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# Teacher professional learning and development

*by Helen Timperley*



United Nations  
Educational, Scientific and  
Cultural Organization



International Bureau  
of Education

EDUCATIONAL PRACTICES SERIES-18

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## Series Preface

This booklet about teacher professional learning and development has been prepared for inclusion in the Educational Practices Series developed by the International Academy of Education and distributed by the International Bureau of Education and the Academy. As part of its mission, the Academy provides timely syntheses of research on educational topics of international importance. This is the eighteenth in a series of booklets on educational practices that generally improve learning.

This particular booklet is based on a synthesis of research evidence produced for the New Zealand Ministry of Education's Iterative Best Evidence Synthesis (BES) Programme, which is designed to be a catalyst for systemic improvement and sustainable development in education. This synthesis, and others in the series, are available electronically at [www.educationcounts.govt.nz/themes/BES](http://www.educationcounts.govt.nz/themes/BES). All BESs are written using a collaborative approach that involves the writers, teacher unions, principal groups, teacher educators, academics, researchers, policy advisers, and other interested parties. To ensure its rigour and usefulness, each BES follows national guidelines developed by the Ministry of Education.

Professor Helen Timperley was lead writer for the *Teacher Professional Learning and Development: Best Evidence Synthesis Iteration [BES]*, assisted by teacher educators Aaron Wilson and Heather Barrar and research assistant Irene Fung, all of the University of Auckland. The BES is an analysis of 97 studies of professional development that led to improved outcomes for the students of the participating teachers. Most of these studies came from the United States, New Zealand, the Netherlands, the United Kingdom, Canada, and Israel. Dr Lorna Earl provided formative quality assurance for the synthesis; Professor John Hattie and Dr Gavin Brown oversaw the analysis of effect sizes.

Helen Timperley is Professor of Education at the University of Auckland. The primary focus of her research is promotion of professional and organizational learning in schools for the purpose of improving student learning. She has published widely on this subject in peer-reviewed journals, including the *Review of Research in Education*, *Journal of Curriculum Studies*, *Journal of Educational Change*, and *Teaching and Teacher Education*. She has also written four books in her specialist areas for practitioner audiences.

The officers of the International Academy of Education are aware that this booklet is based on research carried out primarily in economically advanced countries. The booklet, however, focuses on practices likely to be generally applicable throughout the world. Even so, the principles should be assessed with reference to local conditions and adapted accordingly.

In any educational or cultural context, suggestions or guidelines for practice must be responsive to that context and open to continuing evaluation. The inquiry model presented in this summary provides a tool to help teachers and teacher educators adapt and build upon the findings of this synthesis in their own contexts.

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This publication was produced in 2008 by the International Academy of Education (IAE), Palais des Académies, 1, rue Ducale, 1000 Brussels, Belgium, and the International Bureau of Education (IBE), P.O. Box 199, 1211 Geneva 20, Switzerland. It is available free of charge and may be freely reproduced and translated into other languages. Please send a copy of any publication that reproduces this text in whole or in part to the IAE and the IBE. This publication is also available on the Internet. See the 'Publications' section, 'Educational Practices Series' page at:

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Printed in 2008 by Imprimerie Nouvelle Gonnet, 01300 Belley, France.

## Introduction

This booklet synthesises the research on teacher professional learning and development that has been demonstrated to have a positive impact on valued student outcomes. Its findings relate to teachers who have received at least some initial teacher education and who are in the process of deepening their knowledge and refining their skills. The booklet should prove particularly useful to those who are involved in helping teachers develop the professional skills they need to teach challenging curricula to diverse students, including students who typically have not achieved well in some of our educational systems.

Behind the ten key principles identified in this synthesis are four important understandings that arise from the evidence base:

1. Notwithstanding the influence of factors such as socio-economic status, home, and community, student learning is strongly influenced by what and how teachers teach.
2. Teaching is a complex activity. Teachers' moment-by-moment decisions about lesson content and process are shaped by multiple factors, not just the agendas of those looking for changes in practice. Such factors include teachers' knowledge and their beliefs about what is important to teach, how students learn, and how to manage student behaviour and meet external demands.
3. It is important to set up conditions that are responsive to the ways in which teachers learn. A recent overview of the research identified the following as important for encouraging learning: engaging learners' prior conceptions about how the world works; developing deep factual and conceptual knowledge, organised into frameworks that facilitate retrieval and application; and promoting metacognitive and self-regulatory processes that help learners define goals and then monitor their progress towards them.
4. Professional learning is strongly shaped by the context in which the teacher practises. This is usually the classroom, which, in turn, is strongly influenced by the wider school culture and the community and society in which the school is situated. Teachers' daily experiences in their practice context shape their understandings, and their understandings shape their experiences.

Other booklets in this series elaborate on aspects of these key understandings. The focus of this particular booklet is on the

interrelated conditions for professional learning and development that impact positively on valued student outcomes.

Helen Timperley

### **Suggested Readings**

1. Alton-Lee, 2003; Donovan, Bransford, & Pellegrino, 1999; Kennedy, 1998; Nye, Konstantanopoulos, & Hedges, 2004.

# 1. Focus on valued student outcomes

Professional learning experiences that focus on the links between particular teaching activities and valued student outcomes are associated with positive impacts on those outcomes.

## Research findings

An important factor influencing whether professional learning activities have a positive impact on outcomes for students is the extent to which those outcomes form the rationale for, and ongoing focus of, teacher engagement. Such a focus requires teachers to understand the links between particular teaching activities, the ways different groups of students respond, and what their students actually learn.

Further, success needs to be defined not in terms of teacher mastery of new strategies but in terms of the impact that changed practice has on valued outcomes. Because teachers work in such varied contexts, there can be no guarantee that any specific approach to teaching will have the desired outcomes for students. For this reason, it is important to keep progress towards the valued outcomes constantly in view.

Professional learning opportunities that have little impact on student outcomes typically focus on mastery of specific teaching skills without checking whether the use of those skills has the desired effect on students.

## Outcomes and expectations

Targeted outcomes for students may be relatively narrow, typically involving the learning of specific knowledge and skills. They also may be broad: comprehending text, learning how to learn, developing collaborative skills, or improving well-being. Whether narrow or broad, they must be clear to the teachers engaging in professional learning experiences. Otherwise, the teachers' engagement is not likely to make a difference for their students.

Where achievement problems are entrenched, possibilities for improved outcomes may become apparent only over time, as teachers see evidence that students can acquire new knowledge and skills when taught differently. Higher teacher expectations of students come from



seeing improved outcomes—there is little evidence to suggest that they can be developed independently of such improvement.

### **Taking responsibility**

Teachers who are engaged in cycles of effective professional learning take greater responsibility for the learning of all students; they do not dismiss learning difficulties as an inevitable consequence of the home or community environment. As they take more responsibility, and as they discover that their new professional knowledge and practice are having a positive impact on their students, they begin to feel more effective as teachers. Like greater expectations, heightened responsibility is developed most effectively when teachers observe that their new teaching practices are having positive impacts on their students.

Linking student learning issues to an expectation that teachers will address them is likely, however, to lead to blaming and a lack of learning unless teachers are confident that they will be given the support they need to develop more effective practices.

*Suggested readings:* Black & Wiliam, 1998; Timperley & Alton-Lee, 2008; Van der Sijde, 1989.

## 2. Worthwhile content

The knowledge and skills developed are those that have been established as effective in achieving valued student outcomes.

### Research findings

How can teachers teach more effectively? While some well-grounded principles have been established (see Brophy, 1999), unproven ideas continue to sweep through different educational jurisdictions. The popularity of particular professional development programmes is not necessarily matched by their impact on students.

Professional knowledge and skills that do have a positive impact on student outcomes are consistent with evidence-based principles of teaching effectiveness. The approaches in which they are embedded have withstood the rigours of policy debates, have been recommended by national school subject associations, or are based on generally accepted research findings.

Some ineffective professional learning approaches also have been justified on the basis of “research” or “policy”, but not research or policy that has been adopted by a professional body or that forms part of a wider programme of research and development.

### Fixed programmes versus context-specific approaches

In some educational jurisdictions, professional development takes the form of fixed programmes designed to develop particular knowledge and skills that have been identified as effective. While they may be based on sound research about student learning, such programmes are developed independently of the participating teachers’ practice contexts and tend to have less impact on student outcomes than approaches that are context-specific. Context-specific approaches promote teaching practices that are consistent with the principles of effective teaching but also systematically assist teachers to translate those principles into locally adapted applications. By developing this kind of knowledge teachers can better solve identified issues about student outcomes in their particular teaching situations.

*Suggested readings:* Brophy, 1999; Stallings & Krasavage, 1986; Timperley, Wilson, Barrar, & Fung, 2007.

### 3. Integration of knowledge and skills

The integration of essential teacher knowledge and skills promotes deep teacher learning and effective changes in practice.

#### Research findings

This principle is central to meaningful change. To establish a firm foundation for improved student outcomes, teachers must integrate their knowledge about the curriculum, and about how to teach it effectively and how to assess whether students have learned it.

Teachers need knowledge and skills in assessment to maintain a student focus: the ability to identify exactly what students know and can do is a prerequisite for teaching that is responsive to each student's needs. But teachers cannot develop their assessment knowledge in isolation from their knowledge of pedagogical content, which is also vital as they focus their teaching on meeting the student needs they identify.

#### Integrating theory and practice

Theory and practice also need to be integrated. In effective professional development, theories of curriculum, effective teaching, and assessment are developed alongside their applications to practice. This integration allows teachers to use their theoretical understandings as the basis for making ongoing, principled decisions about practice.

A skills-only focus does not develop the deep understandings teachers need if they are to change practice in ways that flexibly meet the complex demands of everyday teaching. In fact, without a thorough understanding of the theory, teachers are apt to believe they are teaching in ways consistent with the promoted practice when in fact the relationship between theory and practice is actually very superficial—and any changes they make have little impact on student outcomes. Similarly, using approaches that integrate theory and practice is more effective than merely teaching theoretical constructs to teachers without helping them translate those constructs into practice.

#### Tailoring the emphasis

When designing professional learning opportunities, it is important to consider teachers' prior knowledge of curriculum and assessment

and how they view existing practice. This takes teacher diversity into account just as we expect teachers to take student diversity into account. If teachers have strong curriculum knowledge but weak assessment knowledge, for example, effective approaches to professional development will recognise this. Teachers also have very diverse professional learning needs arising from the specific demands that their particular students place on their teaching skills.

*Suggested readings:* Donovan, Bransford, & Pellegrino, 1999; Hammerness, Darling-Hammond, Bransford, Berliner, Cochran-Smith, McDonald, & Zeichner, 2005; Timperley, Wilson, Barrar, & Fung, 2007.

## 4. Assessment for professional inquiry

Information about what students need to know and do is used to identify what teachers need to know and do.

### Research findings

To engage in professional inquiry that makes a difference for students, teachers need to learn how to identify the pedagogical content knowledge and skills they need to assist their students to achieve the valued outcomes. The core question is, “What do we as teachers need to learn to promote the learning of our students?” Most models of professional inquiry focus on structures and processes. Missing from such models is the nature of the content or understandings to be developed and the skills to be refined (specified through an inquiry process) and the relationship between teacher inquiry and student outcomes. For professional inquiry to have an impact on outcomes, these elements are crucial.

Teachers need sophisticated assessment skills if they are to identify (i) what their students know and can do in relation to valued outcomes and (ii) what further learning they themselves need if they are to assist their students in learning. Assessment of this kind cannot take place outside of the teaching–learning process—it is integral to it. Teachers, therefore, need a variety of ways of assessing their students’ progress, ways that include, but go beyond, standardised testing. These include interviews with students about their learning, systematic analysis of student work, and classroom observations.

### Developing self-regulatory learning skills

It is essential that teachers learn how to identify the needs of their students and their own professional learning needs, but this is not the whole story. Teachers also need to develop the self-regulatory skills that will enable them to monitor and reflect on the effectiveness of changes they make to their practice. This latter inquiry will tell them what ongoing adjustments they must make to maximise student outcomes. In the absence of such self-regulation, changing practice becomes an end in itself instead of a means to benefit students.

Self-regulation is important for all learners, whether students or teachers; it is the process by which they seek feedback on their efforts

to learn. Critical to such self-regulation is the identification of intended outcomes and of cues that will make it possible to monitor progress towards those outcomes. Prescribing sets of desirable behaviours or leaving teachers to develop better practice in the absence of clearly defined goals do not support the development of self-regulation.

This use of assessment information is very different from traditional uses, such as sorting and labelling students or making summative judgments about teaching quality. Indeed, traditional conceptions of assessment are not conducive to self-regulated inquiry: teachers are unlikely to participate in an inquiry process in an open and meaningful way if a less-than-desirable outcome puts their job, pay, or reputation at risk.

*Suggested readings:* Black & Wiliam, 1998; Butler, Lauscher, Jarvis-Selinger, & Beckingham, 2004.

## 5. Multiple opportunities to learn and apply information

To make significant changes to their practice, teachers need multiple opportunities to learn new information and understand its implications for practice. Furthermore, they need to encounter these opportunities in environments that offer both trust and challenge.

### Research findings

Changing practice and developing the skills of professional inquiry require in-depth understanding. For this reason, teachers need multiple opportunities to absorb new information and translate it into practice. Learning is cyclical rather than linear, so teachers need to be able to revisit partially understood ideas as they try them out in their everyday contexts.

Such opportunities should involve a variety of activities that are designed to promote acquisition of the target knowledge and skills. Much of the research literature privileges particular types of activity, such as modelling and coaching, but a synthesis of the research does not reveal that any particular activity is of itself more effective than another. What is more important is that activities are designed and aligned to meet the particular learning purpose.

For substantive learning, such as that involved in improving their students' reading comprehension, mathematical problem solving, or scientific reasoning, teachers need extended time in which to learn and change. In such cases, it typically takes one to two years for teachers to understand how existing beliefs and practices are different from those being promoted, to build the required pedagogical content knowledge, and to change practice. Given that teachers engaged in professional learning are simultaneously maintaining a teaching workload, and that many of their existing assumptions about effective practice are being challenged, it is not surprising that so much time is required. Time, however, is not a sufficient condition for change: teachers also need to have their current practice challenged and to be supported as they make changes.

### Trust and challenge

Opportunities to learn must occur in environments characterised by both trust and challenge because change is as much about the emotions

as it is about knowledge and skills. Expectations for change can touch raw nerves if teachers take them as reflections on their competence or challenges to their professional identity. If emotional issues are ignored, teachers may close themselves off to learning and adopt defensive postures to avoid exposing their inadequacies. At the opposite extreme, if professional vulnerabilities are allowed to dictate the learning agenda, then outcomes for students are unlikely to improve.

All learning activities require the twin elements of trust and challenge. Little professional learning takes place without challenge. Change, however, involves risk; before teachers take on that risk, they need to trust that their honest efforts will be supported, not belittled.

### **Engagement rather than volunteering**

In any learning situation, learners may be present physically but lack commitment to the learning process. In the case of teachers' professional learning, participation is sometimes made voluntary as a way to minimise this problem. The research evidence, however, does not support this approach. Prior commitment does not guarantee greater engagement, and both voluntary and mandatory teacher participation have co-occurred with positive and negative outcomes for students.

The circumstances that initially lead to participation bear a complex relationship to further engagement. Administrative and peer pressures can influence volunteering. Furthermore, participating teachers—whether or not they are volunteers—rarely believe that they will need to engage in in-depth learning or make substantive changes to their practice. Those who provide the professional development typically do believe this but do not disclose it. So learning is likely to prove uncomfortable even if the participants have volunteered.

The research evidence shows that learning important content through engagement in meaningful activities, supported by a rationale for participation that is based on identified student needs, has a greater impact on student outcomes than the circumstances that lead teachers to sign up. These two dimensions determine whether the teachers engage in the learning process sufficiently to deepen their knowledge and extend their skills in ways that lead to improved student outcomes.

Initial engagement can be promoted by identifying specific issues that teachers recognise as real and then offering a vision of how they might be solved. Ongoing, subsequent engagement is promoted by worthwhile learning activities and by opportunities to negotiate the meaning of existing and new theories and explore their differing impacts on students.

**Suggested readings:** Bryk & Schneider, 2002; Phillips, 2003; Wilson & Berne, 1999.



## 6. Approaches responsive to learning processes

The promotion of professional learning requires different approaches depending on whether or not new ideas are consistent with the assumptions that currently underpin practice.

### Research findings

Teachers are diverse in their understandings and assumptions about students and how they learn, what counts as valued knowledge, and how best to teach it. How these understandings and assumptions shape teachers' responses to new information depends on the extent to which they are consistent with, or dissonant from, the understandings that underpin the new knowledge and skills to be learned.

Professional learning approaches that focus primarily on building new knowledge and skills are suitable when teachers' existing understandings are congruent with the new information and therefore can be integrated readily into their existing practice. But when teachers' personal theories about students, valued curricula, and effective teaching practices differ from those being promoted in the professional learning, a different approach is needed. In the case of mathematics and science, for example, existing curricula usually emphasise computational and factual knowledge while new curricula typically emphasise reasoning and problem-solving skills. This kind of change involves more than learning new knowledge and skills. It requires that teachers understand both the limitations of the current emphasis and the new ways of deciding what knowledge is valued.

### Engaging existing theories

Teachers are likely to reject new ideas that conflict with their current ideas unless, as part of the professional learning, their existing understandings are engaged. Without such engagement, teachers are likely to dismiss new strategies as unrealistic and inappropriate for their particular practice contexts. Similarly, they are likely to reject new content as irrelevant. Engaging teachers' existing ideas means discussing how those ideas differ from the ideas being promoted and assessing the impact that the new approaches might have on their

students. If they cannot be persuaded that a new approach is valuable and be certain of support if they implement it, teachers are unlikely to adopt it—at least, not without strong accountability pressures. It is particularly important to engage existing theories when challenging teachers' beliefs about, and expectations of, those students who have traditionally underachieved.

Change appears to be promoted by a cyclical process in which teachers have their current assumptions challenged by the demonstration of effective alternative practice, develop new knowledge and skills, make small changes to practice, and observe resulting improvements in student outcomes. When this happens, teachers come to expect more of their students—that they will learn more quickly or deeply than they had previously believed possible.

*Suggested readings:* Coburn, 2001; Spillane, 1999; Timperley & Phillips, 2003.

## 7. Opportunities to process new learning with others

Collegial interaction that is focused on student outcomes can help teachers integrate new learning into existing practice.

### Research findings

Collegial communities have been promoted as a means of improving teaching, but research typically reveals only a weak relationship between participation in such communities and improved student outcomes. Yet findings from many studies suggest that participation in a professional community with one's colleagues is an integral part of professional learning that impacts positively on students. The resolution of this apparent contradiction appears to be that if teachers are to change, they need to participate in a professional learning community *that is focused on becoming responsive to students*, because such a community gives teachers opportunities to process new information while helping them keep their eyes on the goal.

As an intervention on its own, a collegial community will often end up merely entrenching existing practice and the assumptions on which it is based. The research literature contains many examples of situations where teachers were given the time and resources to meet together to solve a problem or learn about new curricula or pedagogical practices but where this aim was thwarted by norms of politeness and the absence of challenge. As is the case for all other areas of professional learning, the effectiveness of collegial interaction needs to be assessed in terms of its focus on the relationship between teaching practice and student outcomes. Samples of student work, student achievement profiles, and the results of student interviews are all resources that can be used to help maintain this focus.

**Suggested readings:** Lipman, 1997; Timperley, Wilson, Barrar, & Fung, 2007.

## 8. Knowledgeable expertise

Expertise external to the group of participating teachers is necessary to challenge existing assumptions and develop the kinds of new knowledge and skills associated with positive outcomes for students.

### Research findings

The engagement of expertise external to the group of participating teachers is necessary because substantive new learning requires teachers to understand new content, learn new skills, and think about their existing practice in new ways. An expert may come from within the school (for example, the principal) or outside the school (for example, a researcher).

Existing assumptions about curriculum or about what particular groups of students are able to learn can prevent teachers from examining how effective their own practice is in promoting student learning. External experts need to be able to challenge assumptions and present teachers with new possibilities; challenge the social norms by which collegial groups operate, wherever these norms constrain professional learning; and keep the focus on students and their learning.

Experts need to know the content of the relevant curricula and what teaching practices make a difference for students. They need to be able to make new knowledge and skills meaningful to teachers and manageable within their practice contexts, to connect theory and practice in ways that teachers find helpful, and to develop teachers' ability to use inquiry and assessment data to inform their teaching. Not everyone engaged in promoting teacher professional learning has the knowledge and skills to do these things. For this reason, it is unfortunately possible for professional development to have an adverse impact on teacher practice and student outcomes.

Some professional developers treat teachers as technicians who can be taught a new set of behaviours and then be expected to implement them. This approach ignores the complexity of teaching and disregards the need for teachers to be responsive to the learning needs of their students. Effective teaching practice is based on a coherent and integrated set of beliefs, knowledge, and values. External experts who simply promote their own preferred practices are less effective than those who involve teachers in discussing and developing

understandings that are meaningful in their particular practice contexts.

Those who plan and facilitate professional development need to support teachers as they develop the theoretical understandings and tools that will enable them to take a self-regulated, inquiry approach to their everyday practice.

*Suggested readings:* Cordingley, Bell, Isham, Evans, & Firth, 2007; Lipman, 1997; Timperley, Wilson, Barrar, & Fung, 2007.

## 9. Active leadership

Designated educational leaders have a key role in developing expectations for improved student outcomes and organising and promoting engagement in professional learning opportunities.

### Research findings

In most educational jurisdictions, designated leaders have responsibility for promoting professional learning and development opportunities for teachers. Effective professional development may take place outside the school environment, but if it is site-based, it is important that leaders are actively involved.

Leaders may undertake multiple roles, depending on their positions and expertise, but three roles appear to be crucial for gaining and maintaining the interest of teachers and ensuring that their learning is ongoing:

#### a. Developing a vision of new possibilities

This role involves developing a realistic vision—based on alternative possibilities—of better student outcomes, more meaningful curriculum content, or different pedagogical approaches. A vision of this kind can serve as a powerful catalyst for teachers to engage in new learning and to formulate specific goals for their learning.

Establishing a vision in which new things are possible is best done through everyday activities, not decontextualised pronouncements. For example, the use of success stories to embed high teacher expectations of students is likely to contribute as much to the development of an alternative vision as the setting of targets or goals. One of the most powerful means of gaining teacher commitment is to provide proof, obtained through monitoring, of improved student progress towards identified goals. Leaders need to find ways to demonstrate such progress.

#### b. Leading learning

Even if leaders do not have expert understanding of the content of new knowledge, and therefore choose to make use of external expertise, they are responsible in several ways for managing teacher engagement in the learning process. These include: ensuring that

teachers understand new information, engaging dissonance constructively when existing assumptions are challenged, ensuring that teachers have productive opportunities to learn, and providing incentives for teachers to continue to enact the new learning in practice.

Professional development led by outside experts has limitations because these experts are not present in the school on a continuing basis. This means that it falls to site-based leaders to help teachers translate their new understandings into practice and to sustain the professional inquiry process.

### **c. Organising learning opportunities**

Schools do not thrive on visions alone, so leaders must ensure that professional learning opportunities are well managed and organised and that appropriate conditions are in place for the extended engagement that in-depth professional learning requires. By participating in professional development themselves, leaders who do not have specific expertise can develop the understandings they need to create conditions that will support their teachers' ongoing learning.

Leaders need to recognise that bringing about substantive change is a complex business and reduce competing demands accordingly. It is particularly important to ensure that other innovations taking place in the school are theoretically coherent with the new learning. When this is the case, theoretical understandings are deepened, not compromised. One of the greatest threats to comprehensive school reform is the introduction of competing reforms that lead to fragmentation of effort.

***Suggested readings:*** Datnow, Foster, Kemper, Lasky, Rutherford, Schmidt, Stringfield, Sutherland, & Thomas, 2003; Phillips, 2003; Robinson, 2007; Stein & Nelson, 2003.

## 10. Maintaining momentum

Sustained improvement in student outcomes requires that teachers have sound theoretical knowledge, evidence-informed inquiry skills, and supportive organizational conditions.

### Research findings

Regrettably, most efforts to improve student outcomes through professional learning and development are short-lived. For improvement to be sustained, short-term perspectives need to be extended to more distant horizons. Although the research base identifying the conditions associated with long-term improvement is somewhat thin, one thing does appear clear: sustainability depends both on what happens during the professional learning experience and on the organizational conditions that are in place when external support is withdrawn.

### The professional learning experience

A sustained improvement in student outcomes depends firstly on teachers developing strong theoretical frameworks that provide them with a basis for making principled changes to practice in response to student needs. When confronted with specific teaching–learning challenges, teachers can go back to the theory to determine what adjustments they need to make to their practice.

Sustained improvement also depends on teachers developing professional, self-regulatory inquiry skills so that they can collect relevant evidence, use it to inquire into the effectiveness of their teaching, and make continuing adjustments to their practice. Teachers with these crucial self-regulatory skills are able to answer three vital questions: “Where am I going?”, “How am I doing?”, and “Where to next?”

The answer to the “Where am I going?” question is sometimes referenced explicitly to national or state standards; more often it is found in, for example, improvements in students’ mathematical problem solving or text comprehension. The answer to the question, “How am I doing?” is a measure of how effective teaching is in terms of student progress. The answer to the “Where to next?” question is guided by a detailed and theoretically sophisticated knowledge of curriculum content and student progressions.



## Organizational conditions

Continued forward momentum also depends on an organizational infrastructure that supports professional learning and self-regulated inquiry. It is difficult for teachers to engage in sophisticated inquiry processes unless site-based leaders reinforce the importance of goals for student learning, assist teachers to collect and analyse relevant evidence of progress toward them, and access expert assistance when required.

*Suggested readings:* Franke, Carpenter, Fennema, Ansell, & Behrend, 1998; Hattie & Timperley, 2007; McNaughton, Lai, MacDonald, & Farry, 2004.

## Teacher inquiry and knowledge-building

What educational outcomes are valued for our **students** and how are our students doing in relation to those outcomes?

What has been the impact of our changed actions on our students?

Engagement of students in new learning experiences

## cycles to promote valued student outcomes

What knowledge and skills do we as **teachers** need to enable our students to bridge the gap between current understandings and valued outcomes?

How can we as **leaders** promote the learning of our teachers to bridge the gap for our students?

Engagement of teachers in further learning to deepen professional knowledge and refine skills

## Conclusion

The ten principles discussed above do not operate independently; rather, they are integrated to inform cycles of learning and action.

Figure 1 brings the principles together in a cycle of inquiry and knowledge-building. The four questions in the boxes are framed from the perspective of teachers and their leaders because it is they who must answer them. But it is assumed that they will receive support to do so: the research evidence indicates that involving external expertise can be crucial for promoting this kind of teacher inquiry and knowledge building.

Principle 1—focus on valued student outcomes—means that the cycle of professional inquiry and knowledge-building begins with a question about students' learning needs. These needs are determined by first identifying the outcomes that the community values and then assessing how all students are doing in relation to these outcomes. Teachers' understanding of what outcomes are important and achievable often evolves in the course of professional learning cycles as new possibilities suggest themselves. What is important is that the teacher always maintains a focus on the students.

Principle 2 is about teachers learning worthwhile knowledge and skills. Those teaching approaches that have been subject to research and wide debate are most likely to have positive impacts on student outcomes. Teachers need to be able to answer the question, "What knowledge and skills do we as teachers need to help students bridge the gap between current understandings and valued student outcomes?"

Principle 3 concerns the importance of integrating theory and practice as they relate to curriculum, teaching practice, and assessment knowledge in the areas that are the focus for professional learning. Teaching is a complex activity in which moment-by-moment decisions are shaped by teachers' beliefs and theories about what it means to be effective. Theoretical understandings give coherence to these decisions.

Principle 4 identifies the need to use assessment as the basis for professional inquiry. If student learning needs, professional learning needs, and worthwhile content are to be aligned, teachers must be able to discover what students already know and can do and how to build on that knowledge in deep, rather than superficial, ways.

In the most effective professional learning, judged by student outcomes, leaders are active participants as described in principle 9. Leaders are responsible for setting up ongoing, useful opportunities to

promote teacher learning. Even when external experts are involved, leaders still play a crucial role in developing a realistic vision of alternative possibilities, modelling what it means to be a learner, and managing teacher engagement in the learning process.

The circumstances in which teachers sign up for professional learning are not as important as the conditions that promote fruitful engagement. Principles 5, 6, 7 and 8 concern the conditions that promote engagement in professional learning once teachers have identified what they need to learn. Principle 5 is about providing multiple opportunities for teachers to learn and practise new knowledge and skills in environments characterised by trust and challenge. Principle 6 identifies the importance of adapting approaches to professional learning to fit the kind of new learning involved. Principle 7 identifies the need for participating teachers to be given opportunities to process new learning with colleagues. Principle 8 is about the role of knowledgeable expertise in facilitating productive professional learning.

The final stage in the cycle modelled by the diagram involves judging the impact of changed actions on students. This stage incorporates principle 1 (focus on valued student outcomes), principle 2 (worthwhile content), and principle 3 (integration of knowledge and skills). Most important are principles 4 and 10 (assessment for professional inquiry, and maintaining momentum). The first of these focuses on teachers developing the self-regulatory skills they need in order to judge the impact of their teaching on valued student outcomes. Given the varied contexts in which they work, there can be no guarantee that any specific activity will have the anticipated result. Once the experts withdraw their support, teachers need to be able to determine for themselves the effectiveness of their actions. For this reason, the extent to which they develop self-regulatory skills is one of the most powerful determinants of ongoing improvement.

*Suggested readings:* Timperley, Wilson, Barrar, & Fung, 2007.

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