.

The study undertaken by Neuman and Cunningham investigated the impact of professional learning that included coursework content experts and coaching in professional development intended to improve teacher knowledge. They

employed a diagnostic or prescriptive model of coaching that focused on helping participants apply research-based strategies to improve child outcomes in language and literacy. The model focused on the following cycle:

Coaches engaged teachers in reflection and goal setting; the coaches helped identify desired outcomes and strategies to achieve these outcomes; collaboratively, they developed an action plan for the implementation of new practices the following week, which became the source of further reflection and action. (Neuman & Cunningham, 2009)

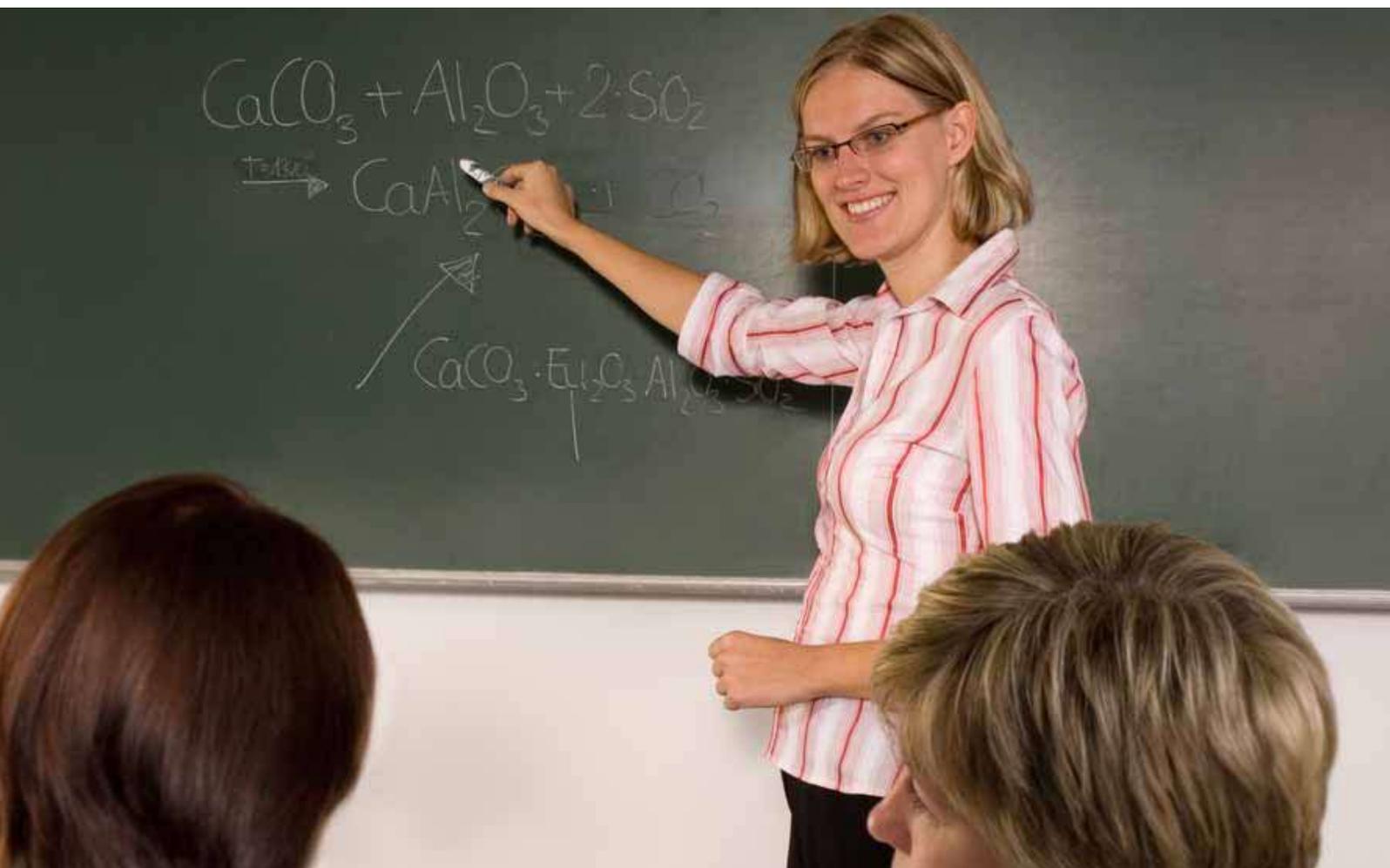
Research studies are not the only source of evidence highlighting the need for content-specific professional development. Perhaps more important are findings that teachers themselves report a strong desire for selfdevelopment in this area. A recent report from the National Staff Development Council (Darling-Hammond et al., 2009) showed that, when asked about their priorities for future professional development, 'learning more about the content they teach' was the option that received the most support from more than 100,000 teachers across the US. ■

Both research findings and teacher priorities have established that building content expertise should be a key feature of professional development programs. To pursue this goal, it is necessary to ask: what facilitates the growth of a teacher from a content novice to a content expert? The first step must be to acquire an in-depth knowledge of a content area; however, teachers must also appreciate that different approaches can be adopted in the teaching of this knowledge, and judge which approach best suits the knowledge to be taught and the students in their care. In other words, in addition to being content experts, teachers must also have pedagogical content expertise. The professional development and learning review conducted by New Zealand's Ministry of Education (Timperley, Wilson, Barrar & Fung, 2007) observed that programs had a more positive effect on student outcomes when they were designed to build content knowledge and pedagogical knowledge rather than content knowledge only. Neuman and Cunningham (2009) used the phrase 'embedding knowledge in practice' as a way to address the topic of pedagogical content expertise. They commented that:

Professional development initiatives and teacher preparation programs that emphasize developing content expertise...are well supported by [an] emerging research base. Content matters, and methods that help teachers develop and convey these understandings to children are an important part of children's... development.

Thus, teachers, as content experts, must demonstrate:

- ▶ a deep understanding of the knowledge that forms a content area;
- ▶ an appreciation for the different approaches that can be used to teach that knowledge;
- ▶ an ability to determine, based on the context they are presented with (e.g. students, resources, school goals), which approach is the most suitable and will produce the best student outcomes, and;



- ▶ a willingness to constantly challenge their assumptions regarding what is best practice, and an openness to taking on new strategies and approaches for learning.

The National Staff Development Council in the US (Darling-Hammond et al., 2009) developed a framework for professional development which takes into account these criteria. This framework proposes three types of standards for staff development: context, content and process. The context standard relates to the importance of encouraging collaboration between teachers, between teachers and school leaders, and between teachers and community leaders, in order to create a healthy and functional context for teacher growth. On the other hand, the content standards refer more specifically to the notion of teachers as content and pedagogical content experts:

Content Standards

Staff development that improves the learning of all students:

- ▶ *Prepares educators to understand and appreciate all students, create safe, orderly and supportive learning environments, and hold high expectations for their academic achievement.*
- ▶ *Deepens educators' content knowledge, provides them with research-based instructional strategies to assist students in meeting rigorous academic standards, and prepares them to use various types of classroom assessments appropriately.*
- ▶ *Provides educators with knowledge and skills to involve families and other stake-holders appropriately.*

Process standards relate to the processes by which teachers can assess their own development and improve their practices.

Process Standards

Staff development that improves the learning of all students:

- ▶ *Uses disaggregated student data to determine adult-learning priorities, monitor progress, and help sustain continuous improvement.*
- ▶ *Uses multiple sources of information to guide improvement and demonstrate its impact.*
- ▶ *Prepares educators to apply research to decision making.*
- ▶ *Applies knowledge about human learning and change.*
- ▶ *Provides educators with knowledge and skills to collaborate.*

A common thread within these criteria is the notion of using different types of feedback to inform teaching practices. Hattie and Timperley (2007) reported that feedback is associated with the investment of more effort and encourages higher levels of confidence. Of course, in addition to these types of motivational effects, feedback provides teachers with the opportunity to exercise reflective practices and gain a better understanding of their own teaching beliefs and behaviours. In their review of professional development and learning, the New Zealand Ministry of Education (2007) argued that teachers who were able to answer the reflective questions, 'where am I going?', 'how am I going?', and 'where to next?' used feedback to inform their learning. This intersected with *in-depth pedagogical content knowledge and an understanding of student progressions in relation to the curriculum.*

programs had a more positive effect on student outcomes when they were designed to build content knowledge and pedagogical knowledge rather than content knowledge only

There are several ways that teachers can access feedback on their development and impact on students. Coaching allows for mentoring from a more experienced teacher who can also review current teaching strategies and their effectiveness. Professional learning communities provide a non-confrontational avenue to receive feedback wherein teachers can compare their strategies with others and learn via modelling. Student performance data can act as a source of diagnostic information about students' progress but also as a way to monitor whether improvements might be associated with the implementation of new teaching practices. Finally, feedback could also be a design feature of professional development programs such that teachers learn about content and pedagogical content, in addition to gaining feedback about their own progress in these areas. ■

The impact of professional learning

8

The increasing focus on the importance of understanding professional learning that improves teachers' practice and student learning has been taken up in various studies of the impact of professional development.

An Australian national study was designed to investigate the links between teacher professional development and student learning outcomes (Meiers & Ingvarson, 2005).

A review of research literature on educational effectiveness clearly identified the connections between quality teachers and their professional development. There was convergence in the research literature on the features of effective professional development, including the focus on subject matter learning, that are linked to improvements in students' learning. This review provided the basis for the school based trials focused on whole-school approaches linking teacher professional development to student learning outcomes. Ten professional development programs were investigated in 70 schools across Australia, encompassing 42 primary schools and 28 secondary schools from all education sectors. The professional development programs were complex and multi-layered.

Evidence of teachers' experience of the professional development programs, and changes in teaching practice was collected from surveys and interviews, and evidence of changes in student learning outcomes was collected by using a range of assessment instruments, aligned as closely as possible to the purposes of each of the professional development programs. These assessments were administered at the beginning and end of the same school year. A 'value-added' analysis was used to identify the schools where it appeared that the professional development might have impacted on student outcomes. Improvements in student learning had taken place in most schools, but the value-added analysis made it possible to focus on cases where the improvement was better than might be expected. The multi-level analysis of the repeated measures of student achievement established that in only a few cases did the data show that the students had achieved more than might have been expected, and that this improvement might have been attributable to the particular professional development program.

The study clearly indicated the difficulties involved in establishing causal links between teachers' professional learning and improved student learning.

The implicit logic of the focus on professional development as a means of improving student achievement, as identified by Supovitz (2001) is that high quality professional development will produce superior teaching in classrooms, which will, in turn, translate into higher levels of student achievement. Supovitz explored five possible reasons why professional development may be effective at changing teaching practices but be less successful in raising student achievement.

First, there are often incompatibilities between standardsbased reform practices and the assessment instruments used to measure their impact. Second, there is often poor alignment between the content of what is taught and what is tested. Third, our impatience for results leads us to look for impacts too soon, rather than allowing effects to accumulate. Fourth, our models relating teaching practice to student achievement may not include crucial environmental specifications. Finally, reformers' specifications of professional development may not be precise enough to powerfully impact student achievement. (Supovitz, 2001)

This investigation identified a number of issues:

1. Student outcomes broadly defined

The professional development programs included in this study were selected because they were explicitly intended to lead to the improvement of student learning. The case studies indicated that it is essential, in investigating the links between teacher learning and student learning, to define student learning broadly, and to avoid narrowing outcomes to those that can be easily measured.

2. A wide range of evidence of improvement, including teachers' classroom observations

This investigation gathered both qualitative and quantitative evidence of improvements. The rigorous analysis of the repeated measures of achievement provided limited, but significant evidence of improvement. The wider range of evidence collected in the case studies, particularly from teacher's informed observations of their students over time, provided nuanced insights into the work of improving student learning.

3. Longitudinal view of change

The school-based trials took place over a single school year. This was a relatively short period to come to understand and to take up new practices, for these new or refined practices to impact on students' learning, and for the evidence of change in student outcomes to become apparent. If the impact of professional development is to be judged, even partially, by its impact on student learning, a longitudinal view of change is needed.

4. Evidence of change in students' learning as an incentive for taking changed practice further

An interesting link between professional development and student outcomes can be seen when teachers take up a new practice, and recognise how this practice creates new learning opportunities for students. This evidence of change then becomes an incentive for further learning.

5. The design of professional development

The investigation highlighted, in the literature review, in the case studies, and in the cross-program analysis, the significance of the emphasis on content in the design of professional development. Emphasis on content knowledge, knowledge of how students learn that content, and knowledge of strategies for teaching that content connect professional development to classroom programs.

6. School contextual factors

The school-based trials provided a considerable body of information about the impact of school contextual factors on the implementation and sustainability of the intended outcomes of professional development. Leadership support was a crucial mediating influence. Where leadership support and commitment was strong, the case studies indicated that it was possible to implement change over time. (Meiers & Ingvarson, 2005)

There are methodological issues involved in evaluating the impact of professional development, particularly the impact on students' achievement.

Timing is one of the most interesting. Timing is important because moving from providing PD to obtaining an impact on achievement involves traversing a number of causal links, and each of these may take time to unfold. How long do teachers need to think about what they have learned in order to put it effectively into practice? Once practices are put in place, are they sustained over time? And how long does improved instruction take to effect detectable increases in students' learning? That is, does PD have an impact on student outcomes during the year in which the PD is delivered, or is there a delay in impact? (Wayne, Yoon, Zhu, Cronen & Garet, 2008)

moving from providing PD to obtaining an impact on achievement involves traversing a number of causal links, and each of these may take time to unfold.

The US Council of Chief State School Officers undertook a meta-analysis study seeking scientifically-based evidence regarding the effects of teacher professional development on improving student learning (Blank & de las Alas, 2009). The study was supported by a grant from the National Science Foundation. The analysis focussed on completed studies of the effects of professional development for K-12 teachers of science and mathematics. The results of the meta-analysis showed cross-study evidence that teacher professional development in mathematics does have significant effects on student achievement. It is interesting to note the finding that the analysis results also confirm the positive relationship to student outcomes of key characteristics of design of professional development that have been documented in prior research. Common patterns identified that the program designs included strong emphasis on teachers learning specific subject content as well as pedagogical content for how to teach the content to others. The implementation of professional development included multiple activities to provide follow-up reinforcement of learning, assistance with implementation, and support for teachers from mentors and colleagues in their schools. ■

Comment: The crucial role of professional learning

10

Ongoing professional development plays a crucial role in improving teacher effectiveness and the quality of learning opportunities for students.

This digest has reviewed research about effective teacher professional learning, and its impact on teaching practice and student achievement. The reporting of research into professional learning approaches designed to develop content expertise in an area of learning indicates the importance of subject-matter expertise in high quality practice. A chain of logic links teachers' professional learning and improved student outcomes, and the research reported in this digest identifies the growing consensus about features of professional development that have the potential for strengthening these links. The research findings in this digest offer signposts for teachers and school leaders with an interest in the role of professional development in improving teaching practice and student learning. ■



useful websites

<http://www.aussieeducator.org.au/teachers/professionaldevelopment.html>

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