

Research Conference

2012

## School Improvement:

What does research tell us  
about effective strategies?

**26–28 August 2012**

**Sydney Convention and Exhibition Centre  
Darling Harbour, NSW**





# Conference Proceedings



# Contents

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<b>Foreword</b>	v
<b>Keynote papers</b>	
Professor Geoff N. Masters <i>Continual improvement through aligned effort</i>	3
Professor David H. Hargreaves <i>Endgame: a self-improving school system</i>	8
Dr Michele Bruniges <i>Developing and implementing an explicit school improvement agenda</i>	9
Ms Valerie Hannon <i>Innovating a new future for learning: Finding our path</i>	16
<b>Concurrent papers</b>	
Professor Kathryn Moyle <i>Differentiated classroom learning, technologies and school improvement: What experience and research can tell us</i>	23
Professor Brian Caldwell and Dr Tanya Vaughan <i>Transforming education through the Arts: Creating a culture that promotes learning</i>	29
Professor Stephen Dinham <i>Walking the walk: The need for school leaders to embrace teaching as a clinical practice profession</i>	34
Professor Helen Timperley <i>Building professional capability in school improvement</i>	40
Professor Helen Wildy <i>Using data to drive school improvement</i>	44
Associate Professor John Munro <i>Effective strategies for implementing differentiated instruction</i>	48
Mr Brian Giles-Browne and Ms Gina Milgate <i>Improving school practices for Aboriginal and Torres Strait Islander students: The voices of their parents and carers</i>	55
Professor Mike Askew <i>Effective teaching: Lessons from mathematics</i>	59
Dr John Ainley <i>Lessons for improvement from international comparative studies</i>	63
Mr Mark Campling, Mr Stephen Savvakis and Ms Jane Sedgman <i>A personal and collective commitment to a focus on school improvement</i>	72
Professor Patrick Griffin <i>The influence of teaching strategies on student achievement in higher order skills</i>	77
Dr Michael J. Timms <i>SimScientists: An example of how technology can support differentiated instruction in the classroom</i>	86
Dr Michele Lonsdale, Ms Sharon Clerke and Dr Michelle Anderson <i>The neighbourhood just got bigger: Schools and communities working together for change</i>	96
Ms Lynette Virgona <i>Teachers are the key: Strategies for instructional improvement</i>	99
Professor Tania Aspland <i>Professional Practice Research: Ensuring teacher development through a critical approach to professional learning</i>	105
Dr Kath Glasswell <i>Building teacher capacity and raising reading achievement</i>	112
Dr Ben Jensen <i>Targeting the things that matter</i>	116
<b>Poster Presentations</b>	119
<b>Conference program</b>	123
<b>Sydney Convention Centre Bayside Gallery floorplan</b>	127
<b>Conference delegates</b>	131

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# Foreword







## Geoff Masters

*Australian Council for Educational Research*

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Professor Geoff Masters is Chief Executive Officer and a member of the Board of the Australian Council for Educational Research (ACER) – roles he has held since 1998.

He has a PhD in educational measurement from the University of Chicago and has published widely in the fields of educational assessment and research.

Professor Masters has served on a range of bodies, including terms as founding President of the Asia-Pacific Educational Research Association; President of the Australian College of Educators; Chair of the Technical Advisory Committee for the International Association for the Evaluation of Educational Achievement (IEA); Chair of the Technical Advisory Group for the OECD's Programme for International Student Assessment (PISA); member of the Business Council of Australia's Education, Skills and Innovation Taskforce; member of the Australian National Commission for UNESCO (and Chair of the Commission's Education Network); and member of the International Baccalaureate Research Committee.

He has undertaken a number of reviews for governments, including a review of examination procedures in the New South Wales Higher School Certificate (2002); an investigation of options for the introduction of an Australian Certificate of Education (2005); a national review of options for reporting and comparing school performances (2008); and a review of strategies for improving literacy, numeracy and science learning in Queensland primary schools (2009).

Professor Masters was the recipient of the Australian College of Educators' 2009 College Medal in recognition of his contributions to education.

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*Research Conference 2012* is the seventeenth national Research Conference. Through our research conferences, ACER provides significant opportunities at the national level for reviewing current research-based knowledge in key areas of educational policy and practice.

*Research Conference 2012* brings together key researchers, policy makers and teachers from a broad range of educational contexts from around Australia and overseas. The conference will explore the important theme of school improvement. It will explore our understanding of what defines whole school success and therefore what drives the structure and focus of a school improvement agenda. The conference will draw together research-based knowledge about effective strategies in the key domains known to impact on whole school improvement efforts such as, *creating a culture that promotes learning, an expert teaching team, differentiated classroom learning, effective teaching practices, analysis and discussion of data, targeted use of resources and an explicit improvement agenda*. It will consider the role of small scale and large scale innovation in school improvement and the importance of an alignment of efforts by governments, systems, communities, school leaders, teachers, and students.

We are sure that the papers and discussions from this research conference will make a major contribution to the national and international literature and debate on key issues related to school improvement.

We welcome you to *Research Conference 2012*, and encourage you to engage in conversation with other participants, and to reflect on the research and its connections to policy and practice.

Professor Geoff N Masters  
Chief Executive Officer, ACER





# Keynote papers



# Continual improvement through aligned effort



## Geoff N. Masters

Australian Council for Educational Research (ACER)

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Professor Masters was the recipient of the Australian College of Educators' 2009 College Medal in recognition of his contributions to education.

## Abstract

Effective classroom teaching and distributed instructional leadership are keys to improving student outcomes. Almost all school systems understand this, but not all systems take the logical next step of making the improvement of day-to-day teaching and the development of effective instructional leadership the primary focus of their reform efforts. Instead, priority is given to secondary considerations such as redesigning school curricula, measuring performance levels, increasing local autonomy and holding schools publicly accountable. Improvements in student outcomes depend on an alignment of effort – by students, teachers, school leaders, systems and governments – to enhance the quality and effectiveness of day-to-day teaching and learning. For all these groups, improvement depends on a commitment and belief that performance can be further improved; a clear understanding of what improvement would look like; a way of establishing current levels of performance as starting points for action; a familiarity with evidence-based, differentiated improvement strategies; and ongoing processes for monitoring progress and evaluating improvement efforts.

## Introduction

The most effective strategy available to governments, schools and school systems for improving student achievement is to improve the quality of day-to-day teaching and learning. At a fundamental level, this means changing what teachers do. The challenge is to get all teachers doing what the best already do and supporting the best teachers to develop still more effective classroom practices.

There has sometimes been reluctance in school education to engage with the details of teachers' practice. The questioning of practice has been seen as

an encroachment on the professionalism of teachers. It has been argued that teachers are best placed to decide what is appropriate in their particular settings; that teaching is an art not a science; and that there are no single 'best' ways of teaching.

As a consequence, discussions of teaching and the development of standards for teachers often have been limited to relatively superficial, observable aspects of teacher behaviour, including compliance. Has the teacher covered the entire curriculum for the year level? Has the teacher participated in the requisite hours of professional development? Have they participated in assessment moderation activities? Do they comply with relevant legislative, administrative and organisational requirements? Does the teacher maintain an orderly classroom environment? Is there evidence of the teacher using a range of teaching strategies?

However, research shows unequivocally that effective teaching – and thus improved student learning – depends on teachers having expertise in the subjects they teach, deep knowledge of how students learn those subjects (including common student misunderstandings and errors), and familiarity with the general conditions that support successful learning. This paper argues for the system-wide alignment of effort to promote teachers' understandings of *learning* and the implications for effective classroom teaching.

## Student learning

There is a substantial body of research into learning. Research in a range of disciplines is adding to our understanding of human learning and contributing to an emerging 'science of learning' (Bransford, Brown & Cocking, 2000). This body of research includes the following observations:

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- High expectations

Learning is more likely to occur when there is a deep belief (on the part of both learners and teachers) that successful learning is possible. Learning is more likely in classroom environments in which all students are expected to make excellent progress, are engaged, challenged, feel safe to take risks and have deep beliefs in their own capacities to learn successfully. In such classrooms there is recognition that learners are at different points in their learning and may be progressing at different rates, but there is an underpinning belief that every student is capable of making excellent progress and eventually achieving high standards if motivated and if exposed to appropriate learning opportunities. In other words, there is a positive and optimistic belief about every learner's capacity for learning and high expectations are held for every learner's success.

- Clarity about learning intentions

Learning is more likely to occur when it is made clear to students what they are expected to learn. Learning and improvement in any area depend on an understanding of what it means to improve. Learners and teachers can monitor progress only if the nature of progress is made explicit. Intended curriculum sequences, rubrics and maps of typical student progress ('developmental continua') with associated progress indicators are some ways of providing this explicitness. Learning intentions also can be clarified and communicated through examples of high quality work or performance.

- Starting points for learning:

Learning is more likely to occur when efforts are made to understand where individuals are in their learning (their current levels of

attainment, interests, motivations, ways of thinking, etc.) and learning opportunities are designed to address their levels of readiness and learning needs. Learning is less likely to occur when students are presented with material that is much too easy or much too difficult. There is evidence that learning is maximised when students are presented with challenges just beyond their current level of attainment – in the 'zone of proximal development' – where success is possible, but often only with scaffolding or other support (Vygotsky, 1978). An implication is that teachers need to gather evidence about where students are in their learning to guide starting points for teaching.

- Evidence-based methods

Learning is more likely to occur when teachers use teaching strategies and methods that have been shown through research and experience to be effective in practice. Popular teaching methods often lack a solid research base. Some commercial programs are based largely on proponents' beliefs about what should work or on misinterpretations of research (e.g., some 'brain-based' teaching methods misinterpret evidence from neuroscience). Many widely used literacy and numeracy programs have never been adequately evaluated and some approaches to the teaching of reading are inconsistent with available research evidence.

- Monitoring and feedback

Learning is more likely to occur when learners are provided with feedback that identifies actions to improve future performance. Feedback is essential to all learning and is most effective when it is timely, allows students to see the progress they are making and builds confidence that further progress is possible. To be

most effective, feedback needs to be provided on a very regular basis.

High-performing education systems have an aligned, system-wide focus on assisting all teachers to do these things well. They recognise the importance of building every teacher's pedagogical knowledge and skills and teachers' capacities to implement highly effective teaching methods. This is a priority for central office staff, for regional/district offices, and for school leaders and teachers themselves.

As well as being aligned around this common focus, effective school systems are also aligned in the sense that all levels of the system are pursuing a continual improvement agenda. Some key elements of an improvement agenda are represented by the rows in Table 1. They include an ongoing commitment to improving practice and performance; an understanding of what further improvement would look like; a process for establishing and understanding current levels of performance as starting points for action; a familiarity with evidence-based, differentiated improvement strategies; and processes for monitoring progress and reflecting on the effectiveness of improvement efforts.

### **Classroom teaching**

A prerequisite for improved teaching is a recognition that no matter how good a teacher's current practice may be, improvement is always possible. A belief in the possibility of improvement and a commitment to learn how to improve are as important to the improvement of classroom teaching as they are to improvement at all other levels of an education system.

Importantly, teachers require an understanding of what improved teaching looks like. Some attempts to describe development as a teacher use broad career stages such as having prerequisite knowledge about teaching,

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having practical teaching experience, assisting colleagues in their teaching and taking on school-wide instructional leadership roles. But such descriptions do not go to the heart of what it means to become a more expert teacher – for example, what it means to become more expert in the teaching of reading, or what it means to become more expert in the analysis of student learning and the diagnosis of learning difficulties. Improved teaching depends on clarity about what highly effective pedagogical practice looks like (Hattie, 2003).

Assessments of teachers' practice can be useful in identifying ways of supporting further professional learning and development, particularly if assessments probe the details of teachers' content knowledge, pedagogical content knowledge and day-to-day classroom teaching. For diagnostic and developmental purposes, global, impressionistic judgements of teacher performance are generally less useful than systematic observations and assessments against explicit descriptions of effective teaching practices.

Strategies for improving teaching practice are most effective when they are differentiated, personalised and grounded in teachers' day-to-day work. Graduate pre-service and in-service courses are useful for building expert pedagogical content knowledge. But powerful forms of learning also occur when teachers collaborate in analysing student work, planning lessons and providing feedback on each other's teaching and as a result of coaching and mentoring by specialist teachers.

Teachers benefit from feedback on the quality of their teaching and the progress they are making. As with all feedback, to be most effective, this needs to be timely and supportive and to identify specific actions that teachers can take to further improve their teaching. Again, impressionistic judgements and general comments

are likely to be less useful than specific suggestions for improving practice.

### **School leadership**

School leadership teams are in powerful positions to influence the quality of classroom teaching and learning. Schools that make significant improvements in student achievement invariably are led by individuals with a passion for improvement – leaders who believe in the possibility of high performance regardless of a school's circumstances or students' socioeconomic backgrounds. These leaders adopt a 'no excuses' policy and drive a strong and explicit agenda to improve the quality of teaching and learning throughout the school. They also surround themselves with colleagues who share their commitment to improvement.

Effective leaders are clear about what it will take to bring about improvement and what kinds of changes they wish to see. They place a high priority on the analysis and discussion of systematically collected data (e.g., student achievement levels, attendance rates, student behaviour; parent perceptions, etc.) as a basis for school planning. They may set targets and timelines for improvements in performance. Effective leaders also understand the changes in school practices and processes required to support improved teaching and learning. They work to create a culture of high expectations; apply discretionary resources to the improvement of outcomes; build a professional team of highly able teachers who take shared responsibility for student learning and success; and work to ensure the use of effective, evidence-based teaching strategies throughout the school.

School improvement frameworks that describe increasingly effective practices can assist schools to reflect on where they are in their improvement journeys and to identify areas in need of further attention. Such frameworks provide

a common language for discussing performance and progress (Masters, 2010). School leaders also sometimes find it useful to have external, independent reviews of a school's performance to identify starting points for whole-school action.

The improvement strategies that schools adopt usually depend on their circumstances. For some schools, the first priority may be to increase student attendance and engagement and to reduce levels of student mobility and staff turnover. Challenges may include raising student, parent and teacher expectations, improving student behaviour and creating learning environments in which disruptions and distractions are kept to a minimum. In other schools, priorities may include having teachers work together to support each other's teaching and professional learning and securing school community support for teaching and learning innovations.

Improvement is facilitated when schools and their communities are able to see improvements in teaching, learning and student outcomes. One way to do this is through regular internal and/or external school reviews. Feedback allows schools to monitor improvement over time and to evaluate the effectiveness of improvement strategies.

### **System leadership**

Continual improvement is equally important at the level of entire education systems. Improvements in systems' practices and processes depend on a belief that, no matter how well a school system is performing, it can always do a better job of supporting and promoting quality teaching and learning. High-performing systems passionately adopt this as their main challenge.

This, in turn, requires an understanding of what it means to become more effective as a system. In recent years



there has been growing interest in lessons that can be learnt from high performing and rapidly improving school systems (Barber & Mourshed, 2007; Mourshed, Chijiok & Barber, 2010). International comparative studies suggest that high-performing systems place a high priority on student learning. They align the efforts of students, teachers, school leaders and system leaders around this core purpose and rigorously evaluate programs and resource allocation on the extent to which they result in improved outcomes. Comparative studies also highlight the crucial importance of attracting highly able people into teaching, retaining them in the profession and investing in their development as expert teachers.

Many education systems undertake or commission regular reviews of

their performance. The purpose is to scrutinise system initiatives and plans, to evaluate these in the light of international best practice, and to recommend improvement strategies.

Strategy differentiation is as important to system improvement as it is to student learning, the professional development of teachers and school improvement. In a study of the world's most improved school systems, Mourshed, Chijiok and Barber (2010) concluded that, in systems with very low levels of student performance, the most effective forms of system action include addressing students' basic living needs, improving school attendance, providing scripted teaching materials and textbooks and getting all schools to a minimum level in terms of infrastructure and student results. In systems with very

high levels of student performance, the most effective forms of system action include decentralising decisions about teaching and assessment, encouraging collaborative practice among teachers and promoting experimentation and innovation.

Finally, school systems require feedback on the effectiveness of their improvement strategies. Systematic evaluations of programs and initiatives are essential to informed future action. At the same time, participation in national and international achievement surveys provides systems with valuable information about trends over time and the effectiveness of system initiatives in improving the quality and equity of schooling.

**Table 1:** A framework for continual improvement

	Students	Teachers	Schools	System
<b>Commitment to improvement</b>	a commitment to, and belief in, every student's ability to learn successfully	a commitment to the continual development of every teacher's effectiveness	a commitment to the continual development of every school's practices and programs	a commitment to continually improve the effectiveness of system initiatives and support
<b>Improvement framework</b>	a framework that describes increasing levels of student learning and achievement	a framework that describes increasing levels of teacher expertise and effectiveness	a framework that describes increasing levels of school practice and performance	a framework that describes increasing levels of system practice and performance
<b>Assessment processes</b>	processes for establishing where students are up to in their learning	processes for establishing current teacher expertise and effectiveness	processes for evaluating current school practices and performance	processes for evaluating current system practices and performance
<b>Improvement strategies</b>	evidence-based teaching strategies tailored to students' current levels of progress and learning needs	evidence-based, differentiated strategies for developing teacher expertise and effectiveness	evidence-based, differentiated strategies for improving school practices and programs	evidence-based, differentiated strategies for enhancing system effectiveness and support
<b>Feedback and monitoring</b>	a process for monitoring learning and providing feedback to guide student action	a process for monitoring and recognising increasing teacher expertise and effectiveness	a process for monitoring and reflecting on progress in improving school practices and programs	a process for monitoring and reflecting on progress in improving system initiatives and support



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## References

- Barber, M. & Mourshed, M. (2007). *How the world's best-performing school systems come out on top*. McKinsey & Company, London UK
- Bransford, J. D., Brown, A. L., & Cocking, R. R. (2000). *How people learn: Brain, mind, experience and school*. Washington: National Research Council.
- Hattie, J. (2003). Teachers make a difference: What is the research evidence? Paper presented at ACER Research Conference *Building teacher quality: What does the research tell us?* 19–21 October 2003, Melbourne.
- Masters, G. N. (2010). *Teaching and learning school improvement framework*. Melbourne: Australian Council for Educational Research.
- Mourshed, M., Chijioko, C., & Barber, M. (2010). *How the world's most improved school systems keep getting better*. McKinsey & Company, London UK
- Vygotsky, L. (1978). *Mind in society: The development of higher psychological processes*. M. Cole, V. John-Steiner, S. Scribner & E. Souberman (Eds.). Cambridge, MA: Harvard University Press.

# Endgame: a self-improving school system

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**David H. Hargreaves**

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Professor David H. Hargreaves is Fellow Emeritus of Wolfson College, Cambridge. He was educated at Bolton School, Bolton and Christ's College Cambridge. He has served for many years in teacher education, and has been Professor of Education in the University of Cambridge and Reader in Education at the University of Oxford. He has also been Chief Inspector of the Inner London Education Authority, Chief Executive of the Qualifications and Curriculum Authority, Chairman of the British Educational Communications and Technology Agency, Associate Director (Development and Research) of the Specialist Schools and Academies Trust, and senior associate of the think tank Demos. He is a Foundation Academician of the Academy of the Social Sciences. Professor Hargreaves has published books, articles and pamphlets, mainly in the fields of social psychology and sociology applied to education and medical education. His most recent work is a series of think-pieces on a self-improving school system for England's National College of School Leadership.

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## **Abstract**

As responsibility for professional development and school improvement in England is transferred to headteachers and their governing bodies, the building block of the school system is no longer a free-standing school but a cluster of schools in partnership. Some of the prerequisites of a self-improving school system are being established, but other features of the education service are inhibiting this project. For many schools the task of establishing and maintaining deep partnerships and strategic alliances with other schools is proving to be a major challenge. The presentation and its supporting materials explore the nature and consequences of this profound change for the teaching profession, for local education authorities, for inspection systems and for university schools of education and research centres.

## **Paper**

Professor Hargreaves draws delegates' attention to the following publications published by the UK National Council.

- Hargreaves, D. (2010). Creating a self-improving school system. National Council.
- Hargreaves, D. (2011). Leading a self-improving school system. National Council.
- Hargreaves, D. (2012). A self-improving school system in international context. National Council.
- Hargreaves (in press for publication late 2012). A self-improving school system: towards maturity. National Council.

All publications are available at: [www.education.gov.uk/nationalcollege](http://www.education.gov.uk/nationalcollege)

# Developing and implementing an explicit school improvement agenda



## Michele Bruniges

NSW Department of Education and Communities TAFE, NSW

Dr Michele Bruniges commenced her role as Director-General of Education and Communities, Managing Director of TAFE NSW on 7 September 2011.

As Director-General, Dr Bruniges is in charge of all State Public Schools, Early Childhood Education and Care, Communities, Aboriginal Affairs, Veterans' Affairs and Sport and Recreation. She is also the Managing Director of TAFE NSW, Australia's largest provider of vocational education and training.

Previously, Dr Bruniges held senior positions in the Australian Government's Department of Education, Employment and Workplace Relations (DEEWR). She held the position of Deputy Secretary for the Office of Early Childhood Education and Child Care until April 2009 when she moved to the position of Deputy Secretary, Schools to focus on delivering the Australian Government's commitments for school education. Her final role in DEEWR was Associate Secretary, Schools and Youth.

Dr Bruniges has a Doctorate of Philosophy in Educational Measurement, a Masters Degree in Education from the University of New South Wales, a Graduate Diploma in Educational Studies and a Diploma in Teaching from the Goulburn College of Advanced Education.

In January 2012, Dr Bruniges became a Member of the Order of Australia for her service to public administration through executive roles, and her contribution to reform in the education sector at state and national levels. She also took up the role of Adjunct Professor in the School of Education, Faculty of Arts and Social Sciences at the University of New South Wales. Dr Bruniges is a Fellow of the Australian College of Educators and the Australian Council for Educational Leaders who, in 2011, awarded her the ACEL Presidential Citation for her high level leadership of public education.

## Abstract

School improvement is a high-stakes enterprise, as difficult as it is important. While the broad agenda of school improvement is unassailable, the concept has become entangled with debates about the use of standardised assessment data for the purposes of public accountability. The risk of this is that data per se are devalued in the eyes of teachers.

Effective use of data by teachers is, however, the crux of school improvement. For student outcomes to improve, teachers need an accurate understanding of individual students' strengths and weaknesses. Moreover, they need the capacity to translate this understanding into improved conditions for teaching and learning through high-quality pedagogic decisions. While positive steps have been taken to strengthen evidence-based teaching, the research literature shows this is not universal.

This paper proposes three systemic actions to improve pedagogic decision-making and practice, and thus engender school improvement: (1) support ongoing improvement in teachers' data literacy, including by fostering a culture of inquiry and trust that facilitates teachers' use of data to evaluate their own practices; (2) ensure that the evidence base for effective teaching practice is readily accessible and understood by teachers, including through evidence-based professional development; (3) support teachers to expand their understanding of effective teaching practice through a collaborative approach to professionalism, including again through the development of a culture of trust that will facilitate genuinely collaborative planning and reflection.

## School improvement – what's at stake?

Education is a high-stakes enterprise in the 21<sup>st</sup> century. At the 2011 International Summit on the Teaching Profession, the OECD Director for Education, Barbara Ischinger, stressed that 'education is both the key driver of economic growth and a key social equalizer' (Asia Society, 2011, p. 5, emphasis added). For individuals, higher levels of education are linked with a greater likelihood of being employed, higher levels of remuneration and other benefits such as better health, which have both personal and quantifiable social benefits (ABS, 2009, 2010; Feinstein 2002). For countries, levels of education are linked with indicators of economic health such as GDP per capita (e.g. KPMG Econtech, 2010; Hanushek & Woessman, 2010; Business Council of Australia, 2004). Importantly, however, analysis has indicated that the salient variable is not merely the quantum (duration) of education, but its quality (Hanushek & Woessman, 2010).

## School improvement – the challenge

The challenge, then, is not just to ensure that all children access their educational entitlement, or to extend that entitlement. Rather, the challenge is to improve the quality of the education they receive for the duration of their schooling. This is easier said than done, as the American experience attests:

In the past decade, the burgeoning economies of India and China have provoked United States commissions and initiatives to advocate the teaching of 21<sup>st</sup>-century skills, tougher curriculum requirements, common national standards, yet more testing, increased competition between teachers and schools, and harder work for everybody. Nevertheless, over the past quarter century, the

standards and performance of American teachers and schools have steadily declined in relation to international benchmarks (Sahlberg, 2012, p. vii).

No educator could seriously dispute either the broad agenda of school improvement, which is better outcomes for more students, or the intermediate objective, which is improvement in the conditions for teaching and learning. Discussions about how to effect school improvement, however, have been vexed. This can be largely attributed to the fact that the concept of school improvement has become entangled with a more ideological debate about the use of standardised, universal assessment data (such as NAPLAN) for the purposes of public accountability (e.g. Graham, 2007). The significant risk of this is that data per se become devalued, particularly in the eyes of teachers.

This is a danger because data is – and always has been – at the heart of the educational process. As early as 1922, Edward Thorndike wrote:

‘The task of education is to make changes in human beings. For mastery in this task, we need definite and exact knowledge of what changes are made and what ought to be made’ ... schools need accurate and actionable information about what students know and can do so that they can plan effectively for student learning (cited in Heritage & Yeagley, 2005, p. 320).

The OECD has recognised the link between effective assessment and use of data to improve student learning, and the effective use of data to inform school and system evaluation (the necessary precursor to school and system improvement) (OECD, August 2011a). With respect to all of these, the 2011 OECD report, *OECD Reviews of Evaluation and Assessment in Education:*

*Australia* has good news, finding that this country has the broad conditions for success in place. There is, in Australia as elsewhere, increasingly widespread recognition that ‘[u]sing information about student learning and progress to inform school and classroom practices is ... an important component of strategies to support improvement’ (Campbell & Levin, 2009, p. 48; see also Protheroe, 2001, 2010; ACER, 2008; van Barneveld, 2008).

There is still, however, room for improvement. In particular, the OECD notes that ‘[t]he links to classroom practice are less clearly articulated’ (OECD, August 2011b, p. 1). This is an issue because, as Black and Wiliam put it:

Attempts to raise standards by reform of the inputs and outputs to and from the black box of the classroom can be helpful, but they cannot be adequate on their own, and whether or not they are helpful can only be judged in the light of their effects in classrooms (Black & Wiliam, 2001, p. 9).

This paper argues that the only real chance for significant and sustained school improvement lies not in structural change in and of itself, but in attending to the bread-and-butter of the educational process – what goes on in our classrooms. As Shulman argued nearly 30 years ago:

... the teacher must remain the key. The literature on effective schools is meaningless, debates over educational policy are moot, if the primary agents of instruction are incapable of performing their functions well (1983; cited in Flinders, 1988, p. 17).

The key question for school systems seeking to improve, then, becomes, ‘how do we support teachers to offer each and every student the best educational experience they possibly can?’

## Using data and evidence – the hallmarks of professional decision-making

Teaching has always required the capacity to make decisions, in a wide range of contexts, across many areas, and often very quickly. Teachers are increasingly, however, required to make more and more nuanced decisions, as the expectations of education and the task of schools undergoes a fundamental change – from sorting students by achievement level to supporting all students to learn (Alton-Lee, 2011). It is important that these decisions are as sound as possible, across the innumerable classrooms of our education systems.

The use of evidence is one of the hallmarks of a profession (Matters, 2006), and evidence-based teaching has been defined as ‘the conscientious, explicit and judicious use of best evidence in making decisions about the education of individual students’ (Gardner, 2009, p. 1). There are two forms of evidence that teachers draw on in practising evidence-based teaching. First, there are the data – in many forms – that reveal a student’s current level of knowledge and skills, relative to the curriculum and expected standards of achievement. This interpretation of this data may be compared with the medical processes of patient assessment and diagnosis.

The second type of evidence is the knowledge base about what works, with particular student cohorts, in particular teaching situations, and what doesn’t. Some researchers (e.g. Heritage & Yeagley, 2005) characterise this as ‘process’ data (in contrast to ‘input’ data, such as student demographic data, and ‘output’ data, such as assessment scores), and the teaching decisions based on this might roughly be compared with the medical process of prescribing treatment.

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## Professional decision-making—how well is it done?

The picture is mixed. Recent research by the US National Council on Teacher Quality into what teacher education students are learning about assessment found that of the 180 elementary and secondary undergraduate and graduate programs examined, only 3 per cent provided sufficient coverage of assessment; only 2 per cent exposed students to the means of analysing test results; and only 1 per cent addressed how to come up with an instructional plan once they've done so (NCTQ, 2012).

Closer to home, the OECD report on educational evaluation and assessment in Australia found 'some inadequacies in teachers' skills for assessment and to use assessment data' (2011b, p. 1). This is corroborated by a small Australian pilot study into teacher intentions to use national literacy and numeracy assessment data, which found that only 27 per cent reported direct access to NAPLAN data. Eighteen per cent chose not to access the data, for reasons including negative perceptions of the data's value and a lack of confidence in how to use the data (Pierce & Chick, 2011).<sup>1</sup> More optimistically, in New South Wales, all of the teachers involved in the Smarter Schools National Partnerships have now had access to training in the effective use of data. Preliminary findings from NSW's

strategic evaluation of the Smarter Schools National Partnerships indicate that 34 per cent of teachers involved with the SSNPs for approximately two years experienced large or very large increases in their use of student achievement data to inform lesson planning.<sup>2</sup>

It is one thing to be data savvy, and another to transform this understanding into improved classroom practice. The 2011 international summit on improving teacher quality around the world observed that education is not yet a knowledge-based industry (Asia Society, 2011). The late Ken Rowe put this view forcefully when he wrote:

First, despite the existing and emerging research evidence for educational effectiveness in terms of teaching and learning, there is a disturbing level of ignorance among teachers at all levels of educational provision related to what works and why. Second, the prevailing ideologies in schools and universities surrounding effective teaching practice are typically not grounded in findings from evidence-based research (2007, p. 59).

Alton-Lee goes even further when she outlines 'recurrent findings of inadvertent harm done in education' that demonstrate 'it is possible for teachers – well-intentioned, caring and experienced – to unknowingly have impacts on students that are the direct reverse of what they intend'. She cites the New Zealand example whereby 'the prevalent use of learning styles matching approaches ... can ghettoise Maori and Pasifika students into kinaesthetic activities with concrete material and procedural activity while other students

engage in metacognitive strategy instruction' (2011, p. 321).

## Quality decision-making—the role of the system

This paper approaches the concept of school improvement from the well-supported premise that teachers are the most significant in-school variable influencing student outcomes and, therefore, that to significantly improve student outcomes necessarily involves improving teachers' capacity for quality pedagogic decision-making. Evidence suggests a number of steps to be taken. While these might seem obvious on the face of it, in actuality they involve significant cultural shift in the teaching profession, not least in the understanding of what it means to be professional.

### (1) Support ongoing improvement in teachers' data literacy

Student data doesn't speak for itself, and the more complex uses of data require more complex skills (Ikemoto & Marsh, 2007). If we are to increase the prevalence of evidence-based teaching in our schools, we need to ensure in the first place that our teachers have the requisite skills for data-based inquiry, and opportunities to practise them.

This is a responsibility we share with teacher educators in our universities. Consistent with Australian and US research cited above, an English study of professional attitudes to the use of student performance data in English secondary schools, discovered that newly qualified teachers and teachers with one to five years' experience have the lowest levels of understanding of student performance data, 'which when taken together with other findings suggests poor "data analysis" content in teacher training courses' (Kelly & Downey, 2011, p. 423).

This is a bigger task than it might superficially seem. It is not just a matter

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1 The study was of 49 secondary Mathematics and 35 secondary English teachers from 16 schools. A much larger research study by the US Department of Education found that 38 per cent of surveyed teachers indicated a need for training on how to formulate questions that they could address with data; 48 per cent reported needing professional development on the proper interpretation of test scores and more than half said that they needed additional professional development on how to adjust their instructional content and approach based on data (Means, Chen, DeBarga and Padilla, 2011).

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2 This excludes schools participating in the Literacy and Numeracy Addendum (commencing 2010) and the low SES Reform Extension (commencing in 2010 and 2011).



of ensuring relevant content in pre-service teacher education courses, or sufficient professional development for our existing workforce, though they are both important. It means, rather, rethinking teaching as an inquiry-based profession (e.g. Alton-Lee, 2011), more akin to its character in Finland and, increasingly, a number of East Asian countries as outlined in the recent Grattan Institute report, *Catching up: Learning from the best school systems in East Asia* (Jensen, Hunter, Sonnemann, & Burns, 2012). In seeking to support this shift, we need to guard against the documented tendency for data hierarchies to develop, where direct access to, and analysis of, data is more evident amongst school executive than classroom teachers (Kelly & Downey, 2011).

Evidence exists that data analysis is most effectively undertaken in groups and that 'when working by themselves, teachers tend to rely on anecdotes and intuition' (David, 2008; see also Hattie 2012 on the 'data teams model'). Building a strong culture of collaborative inquiry within and across schools will involve tackling the assumption that teaching is an independent rather than a collaborative profession (Beswick, 2011), the strength of which is well documented in the literature on teacher isolation (e.g. Flinders, 1988; DuFour, 2011).

Most significantly, we need to build a culture of trust so that teachers feel able to interrogate performance data not only for the insights it might shed on students' strengths and weaknesses, but on their own. Research shows that between-class variation in student outcomes is typically much greater than the variation between schools (Rowe, 2007). Yet research also indicates that this is (understandably) a 'nondiscussable' within the school environment (Barth, 2006); that teachers tend not to question their own pedagogic expertise; and that they

persist in the belief that the teaching practices of their colleagues are 'acceptable at least and exemplary at best, based on the absence of evidence to the contrary' (Griffin, 1995; cp Hattie, 1999).

### **(2) Ensure that the evidence base for effective teaching practice is readily accessible and understood by teachers in classrooms**

An American study has shown that doctors in the United States of America failed to recommend medicines up to 10 years after they were shown to be efficacious, and continued to recommend treatments up to 10 years after they were shown to be ineffective (cited in Matters, 2006). Assuming that this reflects a time lag between the production of evidence and its uptake (and not ill-will on the part of doctors), we need to find effective and timely ways of systematically identifying, interpreting, contextualising, packaging and disseminating robust knowledge about effective teaching practice.

New South Wales has a strong background in the codification and dissemination of knowledge about good teaching practice, as evidenced by the Quality Teaching Model developed almost a decade ago (NSW Department of Education and Training, 2003). The research base continues to evolve however; and we have an ongoing responsibility to guard against fads (Timperley's 'unproven ideas [that] continue to sweep through educational jurisdictions'; cited in Alton-Lee, 2011, p. 320). Conversely, we have a responsibility to highlight robust evidence that might contravene common 'understandings' as in, for example, the evidence that explicit instruction and the systematic, repetitive practice of small learning steps has a higher chance of success than more loosely structured approaches, especially for traditionally educationally disadvantaged groups.

We also need to ensure that professional learning reflects this evidence base. This may seem obvious, but it doesn't always occur. A synthesis of 72 studies which analyses the links between professional development and its impact on student outcomes showed that 'there was little evidence that just providing teachers with time and resources is effective in promoting professional learning in ways that have positive outcomes for students'. More positively, the same study found that the greatest benefits to student learning were from professional development 'that deepen teachers' foundation of curricula-specific pedagogical content and assessment knowledge' because they 'provided teachers with new theoretical understandings that helped them make informed decisions about their practice' (Alton-Lee, 2011, pp. 311–312).

### **(3) Support teachers to expand their understanding of effective teaching practice through a collaborative approach to professionalism**

This is not as straightforward as ensuring access to the evidence base. As DuFour notes, even the most powerful concepts can be badly applied (2011). Early research into teacher decision-making found that at the micro level – such as how to respond to a particular type of question during a class – teachers were remarkably consistent in their individual approach (Borko, Roberts, & Shavelson, 2008; Bishop, 1976). When combined with a cultural tendency to view each other's teaching styles and decisions as sacrosanct, this consistency presents a significant obstacle to broadening one's understanding about how the principles of quality teaching can be translated into a strengthened range of practices in individual classrooms.

What teachers need, in addition to the more 'summative' evidence base, is ready access to evidence-in-action, examples of other teachers doing things differently

yet well. This will require perhaps the biggest cultural shift of all. The metaphor of the classroom as a black box, like the 'egg-crate' image of a school, is an apt representation of a teacher's closed domain. As in the case of increasing capacity for data analysis, we need to build a culture of trust that will facilitate genuinely collaborative planning and reflection, including teachers' observation of each other's classrooms. If this seems challenging, it is business as usual elsewhere in the world. Beginning teachers in Shanghai sit in on three to four of their mentor's classes weekly, and have two to three of their own classes observed (Jensen et al., 2012).

## Conclusion

School improvement is hard and it may be even harder for schools and systems already performing comparatively well. At the same time, we live in a knowledge age and a global economy, which take no prisoners. It is a moral as well as an economic imperative that we continue to improve both the quality and the equity of student outcomes, for our individual and collective wellbeing are intertwined. Take, as just one example, the fact that employed Aboriginal people who have completed Year 12 are about 60 percentage points more likely to be earning above the national median wage than those who have not (Biddle, 2010).

To effect real, systemic improvement in the conditions for, and outcomes of, teaching and learning in our schools will mean improving the quality of the decision-making informing practice at all levels. In the first instance, this means embedding the use of data – and the related use of evidence-based practice – where they belong, in the service of teachers in classrooms (cp Hattie, 2005). We have taken important steps in this direction through the Smarter Schools National Partnerships (SSNPs). Evidence from New South Wales shows that approaching half the teachers

who had been involved in the SSNPs for approximately two years reported large or very large increases in their understanding of what they need to do to be a more effective teacher, and in their ability to implement effective classroom practice, planning and learning strategies.

At the broader level of the school education sector, we must mirror on a larger scale, the capacity we require in our teachers to interrogate multiple data sets for insights into strengths and weakness. We must also, then, adjust our practices accordingly. For, though the benefits of education are of such magnitude they may seem infinite, the public purse is not. We have a real and not merely a rhetorical responsibility to ensure that hard-contested public dollars are well spent.

Finally, we must not, after all, forget the 'schools' in 'school improvement'. This paper has argued that the heart of any school improvement agenda lies first and foremost with teachers in classrooms, but that is not to ignore the crucial, contextual impact of the school community in which we expect those same teachers to develop and demonstrate an increasingly data-informed, evidence-based and collaborative professional practice. For, while 'the quality of a system cannot exceed the quality of its teachers' (Barber & Mourshed, 2007), if you put a high quality recruit into a dysfunctional school environment, 'the system [in the most negative sense of the word] wins every time' (Asia Society, 2011).

## References

- Alton-Lee, A. (2011). (Using) evidence for educational improvement, *Cambridge Journal of Education*, 41(3), 303–329.
- Asia Society (2011). *Improving teacher quality around the world: The international summit on the teaching profession* (n.p.: Asia Society).

- Australian Bureau of Statistics (2009). *National Health Survey: Summary of results 2007–09*, Catalogue no. 4364.0.
- Australian Bureau of Statistics (2010). *Measuring economic returns to post-school education in Australia*, Catalogue no. 1351.0.55.032
- Australian Council for Educational Research (2008). What does research tell us about how schools and teachers can use data to inform teaching in ways that lead to improvements in student achievement? *The Digest Number 2* (Sydney: NSW Institute of Teachers).
- Barber, M., & Mourshed, M. (2007). *How the world's best-performing school systems come out on top* (n.p.: McKinsey & Company).
- Barth, R. (2006). Cooperate: Improving professional relationships, *Teacher*, 171, 22–26.
- Beswick, T. (2011). Revitalising teacher professionalism and accountability, *The Australian Educational Leader*, 33(2), 21–24.
- Biddle, N. (2010). *A human capital approach to the educational marginalisation of Indigenous Australians*. Canberra: Centre for Aboriginal Economic Policy Research, ANU.
- Bishop, A. J. (1976). Decision-making, the intervening variable. *Educational Studies in Mathematics*, 7(1-2), 41–47.
- Black, P., & Wiliam D. (2001). *Inside the black box: Raising standards through classroom assessment*. London: King's College London School of Education. Accessed <http://weaeducation.typepad.co.uk/files/blackbox-1.pdf> June 2012
- Borko, H., Roberts, S. A., & Shavelson, R. (2008). Teachers' decision making: From Alan J. Bishop to today. In P. Clarkson & N. Presmeg (Eds.), *Critical*

- issues in mathematics education (pp. 37–67). New York: Springer.
- Business Council of Australia (2004). *Economic growth and social change in Australia 1976–2025*. Research paper for Scenario Planning Project 'Aspire Australia 2025'.
- Campbell, C., & Levin, B. (2009). Using data to support educational improvement, *Educational Assessment, Evaluation and Accountability*, 21, 47–65.
- David, J. L. (2008). Collaborative inquiry, *Educational Leadership*, 66(4), 87–88.
- DuFour, R. (2011). Work together but only if you want to, *Phi Delta Kappan*, 92(5), 57–61.
- Feinstein, L. (2002). *Quantitative estimates of the social benefits of learning. 2: Health (Depression and Obesity)*. London, UK: Centre for Research on the Wider Benefits of Learning, Institute of Education.
- Flinders, D. J. (1988). Teacher isolation and the new reform. *Journal of Curriculum and Supervision*, 4(1), 17–29.
- Gardner, J. 'Assessment for teaching: The half-way house', *Conference Proceedings*, ACER Research Conference 2009 (Camberwell, VIC: Australian Council for Educational Research).
- Graham, J. (2007) 'Richard Elmore on the use of test data, accountability systems, building teacher capacity and the role of politics in educational change – part three', interview by John Graham, *The National Agenda – Part one* (Abbotsford, VIC: Australian Education Union).
- Griffin, G. A. (1995) 'Influences of shared decision making on school and classroom activity: Conversations with five teachers', *The Elementary School Journal* 96.1, 29–45.
- Hanushek, E. A., & Woessman, L. (2010). *The High Cost of Low Educational Performance*. Paris: OECD.
- Hattie, J. (1999). Influences on Student Learning. Inaugural Lecture as Professor of Education, University of Auckland, 2 August.
- Hattie, J. (2005). What is the nature of evidence that makes a difference to learning? *Using Data to Support Learning*, ACER Research Conference 2005 (Camberwell, VIC: Australian Council for Educational Research).
- Hattie, J. (2012). *Visible learning for teachers: Maximizing impact on learning*. London and New York: Routledge.
- Heritage, M., & Yeagley, R. (2005) 'Data use and school improvement: Challenges and prospects. *Yearbook of the National Society for the Study of Education*, 104(2), 320–339.
- Ikemoto G. S., & Marsh, J. A. (2007). *Yearbook of the National Society for the Study of Education*, 106(1), 105–131.
- Jensen, B., Hunter, A., Sonnemann, J., & Burns, T. (2012). *Catching up: Learning from the best school systems in East Asia* (Camberwell, VIC: Grattan Institute).
- Kelly, A., & Downey, C. (2011). Professional attitudes to the use of pupil performance data in English secondary schools. *School Effectiveness and School Improvement*, 22(4) 415–437.
- KPMG Econtech (2010). *Measuring the impact of the Productivity Agenda, Final Report*, Canberra: Dept. of Education, Employment and Workplace Relations.
- Matters, G. (2006). *Using Data to Support Learning in Schools: Students, Teachers, Systems*. Camberwell, VIC: Australian Council for Educational Research.
- Means, B., Chen, E., DeBarger, A., & Padilla, C. (2011) *Teachers' ability to use data to inform instruction: Challenges and supports*. Washington, DC: US Department of Education.
- National Council on Teacher Quality (2012). *Teacher Quality Bulletin (TQB) Monthly Newsletter*, June. Accessed at: <http://www.nctq.org/p/tqb/viewBulletin.jsp?nllIdentifier=290>
- NSW Department of Education and Training (2003). *Quality teaching in NSW public schools: An annotated bibliography*. Sydney: NSW Department of Education and Training.
- OECD (August 2011a). *OECD Reviews of Evaluation and Assessment in Education: Australia*. Paris: OECD.
- OECD (August 2011b). *Educational Evaluation and Assessment in Australia: Strengths, Challenges and Policy Pointers*. Paris: OECD.
- Pierce, R., & Chick, H. (2011). Teachers' intentions to use national literacy and numeracy assessment data: A pilot study. *Australian Education Research* 38, 433–447.
- Protheroe, N. (2001). Improving teaching and learning with data-based decisions: Asking the right questions and acting on the answers. n.p.: Educational Research Service. Accessed at [www.ers.org/spectrum/sum01a.htm](http://www.ers.org/spectrum/sum01a.htm)
- Protheroe, N. (2010). Schools as effective data users. *Principal* September/October. Accessed at [www.naesp.org/SeptOct](http://www.naesp.org/SeptOct)
- Rowe, K. J. (2007). Educational effectiveness: The importance of evidence-based teaching practices for the provision of quality teaching and learning standards. In D. M. McInerney, S. Van Etten & M. Dowson (Eds.), *Standards in Education* (pp. 59–92). Charlotte, NC: Information Age Publishing.



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Sahlberg, P. (2012). *Finnish lessons: What can the world learn from educational change in Finland?* Moorabbin, VIC: Hawker Brownlow Education.

Shulman, L. S. (1983). Autonomy and obligation: The remote control of teaching. In L. S. Shulman & G. Sykes (eds.), *Handbook of Teaching and Policy*. (pp. 484–504). New York: Longman.

Van Barneveld, C. (2008). *Using data to improve student achievement, What Works? Research into Practice series, Research Monograph no. 15*. Ontario: The Literacy and Numeracy Secretariat and the Ontario Association of Deans of Education.

# Innovating a new future for learning: Finding our path



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## Abstract

This paper, in conjunction with the associated presentation, makes the case that the pursuit of 'school improvement' is insufficient to address the challenges facing us if the world is to make available equitable, effective learning systems for all its citizens. A set of drivers of change are explored. It is argued that a 'split screen' approach is needed by system leaders and policy makers in which, while school improvement must continue to be pursued, simultaneously a 'learning ecosystem' should be created. Such a mutually supportive system would engage a much wider range of partners and players, and would locate learning in a new variety of spaces and places. The conditions needed to create such a system are suggested from the evidence of highly innovative sectors.

## 'Schooling' in the C21st: Pressures and opportunities to change

The argument that education needs to change to adapt to the learning needs of a future that remains uncertain has been exhaustively rehearsed. Although there is considerable debate about the extent and urgency of the problem and the kinds of changes to pedagogy, curriculum and assessment required, there is nevertheless a growing consensus that conventional education systems are, on current trajectories, unlikely to be capable of the kind of step change that is urgently needed.

At the heart of this debate is the role of schools. Schools are the dominant vehicle for organising learning across the world, and have been resilient. However, the challenge to the existing

model for schooling is very real. In the developing world, some innovators in education are questioning the very idea of schools as the right (or the exclusive) solution to the challenge of educating their young people. In richer countries widespread disengagement by young people with schooling (other than for entirely instrumental purposes) is the presenting challenge.

The argument of this paper is that school improvement is not enough. It is necessary, but not sufficient.

Five drivers are converging to force a change of shape on schooling:

### Digital technology

As long ago as 2000, it was estimated that the amount of knowledge in the world doubled during the previous decade and at that time was said to be doubling every 18 months.<sup>1</sup>

Changing even faster is the ease of access to information from any device with an internet connection. Until very recently, that meant a computer in a fixed location or at best a laptop. Now it might be a smart phone or a tablet. Internet-connected devices are expected to become ubiquitous to the point of invisibility over the next decade.<sup>2</sup>

Communication and connection are changing too. The world's most popular social networking site, Facebook, has over 500 million active users worldwide,<sup>3</sup> and 43 per cent of 9–12-year-olds in the UK have a profile

1 D. Wetmore, 'Time's a wastin' Training and Development Magazine (ASTD), September 2000, p. 67

2 Oliver Burkeman, 'The Internet is over' Guardian 15 March 2011

3 From Facebook website (<https://www.facebook.com/>)

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on a social networking site.<sup>4</sup> For many young people email is over; Hence: the increased volume of knowledge; the ease of access to it; and transformed communication, collaboration and connectivity together present powerful forces challenging the schooling paradigm.

### Global economic recession

Before the 2008 financial crisis, the world could be divided into two broad categories: 'developed' nations, which could afford to invest heavily in education, and 'developing' nations, which could not.

Today, most education budgets are contracting across the developed world; governments face the challenge of 'improving' education systems built for the 19th and 20th centuries, while cutting spending. Meanwhile, most developing countries have no possibility of the kind of investment in public services historically enjoyed by the developed world.

### Globalisation

Chinese-American educationist Yong Zhao writes that 'as a social institution, education has been mostly a local entity [...] serving the purpose of the local community or the nation, preparing workers for the local economy, and passing on local values.'<sup>5</sup>

Today, however, our local communities and local economies are globally connected. Of particular concern for policy makers has been the fact that jobs have also become globalised and can be quickly transferred from one side

of the world to another, sometimes with the job-holders travelling with them, but more often leaving someone jobless, replaced by someone better qualified and cheaper to employ.

Meanwhile, education itself is globalising: millions of students are studying outside their home countries, while open courseware, pioneered by MIT, makes virtual globalisation a common experience. Students need to develop 'global competence', and schools have wider goals – and competitors.

### Demographics

In Europe, Japan and North America, the working age population is projected to shrink by almost 50 million by 2016, while the number of over-65s is projected to increase by almost 67 million.<sup>6</sup> People will need to work longer; meaning that they will need to continue to learn new skills throughout their lives. Lifelong learning must be a habit and a reality.

Developing countries, on the other hand, are experiencing rapid population growth which, along with urbanisation and economic and technological advancement, is serving to increase significantly the demand for education. Low (or no) standards of education for the generation before mean that often there are insufficient qualified teachers to meet this need. In regions ravaged by AIDS or war the problem is especially acute. The western models of schooling will never serve to meet this huge demand.

### Environmental instability

In 2009, the UK's Chief Government Adviser on Science, John Beddington, warned that the world was facing a

'perfect storm' brought on by the combination of climate change, energy shortages, food shortages and water depletion.<sup>7</sup> Insurance company Munich Re reported that 2010 saw unprecedented damage from natural disasters, while NASA found that 2010 and 2005 were the hottest years since records began in 1880.<sup>8</sup>

In 2008, the world tipped from predominantly rural to predominantly urban: most of the world now lives in cities – 3.3 billion according to the UN Population Fund, set to rise to 5 billion by 2020,<sup>9</sup> by which point China intends to have built 400 new cities.<sup>10</sup>

For the most part governments have been slow to reflect these global pressures in their broad approach to education. However, some innovators are putting sustainability and learners' relationship with their environments – whatever they may be – at the heart of the learning process. Arguably, developing eco-literacy is as urgent a task as the acquisition of other traditional literacies.

### How can system leaders respond?

The argument of this paper is by no means that 'school is dead' or defunct or redundant. We have to move from where we are now – and find a sensible path by which to do it. What is needed is a 'split screen' approach; that is,

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4 Sonia Livingstone, 'Social Networking, Age and Privacy' EU Kids Online 2011

5 Yong Zhao, *Catching Up or Leading the Way?* ACSD 2002.

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6 Konstantinos Giannakouris, 'Ageing characterises the demographic perspectives of the European societies', Eurostat 2008.

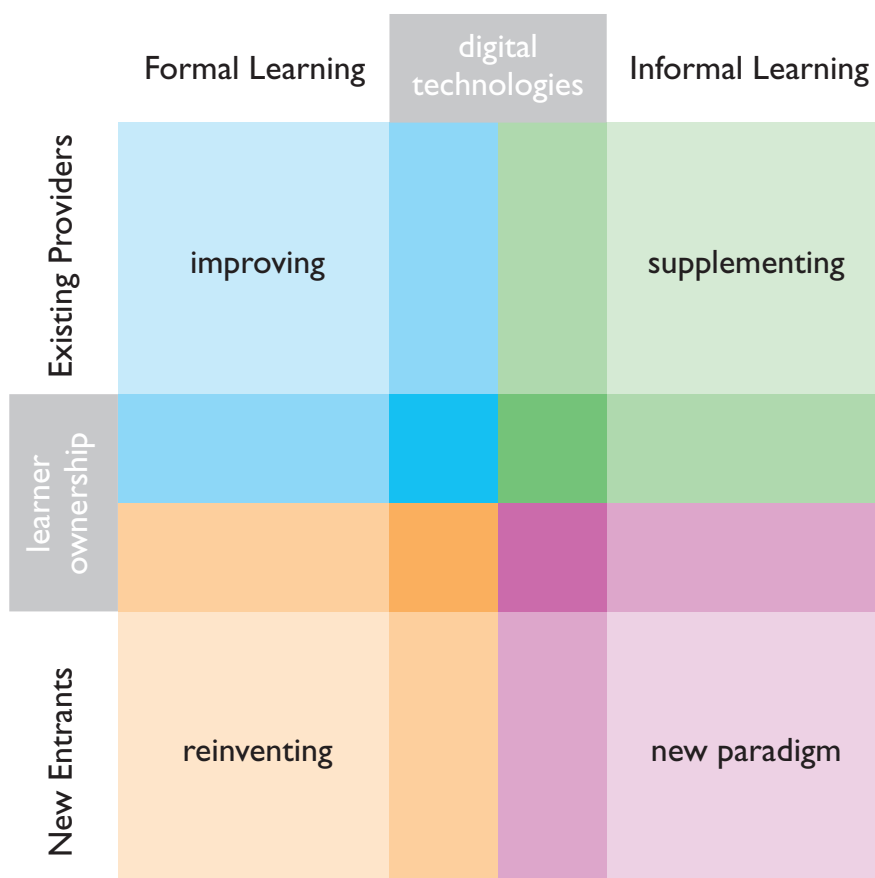
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7 Quoted in Jonathon Porritt, 'Perfect storm of environmental and economic collapse closer than you think', *Guardian*, 23 March 2009.

8 Munich Re (<http://www.scientificamerican.com/article.cfm?id=insurance-ranks-2010-worst-for-climate-disasters>); NASA (<http://www.nasa.gov/topics/earth/features/2010-warmest-year.html>)

9 'State of the World Population 2007: Unleashing the Potential of Urban Growth' UN Population Fund 2007.

10 Neville Mars & Adrian Hornsby, *The Chinese Dream: A Society Under Construction* 010 Publishers, 2008.



system leaders must – indeed have a moral responsibility to – pursue the most effective school improvement techniques available. However, simultaneously they need to create the conditions in which a flourishing ecosystem of innovation can occur:

One way to think about this is through conceptualising such a system through the following grid or heuristic:

This model was evolved through reference to research and then developed and tested, through an inductive process using around 50 examples of innovative practice in education drawn from a global field, and with groups of system leaders in countries around the world.<sup>11</sup>

It proposes that *learning spaces* may be thought of as either formal or informal (vertical columns); and learning providers are comprised of existing providers and new entrants – this latter category to incorporate the kinds of new partnerships/alliances of which schools themselves can be a part.

Plotting numerous examples of learning environments of the grid suggested the descriptors assigned to them. Existing providers working within the formal (schooling) space are engaged in school improvement (challenging, difficult and essential). However, the paradigmatic changes are more likely to be found where new providers, alliances or entrepreneurs engage

also in the informal learning space. And finally, on the basis of emergent research and critique, the hypothesis is that learning in *all the quadrants* is made more engaging when combined with powerful digital technologies and learner ownership.

The point however, is not to drive *all* activity towards the 4th lower right quadrant. Rather, it is suggested that acknowledging the balance that systems must strike between the short-term priorities to improve today's schools for today's children with more radical shifts, a thriving ecosystem of innovation would see an appropriate mix of activity across all four quadrants.

The question then becomes: how do system leaders hoping to develop an innovation ecosystem get from where they are now to where they want to be? What are the conditions they need to create for an ecosystem like this to grow and flourish?

### Platform thinking: how to encourage an innovation ecosystem

All this fresh research and thinking about the nature of innovation points us in a new direction in relation to education; that is, that creating the conditions for a *flourishing ecosystem* of innovation should be our objective if organised learning is to adapt adequately to the pressures and opportunities for change.

How do flourishing ecosystems arise and sustain themselves in the natural world? One route is through **platform creation**. An excellent example is that of the coral reef. Darwin's exploration of this phenomenon revealed that the physical platform created by the skeletons of millions of soft polyps created a habitat within which literally millions of other species could co-exist and flourish. While within it there is competition for resources, nevertheless

<sup>11</sup> The model and associated materials were co-developed and tested with groups of

system leaders from England, Australia, New Zealand, China, South Korea and Finland.

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species also collaborate, with mutually supportive outcomes.<sup>12</sup>

This biological ecosystem, sustained by the platform of the coral reef, is mirrored repeatedly in the world of digital technology. The internet itself is a platform; while it makes commerce possible, it remains itself outside it. And it supports many other ('stacked') platforms. It could be said that the history of the computer industry is characterised by a series of defining innovations that created platforms for participation by a wide range of companies and players.

The most obvious of these is iTunes as a platform for the iPhone and the iPad. Apple did not seek to monopolise the creation of apps for these devices, but created a suite of initial model apps, showing their power and demonstrating what could be done. They primed the pump. Now tens of thousands of apps populate the system, created by a multitude of providers, and powered by consumer demand.

### **Towards a learning ecosystem**

Jurisdictions across the world with responsibility for the provision of education systems have recognised that their role needs to evolve. The conclusions set out in reports such as the 2010 McKinsey Report<sup>13</sup> are therefore seized upon. They concentrate on the improvement techniques deployed by the 'most successful systems' over the last ten years. However, they do not address what is needed for the coming twenty or thirty. Extrapolating from the conditions which give rise to examples of dynamic improvement *and* transformation,

some implications are apparent – and these accord with the learning which has emerged from the exploration of platform development.

Perhaps some of these lessons can be applied more broadly to how the state fulfils its responsibility to organise for the education of citizens in a manner appropriate to the new century. The 'planks in the platform' are likely to include, amongst others:

- an inspiring vision for lifelong and engaged learning, with aims beyond personal wealth and economic competitiveness
- low barriers of entry for new providers
- freedom for merger and demerger activity
- incentivising student-led curriculum development
- greater transparency for learners about the range of opportunities available
- coalition building
- investment in, and encouragement for, disciplined 'innovation zones'.

There can be no prescription here: the evidence is insufficiently strong. Such is the nature of innovation. But the benefits of these approaches can be seen in other fields and sectors; and 'fortune favours the connected mind'. New players and partners are beginning to enter this space with unprecedented energy. These include: social enterprises; businesses; creative and cultural organisations; user groups; philanthropists; further and higher education organisations and NGOs.

In the case of education, which is such a critical portal to full entry into the life of a society – and a prerequisite for democracy – governments must not and cannot abrogate certain responsibilities critical to their broader democratic and social goals. Amongst

these are issues of equity and social mobility. For this reason the aim must be to enable policy makers to adopt an approach that will safeguard these aims, while simultaneously rethinking their role in the light of new knowledge about innovation. An analytical approach is needed to develop a contextually appropriate blend of provision, commissioning, regulation, prescription and quality assurance.

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<sup>12</sup> Charles Darwin, *The structure and distribution of coral reefs*, 1842

<sup>13</sup> *How the world's most improved school systems keep getting better* McKinsey & Co 2010





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# Differentiated classroom learning, technologies and school improvement: What experience and research can tell us



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## **Abstract**

One of the ways in which Australian schools are working to achieve differentiated classrooms and personalised learning for students is through the use of technologies. Promises of the integration of technologies into teaching and learning include that technologies enable teachers to be learner-focused, and students' respective interests and ways of learning are foremost in classroom practices. Virtual learning environments such as learning management systems, mobile technologies, online games, simulations and virtual worlds, are seen to offer students and teachers the capacity to personalise students' learning opportunities, and to put students in control of the pace of their learning. More recently, technologies are also being seen to offer data about students' learning achievements and developmental requirements. This paper draws on education theories, research and emerging new practices, to explore how technologies can be used to customise and personalise students' learning, and to reflect on the implications of the evidence and practices presented, for school improvement.

## **Differentiating learning with technologies**

Australian school principals suggest that teaching and learning with technologies affords educators opportunities to shift from teacher-centred to student-centred learning (Moyle, 2006). These views are consistent with those expressed by researchers in the United Kingdom (e.g. British Education Communications and Technology Agency (BECTA) and the National College for School Leadership, (NCSL) 2003; Hollingworth, Allen, Hutchings,

Kuyok & Williams, 2008), in the United States of America (Dede, Honan & Peters, 2005), and across countries in the Organisation for Economic Co-operation and Development (OECD) (Fisher; 2010; OECD, 2006; 2012). Technologies are seen to be able to provide learners with a wider range of learning experiences beyond those offered in traditional classrooms (BECTA, 2003; Johnson, Adams & Haywood, 2011; Lelliot, 2002). Furthermore, students consistently report that they value the capacity for personalisation of their learning through the use of technologies, where they are in control of the pace and style of their learning (Moyle & Wijngaards, 2012; Project Tomorrow, 2012).

## **Differentiation and personalisation**

The phrase 'differentiated classrooms' has gained traction over the past few decades, to describe approaches to teaching and learning that commence from students' knowledge, skills and abilities rather than from pre-determined programs of study. Differentiated learning approaches have been founded on theories such as those proposed by Dewey (1938/1963) and Bruner (1960), who both promoted approaches to learning built on students' interests, curiosity and experiences. Theorists of school students' learning styles in the 21st century, however, have extended these 20th century theories to propose new learning theories comprised of interrelated matrices of learning styles that are characterised by real and simulated active learning that is co-designed and personalised to accommodate individual preferences based on diverse, tacit and situated experiences (Dieterle, Dede & Schrier 2007; Koehler & Mishra 2008; Mishra

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& Koehler, 2006). At the heart of differentiated education theories and practices though, is the placement of students' learning at the centre of organisational decision-making about the practices that occur within and beyond classrooms and schools.

Although slightly different, the concepts of 'differentiated classrooms' and 'personalised learning' are oftentimes used inter-changeably. A distinction that can be made though, is that 'personalised learning' is tailored specifically to each individual student's learning demands. 'Differentiated classrooms' can refer to the use of different teaching approaches for individuals or small groups of students within the same class, depending on their respective developmental stages and interests. Sir Ken Robinson (2010) talks about teachers having to make a paradigm shift to personalised learning which involves the process of shaping learning to individuals' requirements, recognising that each student inherently has different strengths and weaknesses, interests and ways of learning. Personalising learning also involves recognising that students in the one class and across a school can have differing world views. Personalised learning strategies then, place an emphasis on students' self-direction and self-reliance. Trust is placed in the learner to make thoughtful and meaningful choices about what they learn and how they will learn it (McCombs, 2012). Teachers assist students to make links between their informal experiences gained outside of school, with the formalised requirements of teaching and learning that occurs within schools.

Australian teachers today then, have a wide variety of environments or spaces available for use in teaching, and as a result they require a broad set of teaching and learning approaches upon which to draw. Indeed, the increasing availability of technologies to Australian

school students, means schools no longer have to be only physical places. Now schools can use differentiated approaches to teaching, learning, student assessment and staff development using multiple environments that can consist of physical, online, and/or simulated learning places, or a mixture of all three environments. In physical and virtual ways then, schools can support students and staff to learn in ways previously not possible, and to practise different sorts of interpersonal relationships in various environments. Their learning can be differentiated and personally tailored to what they have to or want to know. Against this backdrop, school improvement and the capacity-building of teachers and school leaders then, necessarily has to be multidimensional.

### **Students' views of differentiated learning with technologies**

Several Australian and overseas studies have highlighted that students at all levels of education enjoy learning with technologies (cf Moyle & Owen, 2009; Li, 2007; Livingstone & Bober, 2005; Neal, 2005; Project Tomorrow, 2012). Project Tomorrow, a national US education non-profit group conducts annual, national online surveys of hundreds of thousands of primary and secondary school students, about their views of learning with technologies. The Project Tomorrow annual reports of findings indicate that US school students persistently indicate that they see one of the purposes of learning with technologies is to receive personalised learning opportunities that support different learning styles and developmental levels. Indeed over half (52 per cent) of the middle school respondents to the 2011 survey indicated that they like to use technologies to work at their own pace, and be in control of their own learning (Project Tomorrow, 2012). Australian students have reported similar views to

their US peers (Moyle & Owens, 2009).

Project Tomorrow (2012) also reports that over the nine years they have been surveying students' views about their uses of technologies, that students' adoption of new technologies in their personal lives has often stimulated the use of the same or similar tools in schools. For example, in 2003 Project Tomorrow documented how students were using emails not only for communication purposes, but also as a storage vehicle for schoolwork. The students used their emails in order to have ready access to their documents, irrespective of whether they were at home or at school (Project Tomorrow, 2012). Now, teachers both regularly communicate with their students via email, and accept homework through email as well as through school portals.

Furthermore, 46 per cent of the US parents who completed the Project Tomorrow 2011 survey indicated that they agreed that mobile devices provide a way for personalising school education. This finding represents a 48 per cent increase compared to parents' views in 2009 (Project Tomorrow, 2012). In addition, 48 per cent of the parent respondents to the 2011 survey also saw mobile devices as a means for extending learning beyond the school day, compared to about a third of parents holding this view two years ago (Project Tomorrow 2012). A majority of the parent respondents (57 per cent), also placed a high value on their children's ability to use their smartphone or tablet to video a classroom lesson or lab to review later at home (Project Tomorrow, 2012). These findings and the trends that Project Tomorrow have collected over almost a decade, provide insights into changing expectations of US school education, where teachers' pedagogies are increasingly expected to include the ability to use technologies to differentiate learning opportunities for their students.

In Australia, there is no similar annual

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survey conducted to that undertaken by Project Tomorrow, but given the similarities in Australian students' use of technologies to those of their US counterparts, it would be interesting to see if Australian students and their parents expressed similar views about the role of technologies in children's learning.

### **Using games to differentiate learning**

One of the emerging ways for schools to cater for differentiated learning is through the use of games. The *New Horizon K–12 Report 2011*, predicts the time to adoption of games-based learning is two to three years (Johnson et al., 2011). Games have been used in school education for many years. In the 21st century, games can include single-player or small-group card and board games through to massively multiplayer online games and alternate or augmented reality games (Johnson et al., 2011). The potential of online games for learning that is intriguing researchers, however, lies in how online game designs can foster collaboration and engage students deeply in the process of their learning. The following short case study illustrates how the philosophy of differentiated learning through the use of games and technologies has gained traction in a US school, while at the same time, the students have met the demands of their external testing requirements.

The Institute of Play is a government school in New York City that has taken a unique approach to school organisation where teaching and learning occurs with technologies, and games are used as their primary mode of teaching and learning. The philosophy of games informs the work at the school. The reason the *Institute of Play* has adopted this particular approach to teaching and learning is that they see games as a way of building higher order thinking skills (such as systems thinking, problem solving, and working in

teams), while at the same time fostering the key foundational skills of literacy and numeracy (Institute of Play, 2012a). Indeed the school reports above average achievement by their students on English and Maths standardised tests; an average of 90 per cent attendance rate; and a 96 per cent student stability in retention rate (Krueger, 2012).

To inform their work, the school has brought together research about school education and game design (cf Ito, Baumer & Bittanti, 2009), and interdisciplinary partnerships with universities and not-for-profit agencies, to create game-based teaching and learning approaches, school strategies and systems (Institute of Play, 2012a; Institute of Play 2012b).

At the school, teachers and school leaders view the curriculum and assessment as interconnected. Learning is differentiated with the use of technologies as well as through the use of games, with the aim that feedback is immediate and ongoing. Assessments are embedded into the games, not disaggregated from them. The school leaders argue that games are designed to create a compelling complex space, in which the students have to learn and come to understand the game through self-directed exploration. Students participate in 'just-in-time' learning and use data to help them understand several aspects of their game play: the context of the game; how they are performing; on what they ought to work; and in what directions they should go next. The games are seen to create a reason for students to learn and do certain things. The students have to examine, assimilate and become proficient at skills and content areas relevant to playing specific games, and as such have to be strategic as well as informed (Institute of Play, 2012c). These characteristics of game playing also position students well for applying these skills in different contexts.

In addition, while the games are played in artificial spaces, they have rules to which the students must adhere, in order to be successful. The research informing the use of games at the school suggests that the games provide opportunities for the students to succeed, but at the same time, some of the game playing involves the students attempting to meet almost unachievable goals, which they regularly fail to reach (Institute of Play, 2012c). The students report, however, that they find those goals challenging, and rarely experience their failures as an obstacle to trying again and again. The school leaders observe that there is something about playing games that gives the students permission to take risks considered impossible in real life. The challenge of the game is constant, but there is a balance of just enough challenge to be motivating, and not too much to overwhelm the student. Indeed, the school argues that the play itself activates the characteristics of tenacity and persistence required for effective learning (Institute of Play, 2012c). To be successful, the students test out their basic literacy and numeracy skills as well as their strategic and problem solving skills, and these experiences have seen them perform well on their external tests as well as on formative assessments.

'Differentiated learning', however, not only refers to constructing the means by which students can pursue their own learning paths, it also implies that teachers monitor students' achievements against their respective individual learning goals, as well as those goals that are externally prescribed. Although not yet widespread, there are technologies that can offer teachers the means by which to support students to conceptualise and pursue their own learning paths, as well as to analyse what students are doing so that they can provide specific feedback to individual students.

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## Differentiated classrooms, personalised learning and learning analytics

Student assessments and the mapping of student progress can generate considerable data that teachers can use to inform the tracking of student performance. Two future technologies considered to have potential to assist teachers to differentiate classrooms and personalise learning are 'personal learning environments' and 'learning analytics' software (Johnson et al., 2011). Through the use of online tools these technologies can be used by teachers to assist them to monitor and guide students along their own learning paths. While currently neither of these technologies are commonly available in schools, there is sufficient interest in their potential for the *New Horizon K-12 Report 2011* to predict they will be part of schools' suite of software tools in the coming four to five years (Johnson et al., 2011).

Personal learning environments are designed around each student's learning goals, and have the capacity for customisation. They are student-designed spaces and encompass different types of content, including videos, apps, games, and social media tools. The components used in their personal learning environments are chosen by students to match their identified learning goals, personal learning styles and pace. While personal learning environments sit in the hands of students, various vendors are currently developing learning analytics software to analyse student performances and behaviours, and to provide that aggregated information to teachers. Learning analytics software brings together data gathering, data mining tools and analytic techniques to produce synthesised real-time information about aspects of students' learning such as reports about students' performances on both formative and summative

assessments. Learning analytics software builds on the types of data generated by *Google Analytics* and other similar tools, to analyse the breadth and depth of information available from within learning environments (Johnson et al., 2011). An illustration of learning analytics software in practice can be found at the School of One, which is a middle years maths program run in three government schools in New York City. An algorithm is used that pairs teachers with students in ways that take into account the students individual learning styles, developmental stage and pace of learning. The learning analytic tools provide up-to-date data on students to create a personalised schedule for each student every day (School of One, 2012). The schedule links each student with the appropriate teacher at any point in the student's learning path.

These sorts of emerging software provide insights into what might be possible over the next five years. It would seem that the power of computing linked to data about students' own learning goals, attendance, learning preferences and assessments of performance, will soon enable teachers to provide each of their students with individualised guidance about what they do and do not know, and based on this information be able to provide personalised guidance to each of their students, on ways they may develop further. An emerging challenge for teachers and school principals though, is their ability to interpret and make meaning from the rich sources of data that are becoming available to them. Data interpretation will become an increasingly important capability in teachers' and school principals' toolkits.

### Conclusion

Evidence and experiences suggest that students enjoy and engage in their learning when it includes technologies. Although it is difficult to directly link the improvement of schools through

differentiating teaching and learning with technologies, there is an increasing pool of research that suggests that teaching and learning with technologies does afford teachers the ability to construct student-centred pedagogies.

To enable teachers and school principals to differentiate classrooms and personalise learning with technologies does, however, raise some challenges for school improvement. Differentiation of classrooms means students have choices about how they will achieve their own goals and those of the curriculum. It requires that teachers allow their students to study issues of personal relevance, and to support students to see and develop clear learning pathways that meet personal as well as external curriculum requirements. These learning approaches, by necessity, have to be based on detailed and ongoing knowledge of the strengths and weaknesses of individual students. Assessment for learning and the use of data to identify students' learning requirements on a daily basis, therefore becomes an important teaching capability.

Technologies in schools also provide principals with the challenge of how to organise a school and classrooms, based around rich data about student progress. Technologies can be used to inform teaching practices, but an emerging challenge for school principals is how to develop teachers' abilities to analyse and meaningfully act on the data they have at hand. Workforce development then is a key factor, if technologies are to be used in innovative ways to differentiate classrooms and personalise students' learning. It may be that the technologies simply provide a lens or a focus through which the teacher can filter his or her approaches to differentiated learning. If, however, the outcome is that teachers and school principals reflect upon what they teach, how they teach it, and how students' performances are assessed and reported, then useful outcomes will have been achieved.



## References

- British Educational Communications and Technology Agency (BECTA). (2003). *What the research says about ICT and motivation*. UK: BECTA.
- British Educational Communications and Technology Agency (BECTA) & National Council for School Leadership (NCSL). (2003). *Strategic leadership in ICT*. UK: NCSL.
- Bruner, J. (1960). *The process of education*. Cambridge, MA: Harvard University Press.
- Dede, C., Honan, J. P., Peters, L. C. (Eds.). (2005). *Scaling up success: Lessons learning from Technology-based educational improvement*. USA: Wiley.
- Dewey, J. (1938/1963). *Experience and education*. New York, USA: Collier Books.
- Dieterle, E., Dede, C., & Schrier, K. (2007). 'Neomillennial' learning styles propagated by wireless handheld devices. In M. Lytras & A. Naeve (Eds.), *Ubiquitous and pervasive knowledge and learning management: Semantics, social networking and new media to their full potential*. Hershey, PA: Idea Group, Inc.
- Fisher, K. (2010). *Technology-enabled active learning environments: An appraisal*. CELE Exchange, Centre for Effective Learning Environments, 2010/07, OECD Publishing. Accessed on 21 May 2012 from <http://dx.doi.org/10.1787/5kmbjxzm0p-en>
- Hollingworth, S., Allen, K., Hutchings, M., Kuyok, K. A., & Williams, K. (2008). *Technology and school improvement: Reducing social inequity with technology?* England: British Education and Communications Technology Agency (BECTA).
- Institute of Play, (2012a). About, *Institute of Play*. Accessed 22 May 2012, <http://www.instituteofplay.org/about/>
- Institute of Play, (2012b). Funders and partners, *Institute of Play*. Accessed 22 May 2012, from <http://www.instituteofplay.org/about/funders-partners/>
- Institute of Play, (2012c). Context, *Institute of Play*. Accessed 22 May 2012, from <http://www.instituteofplay.org/context/>
- Ito, M., Baumer, S., & Bittanti, M. (2009). *Hanging out, messing around, and geeking out: Kids living and learning with new media (The John D. and Catherine T. MacArthur Foundation Series on Digital Media and Learning)*. USA: MIT Press.
- Johnson, L., Adams, S., & Haywood, K. (2011). *The New Media C Horizon Report: 2011 K-12 Edition*. Texas, USA: The New Media Consortium Austin.
- Koehler, M. J., & Mishra, P. (2008). Introducing TPCK. In J. A. Colbert, K. E. Boyd, K. A. Clark, S. Guan, J. B. Harris, M. A. Kelly, & A. D. Thompson (Eds.), *Handbook of technological pedagogical content knowledge for educators*, pp.1–29. New York: Routledge.
- Krueger, K. (2012). Learning to change, changing to learn. Keynote address *EduTech 2012, K-12 IT Managers Conference* Sydney Australia 31<sup>st</sup> May .
- Lelliott, A. (2002). Developing the ICT capable school. *Computers and Education*, 39(3), 313–317.
- Li, Q. (2007). Student and Teacher Views About Technology: A Tale of Two Cities? *Journal of Research on Technology in Education*, 39 (4) pp377-397
- Livingstone, S., & Bober, M. (2005). *UK children go online. Final report of key project findings*. UK: Economic and Social Research Council.
- McCombs, B. (2012). *Developing Responsible and Autonomous Learners: A Key to Motivating Students*. American Psychological Association, Accessed on 22 May 2012 from <http://www.apa.org/education/k12/learners.aspx>
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017–1054.
- Moyle, K. (2006). *Leadership and learning with ICT*. Canberra, Australia: Teaching Australia.
- Moyle, K., & Owen, S. (2009). *Listening to students' and educators' voices: The views of students and early career educators about learning with technologies in Australian education and training, Research findings*. Canberra: Commonwealth of Australia.
- Moyle, K., & Wijngaards, G. (Eds.). (2012). *Student reactions to learning with technologies: Perceptions and outcomes*. Pennsylvania, USA: IGI Global.
- Neal, G (2005). Student reflections on the effectiveness of ICT as a learning resource. Annual Conference, Australian Association for Research in Education (AARE), Parramatta, Australia.
- Organisation for Economic Co-operation and Development (OECD). (2012). *OECD Review on evaluation and assessment frameworks for improving school outcomes*. OECD. Accessed on 19 May 2012 from [http://www.oecd.org/document/24/0,3746,n\\_2649\\_39263231\\_44567960\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/24/0,3746,n_2649_39263231_44567960_1_1_1_1,00.html)
- Organisation for Economic Co-operation and Development (OECD). (2006). *Personalising education*. OECD. Accessed on 19 May 2012 from [http://www.oecd.org/document/49/0,3746,en\\_2649\\_39263231\\_36168625\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/49/0,3746,en_2649_39263231_36168625_1_1_1_1,00.html)
- Project Tomorrow. (2012). *Mapping a personalized learning journey – K-12 students and parents connect the*

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*dots with digital learning*, Project Tomorrow, USA. Accessed on 25 May 2012, from [http://www.tomorrow.org/speakup/pdfs/SU11\\_PersonalizedLearning\\_Students.pdf](http://www.tomorrow.org/speakup/pdfs/SU11_PersonalizedLearning_Students.pdf)

Robinson, K. (2010). *Bring on the revolution*. TED Talks. Accessed on 25 May 2012, from [http://www.ted.com/talks/sir\\_ken\\_robinson\\_bring\\_on\\_the\\_revolution.html](http://www.ted.com/talks/sir_ken_robinson_bring_on_the_revolution.html)

School of One, (2012). *School of One*, New York City, Access on 25 May 2012, from <http://schoolofone.org/concept.html>

# Transforming education through the Arts: Creating a culture that promotes learning



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From 1998 to 2004 he served as Dean of Education at the University of Melbourne. He was appointed Professorial Fellow and Emeritus Professor in 2004. His previous appointments include Head of Education Policy and Management (1995–1998) at the University of Melbourne; Head of Teacher Education (1988–1989) and Dean of Education (1989–1990) at the University of Tasmania; and Research Assistant Professor (1979–1981) at the University of Alberta, Canada. He has held leadership positions in schools in Australia (1963–68) and Canada (1968–1977).

International work over the last 25 years includes more than 500 presentations, projects and other professional assignments in or for 40 countries or jurisdictions on six continents. In addition to approximately 180 published papers, chapters and monographs, Professor Caldwell is author or co-author of books that have helped guide educational reform in several countries

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Dr. Vaughan's major responsibility with Educational Transformations in 2009 and 2010 was as lead consultant in the major research project investigating the impact of programs in the arts on outcomes for students in highly disadvantaged setting. A summary of the research entitled *Bridging the gap in school achievement through the Arts* (Vaughan, Harris & Caldwell, 2011) was launched at Parliament House Canberra in March 2011 by Peter Garrett, Minister for School Education, Early Childhood and Youth. Her other project responsibilities have included support of the review of teacher education and induction in Queensland, evaluation of the state schools' academies program in Queensland, consultancy on middle schooling, and research on school improvement

and futures in education. She is co-author with Brian Caldwell of *Transforming education through the Arts* (Caldwell & Vaughan, 2012). She is also co-author of two chapters in *Changing schools in an era of globalization* (Lee & Caldwell, 2011).

Dr. Vaughan was lead consultant in a research project to investigate the effectiveness of The Song Room Creative Arts Indigenous Parents Engagement (CAIPE) in building parental and youth engagement with schools and schooling and co-leader of a project to study the social rate of return of investment in arts education. The findings of the CAIPE evaluation show important benefits for the engagement of Aboriginal and Torres Strait Islander parents and students in the arts.

## Abstract

There is persuasive evidence that participation in the arts can have a powerful impact on achievement in other areas of the curriculum and on student wellbeing. We gained a positive view of what is possible in research commissioned by The Song Room (TSR) (Vaughan, Harris & Caldwell, 2011). TSR is a non-profit organisation that provides free music and arts-based programs for children in disadvantaged and other high-need settings.

Researchers examined the performance of students in 10 schools in highly disadvantaged settings in Western Sydney, within a quasi-experimental model with three groups of schools 1) longer-term TSR - 12-18 months 2) initial TSR - 6 months and 3) non-participating – control. The schools were a matched set; they scored roughly the same on the Australian Curriculum, Assessment and Reporting Authority (ACARA) Index of Community Socio-Educational Advantage (ICSEA). Students in eight schools completed the Social-Emotional Wellbeing (SEW) survey designed and validated at the Australian Council for Educational Research (ACER).

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Students in TSR programs outperformed students in non-TSR schools in school achievement tests and in NAPLAN tests (Caldwell & Vaughan, 2012). The percentage of students absent on a day when TSR programs were offered was higher in non-TSR schools than in TSR schools. The gain in achievement in reading is approximately one year which is a larger effect than achieved in more sharply focused interventions. A higher proportion of student in TSR programs were at the highest levels of SEW and resilience than their counterparts in non-TSR schools.

## Introduction

UNESCO considers education in the arts to be a universal human right, implying that its absence or sidelining is a breach of the convention on the rights of the child. A 'road map for arts education' was prepared at the First World Conference on Arts. It included the following statement:

Culture and the arts are essential components of a comprehensive education leading to the full development of the individual. Therefore, Arts Education is a universal human right, for all learners, including those who are often excluded from education, such as immigrants, cultural minority groups, and people with disabilities.

(UNESCO, 2006, p. 3)

We gained a positive view of what is possible in research commissioned by The Song Room (TSR), as published in *Bridging the gap in school achievement through the Arts* (Vaughan Harris & Caldwell 2011), launched by Hon. Peter Garrett, Australia's Minister for School Education, Early Childhood and Youth in March 2011. The Song Room is a non-profit organisation that provides free music and arts-based programs for children in disadvantaged and other high-need settings. According to

The Song Room, 700,000 students in government primary schools in Australia have no opportunity to participate in programs in the arts. The research was funded by the Macquarie Group Foundation. A complete account is contained in *Transforming education through the Arts* (Caldwell and Vaughan, 2012).

The research was conducted in primary schools in the public sector but we did the study against a background of international research in both primary and secondary schools in all sectors. The findings are as unexpected as they are powerful and there is no reason to expect that they do not also apply in secondary schools.

Our research team examined the performance of students in 10 schools in highly disadvantaged settings in Western Sydney. Three schools offered a longer-term program over 12 to 18 months, and three schools offered an initial short-term program of 6 months. In each instance the program was conducted for Grade 5 and 6 students for one hour on a single day once per week. A control group of four schools did not offer The Song Room program. The three sets of schools were a matched set. At the time of the study they scored roughly the same on the Australian Curriculum, Assessment and Reporting Authority (ACARA) Index of Community Socio-Educational Advantage (ICSEA) as calculated in 2009. An even closer match was evident when 2010 ICSEA scores were used. The study is a rare example of quasi-experimental design in educational research.

ICSEA is scaled to a mean of 1000 with a standard deviation of 100 (ACARA, 2011). ICSEA 1 data collected from the My School website in 2010 enabled the choice of control schools, while ICSEA 2 data collected from My School 2 in 2011 provided a more accurate comparison of ICSEA between the

experimental groups. The ICSEA 2 data collected from the My School 2 had improved accuracy to predict NAPLAN scores (ACARA, 2011) and was different from the ICSEA 1 as it contained data sourced directly from parents rather than the Australian Bureau of Statistics census data, and included the proportion of students from Language Background other than English (LBOTE) families having a low school education levels (Barnes, 2010). The schools not participating in TSR programs were chosen by the research team from a list of schools provided by TSR to match schools offering TSR programs. Weighted mean enrolments of the three groups were 439 (longer-term), 359 (initial) and 444 (non-participating). Weighted mean ICSEA 1 scores were 910 (longer-term), 905 (initial) and 883 (non-participating) for ICSEA. The ICSEA 2 scores provided an improved match between the cohorts, with those who had not participated in TSR having the highest ICSEA of 913, and the initial and longer-term cohorts having an ICSEA of 903. The slightly increased ICSEA for the non-participating group of schools would act as a slight bias towards the identification of higher outcomes in those who had not participated. The weighted mean in each instance takes account of the relative numbers of students in each school that participated in the study.

Data on gender, grade level, attendance, grades and NAPLAN results were collected from 10 schools and categorised according to participation in TSR program. Two schools from each of the cohorts were selected to participate in the Social-Emotional Wellbeing (SEW) Survey, which was designed and validated by the Australian Council for Educational Research (Bernard, Stephanou, & Urbach, 2007). The SEW survey was administered to a total of 271 students.

Students that participated in TSR showed significantly higher grades



in their academic subjects (English, Mathematics, Science and Technology and Human Society) in comparison to those who had not participated in TSR. Students' grades in Science and Technology and Human Society were significantly higher for students who had participated in TSR in comparison to those who had not participated in TSR. The largest effect size was observed for Science and Technology grades, of  $d = 0.46$  which was equivalent to a gain of half a year in achievement.

Baseline measurements of the NAPLAN results in 2008 showed no significant differences between the longer-term cohort (prior to participation in TSR) and those who had not participated in TSR. Significantly higher Year 5 NAPLAN 2009 results for the longer-term TSR cohort were observed in Reading, Writing, Spelling, Grammar and Punctuation and Overall Literacy ( $p < 0.01$ ), with the largest effect size of  $d = 0.79$  for Reading, which was within the 'zone of desired effects' for educational research and equivalent to a gain in achievement of at least a year. The comparison of the Year 5 2010 NAPLAN results showed lower percentages of students below the minimum national level for the longer-term TSR and initial TSR cohorts in writing, spelling and grammar and punctuation in comparison to those students who had not participated in TSR.

Students who participated in TSR had higher overall SEWB and resilience, which showed the greatest magnitude of difference in the longer-term TSR in comparison to those schools who had not participated in TSR. Male students who participated in TSR showed significantly reduced agreement to the statement 'I feel stressed' in comparison to students who had not participated in TSR. The students' responses to the statement 'During the past six months, I have felt so hopeless and down almost every day for one week

that I have stopped doing my usual activities' showed a statistically significant difference for female students in the longer-term TSR in comparison to those who had not participated in TSR.

Important differences were found in favour of students that undertake The Song Room program. The findings have national and international significance. First, related research in other countries is confirmed (Baker, 2011; Bamford, 2006; Brice, Heath and Roach, 1999; Catterall, Chapleau and Iwanaga 1999; Catterall and Peppler 2007; Catterall, Dumais and Hampden-Thompson, 2012; Hunter, 2005; Oreck, Baum and McCartney 1999; Schellenberg, 2006; Spillane, 2009; Uptis and Smithrim, 2003). Second, there appears to be a direct association between the arts and outcomes in other areas. Third, the wisdom of including the arts in Australia's national curriculum is confirmed. The key findings were summarised as follows:

- 1 Participation in TSR is associated with a gain of approximately one year in Year 5 NAPLAN scores in reading and approximately half a year in science and technology when compared to outcomes for students in matching schools.
- 2 Participation in TSR is associated with higher levels of social and emotional wellbeing on every dimension compared to measures for students in matching schools.
- 3 While there was no implication that students in TSR in participating schools had a propensity to engage in juvenile crime, the findings are consistent with worldwide research on factors that mitigate such engagement.

While caution must always be exercised in drawing cause-and-effect relationships, these differences in comparisons in matched sets of schools were statistically significant. Moreover,

the longer the students were in TSR programs, the greater the differences.

The sidelining of the arts appears to be more evident in public schools than in independent schools, and more so in public schools in highly disadvantaged settings than in their counterparts in more affluent communities. An explanation lies in the fact that large numbers of independent schools have, at least in the eyes of parents, a more holistic view of the curriculum and have well-developed programs in the arts that have withstood the narrowing effect of high-stakes testing. There are notable exceptions, of course, especially for public schools of long standing or where the arts are a 'protected' specialisation. An associated reason that takes account of socio-economic status in the public sector as well as in the independent sector is that these schools have more financial resources to draw on or have higher levels of social capital from which they can secure support for the arts.

It is important that we acknowledge that the sidelining of the arts and the other dysfunctions we described above are not universal and that, even in the same countries or school systems or schools, there are outstanding programs in the arts.

The sidelining of the arts reflects the divisions in the disciplines of learning that has existed since at least the nineteenth century. Paul Johnson drew attention to the problem in *Creators* (Johnson, 2006) where he described the work of men and women of outstanding originality, including Chaucer, Shakespeare, J. S. Bach, Jane Austen, Victor Hugo, Mark Twain, Picasso and Walt Disney. In an affirmation of what can be accomplished in arts education, he declared that 'creativity is inherent in us all' and 'the only problem is how to bring it out' (Johnson, 2006, p. 3). Johnson believes that 'the art of creation comes closer than any

other activity to serving as a sovereign remedy for the ills of existence' (Johnson, 2006, p. 2).

We conclude by returning to the Australian scene. In May 2011 *The Economist* published a lead article on the future of Australia under the heading 'The next Golden State' with a sub-title 'With a bit of self-belief, Australia could become a model nation' (*The Economist*, 2011, pp. 13–14). Much of the article contrasted the social and economic potential of the nation with the narrowly focused inward-looking discourse that it alleges is characteristic of politics in Australia. It looked at the characteristics of open, dynamic and creative societies as these have been created over the years in other nations and offered the following in respect to Australia:

Such societies, the ones in which young and enterprising people want to live, cannot be conjured up overnight by a single agent, least of all by government. They are created by the alchemy of artists, entrepreneurs, philanthropists, civic institutions and governments coming together in the right combination at the right moment. And for Australia, economically strong as never before, this is surely such a moment.

(*The Economist*, 2011, p. 13)

Australia will not achieve this state if it does not take seriously the intentions in the Australian Curriculum and evidence on the impact of the arts in schooling that is now irrefutable.

## References

- ACARA (2011) My School: Guide to understanding ICSEA. Online. Available HTTP: <[http://www.acara.edu.au/verve/\\_resources/Guide\\_to\\_understanding\\_ICSEA.pdf](http://www.acara.edu.au/verve/_resources/Guide_to_understanding_ICSEA.pdf)>. Accessed 13 May 2011.
- Baker, R. (2011). The Relationship between Music and Visual Arts formal study and academic achievement on the eight-grade Louisiana Educational Assessment Program (LEAP) test, PhD thesis (Louisiana State University).
- Bamford, A. (2006). The Wow factor: Global Research compendium on the impact of the arts in education, Münster: Waxman.
- Barnes, G. (2010). Report on the generation of the 2010 Index of Community Socio-Educational Advantage (ICSEA). Online. Available HTTP: <[http://www.acara.edu.au/verve/\\_resources/2010\\_Index\\_of\\_Community\\_Socio-Educational\\_Advantage\\_Generation\\_Report.pdf](http://www.acara.edu.au/verve/_resources/2010_Index_of_Community_Socio-Educational_Advantage_Generation_Report.pdf)>. Accessed 3 May 2011.
- Bernard, M. E., Stephanou, A., & Urbach, D. (2007). Australian Scholarships Group (ASG) Student social and emotional health report: A research project conducted by the Australian Council for Educational Research. Melbourne: Australian Council for Educational Research. Online. Available HTTP: <[http://www.acer.edu.au/documents/SEWB\\_ASG-StudentSocialEmotionalHealthReport.pdf](http://www.acer.edu.au/documents/SEWB_ASG-StudentSocialEmotionalHealthReport.pdf)>. Accessed 13 May 2011.
- Brice Heath, S., & Roach, A. (1999), Imaginative Actuality. In E. B. Fiske (Ed.), *Champions of change: The Impact of the arts on learning*, Washington: The Arts Education Partnership; The President's Committee on the Arts and Humanities, 19–34.
- Caldwell, B. J., & Vaughan, T. (2012). *Transforming education through the arts*, London and New York: Routledge.
- Catterall, J. S., Chappleau, R., & Iwanaga, J. (1999). Involvement in the arts and human development: General involvement and intensive involvement in music and theater arts. In E. B. Fiske (Ed.), *Champions of change: The impact of the arts on learning*, Washington: The Arts Education Partnership; The President's Committee on the Arts and Humanities. Online. Available HTTP: <<http://artsedge.kennedy-center.org/champions/pdfs/ChampsReport.pdf>>, (accessed 27 April 2011).
- Catterall, J. S., & Pepler, K. A. (2007). Learning in the visual arts and the worldviews of young people. *Cambridge Journal of Education*, 37, 543–60. Online. Available HTTP: <[http://gseis.ucla.edu/faculty/files/catterall/JC\\_CJPublished.pdf](http://gseis.ucla.edu/faculty/files/catterall/JC_CJPublished.pdf)>. Accessed 28 May 2011.
- Catterall, J. S., Dumais, S. A., & Hampden-Thompson, G. (2012). The arts and achievement in at-risk youth: Findings from four longitudinal studies. Washington: National Endowment for the Arts. Online. Available HTTP: <<http://www.nea.gov/research/Arts-At-Risk-Youth.pdf>>. Accessed 5 April 2012.
- Hunter, M. A. (2005). Education and the Arts Research Overview. Strawberry Hills: Australia Council for the Arts. Online. Available HTTP: <[http://www.australiacouncil.gov.au/\\_\\_data/assets/pdf\\_file/0018/34083/EdArts\\_Research\\_Overview.pdf](http://www.australiacouncil.gov.au/__data/assets/pdf_file/0018/34083/EdArts_Research_Overview.pdf)>, (accessed 13 May 2011).
- Johnson, P. (2006). *Creators*. New York: Harper Perennial.
- Oreck, B., Baum, S., & McCartney, H. (1999). Artistic talent development for urban youth. In E. B. Fiske (Ed.), *Champions of change: The impact of the arts on learning*, Washington: The Arts Education Partnership; The President's Committee on the Arts and Humanities. Online. Available HTTP: <<http://artsedge.kennedy-center.org/champions/pdfs/ChampsReport.pdf>>. Accessed 13 May 2011.

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- Schellenberg, E. G. (2006). Long-term positive associations between music lessons and IQ, *Journal of Educational Psychology*, 98, 457-68.
- Spillane, D. (2009). Boys in a small rural school: Developing a culture of confidence and success. In Harrison (Ed.), *Male voices, stories of boys learning through making music*. Melbourne: ACER Press.
- The Economist. (2011). The next Golden State, *The Economist*, 28 May, pp. 13-14.
- UNESCO. (2006). Road Map for Arts Education. Report from The World Conference on Arts Education: Building Creative Capacities for the 21st Century in Lisbon, 6-9 March 2006. Online. Available HTTP: <[http://portal.unesco.org/culture/en/ev.php-URL\\_ID=30335&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/culture/en/ev.php-URL_ID=30335&URL_DO=DO_TOPIC&URL_SECTION=201.html)>, (accessed 9 March 2009).
- Upitis, R., & Smithrim, K. (2003). *Learning through the Arts: National Assessment: 1999-2002. Final Report to The Royal Conservatory of Music*. Toronto: Toronto Royal Conservatory of Music.
- Vaughan, T., Harris, J., & Caldwell, B. J. (2011). *Bridging the gap in school achievement through the Arts: Summary report*. Melbourne: The Song Room. Online. Available HTTP: <<http://www.songroom.org.au/images/stories/Bridging%20the%20Gap%20in%20School%20Achievement%20through%20the%20Arts.pdf>>, (accessed 30 May 2011).

# Walking the walk: The need for school leaders to embrace teaching as a clinical practice profession



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He has conducted a wide range of research projects (68 funded) in the areas of educational leadership and change, effective pedagogy/quality teaching, student achievement, postgraduate supervision, professional teaching standards, teachers' professional development, middle-level leaders in schools, and teacher satisfaction, motivation and health. He has an extensive publication record (more than 290 publications) of books, book chapters, refereed journal articles, and articles in professional journals. His most recent book is *How to Get Your School Moving and Improving: An evidence-based approach* (2008). He is a frequent presenter at international, national and state conferences (over 425 presentations) in countries such as the USA, Canada, England, New Zealand, Northern Ireland, Sweden, Scotland, Germany, Switzerland, Malaysia, Singapore and Crete as well as every Australian state and territory) and has conducted consultancies with a wide range of educational bodies nationally and internationally.

Professor Dinham is a Past President of the NSW Branch of the Australian College of Educators (ACE) and chaired the Steering Committee responsible for the NSW Minister for Education and Training and ACE Quality Teaching Awards introduced in 2001 until 2007. In June 2002, he was appointed to the Interim Committee for the NSW Institute of Teachers and in August 2002, to the Commonwealth Review of Teaching and Teacher Education.

He is National President-elect of the Australian College of Educators and Chair-elect of the ACE Board from 2012. He is also Vice-President of the Victorian Branch of the Australian Council for Educational Leaders (ACEL).

Professor Dinham is the only person to have been awarded the peak medals of both the Victorian and New South Wales branches of the Australian College of Educators.

## Abstract

There have been longstanding concerns with teacher pre-service education. The model of university coursework plus practicum has been criticised. Despite attempts to rectify this situation, only a minority of beginning teachers in Australia rate themselves as being well prepared or very well prepared when they begin teaching.

This paper examines such concerns before offering an alternative. There are two aspects to this new model.

Firstly, a clinical approach to teacher pre-service education coupled with new roles, practices and structures designed to overcome the so-called theory practice gap and enable implementation of evidence-based interventionist practice. One such approach is highlighted.

Secondly, the adoption of a clinical approach to teacher education and teaching practice requires understanding, knowledge, commitment and support from education leaders. Educational leaders require a thorough grounding in instructional leadership for clinical teaching if real change towards

evidence-based teaching practice for improved student achievement is to occur in schools. Approaches to addressing these needs are outlined.

## Introduction

'I can't understand why people are afraid of new ideas. I'm frightened of the old ones.'

(John Cage, Composer)

## The importance of the teacher to student outcomes

The teacher is the major in-school influence on student achievement. While research has given a clear picture of what good teaching looks like, teacher quality varies widely, and more so within than between schools (Rowe, 2003; Dinham, 2008; Hattie, 2009).

Wright, Horn and Sanders have noted (1997, p. 57):

the most important factor affecting student learning is the teacher ... more can be done to improve education by improving the effectiveness of teachers than by any other single factor.

Ensuring a quality teacher in every classroom is vital in terms of equity and improving the life chances of every student. It also has wider social, political and economic ramifications. While factors such as Socio-Economic Status (SES) and family background can each have moderate to large effects on student achievement (Hattie, 2009, pp. 61-63), these are not life sentences: 'Life isn't fair, but good teaching and good schools are the best means we have of overcoming disadvantage and opening the doors of opportunity for young people' (Dinham, 2011a, p. 38).

In improving the quality of teaching, pre-service education is critical but it is not

sufficient. Ongoing professional learning and informed, committed leadership are required to improve teaching practice within schools and to lift student achievement (Dinham, 2007; Robinson & Timperley, 2007).

### Concerns with teacher education

There have been consistent concerns with teacher pre-service education for decades (Dinham, 2006; Labaree, 2004). The model of university coursework plus practice teaching has been found wanting (Hattie, 2009, pp. 109-112).

In Australia there has been, on average, one major state or national enquiry into teacher education every year for the past 30 years. Inevitably and unfortunately, 'Each inquiry reaches much the same conclusions and makes much the same recommendations, yet little changes' (Dinham, 2006, p. 1).

Darling-Hammond and Baratz-Snowden (2005, p. 37) provide a succinct summary of these concerns and an emerging trend:

In the recent past, traditional teacher preparation often has been criticised for being overly theoretical, having little connection to practice, offering fragmented and incoherent courses, and lacking in a clear, shared conception of teaching among the faculty. Programs that are largely a collection of unrelated courses and that lack a common conception of teaching and learning have been found to be feeble agents for effecting practice among new teachers ...

However in response:

Beginning in the late 1980s, teacher education reforms began to produce program designs representing more integrated, coherent programs that emphasise a consistent vision of

good teaching ... The programs teach teachers to do more than simply implement particular techniques; they help teachers to think pedagogically, reason through dilemmas, investigate problems, and analyse student learning to develop appropriate curriculum for a diverse group of learners.

There is growing recognition that teachers need to be able to 'diagnose' individual student learning and provide appropriate 'prescriptions' for improvement i.e., to be clinical, evidence-based, interventionist practitioners in the manner of health professionals. Teachers have been told for decades that they need to cater for individual student differences and to 'personalise' learning, yet generally, have not been shown or taught how to do this.

Darling-Hammond and Baratz-Snowden (2005, p. 43) have noted that successful clinical teacher education programs exhibit:

- Clarity of goals, including the use of standards guiding the performances and practices to be developed
- Modelling of good practices by more expert teachers in which teachers make their thinking visible
- Frequent opportunities for practice with continuous formative feedback and coaching
- Multiple opportunities to relate classroom work to university coursework
- Graduated responsibility for all aspects of classroom teaching
- Structured opportunities to reflect on practice with an eye toward improving it.

### Addressing clinical practice in a graduate entry teacher education program<sup>1</sup>

In 2008 the Melbourne Graduate School of Education (MGSE) at the University of Melbourne began phasing out its undergraduate pre-service teacher education degrees and introduced the Master of Teaching (MTeach), a new graduate program with early childhood, primary and secondary streams.

The design of the MTeach, a two-year full-time equivalent program, was influenced by concerns over traditional approaches to teacher education and by developments at leading international pre-service teacher education institutions.

A key principle underpinning the MTeach is the focus upon evidence or data about learners to improve teaching practice and to lead to enhanced student learning and development. A second principle is that in order to break the cycle of teachers teaching as they were taught and new teachers being drawn into this prevailing culture, there needs to be more alignment, understanding and collaboration between the university and schools/early childhood settings.

Additional features of the MTeach include:

- Teacher Candidates spend two days per week in a school or early childhood centre from early in their studies and undertake placements in block rounds of up to four weeks in each semester.
- Placement sites (Base Schools [hubs], Placement Schools and early childhood centres) are arranged in neighbourhood groups (networks in early childhood), which have been

<sup>1</sup> This section is drawn from McLean Davies et al., (in press).



carefully chosen and where staff have a sound understanding of the program.

- MGSE funds one staff member at each Base School/centre (40 in total) called a Teaching Fellow, to be released from 50 per cent of their duties to work across the partnership group/network with Candidates, and Mentor [supervising] Teachers to ensure coherent and consistent delivery of the placement.
- The Teaching Fellow [0.5] is joined by a university-based Clinical Specialist [0.2] who supports Teacher Candidates to draw on the work undertaken at university as they seek to meet the needs of individual learners. Most Clinical Specialists are also involved in the teaching of university-based subjects and are well placed to make links between theory and practice.
- In order to further embed the links between theory and practice within the program, Clinical Specialists, with the support of Teaching Fellows, organise and deliver a seminar series that runs throughout each semester at a placement/network site.
- These partnerships play a key role in supporting the clinical premise of the Master of Teaching, i.e. that teachers who use a specific form of evidence-based, diagnostic, interventionist teaching have a positive effect on student learning outcomes. The program facilitates the role of the teacher to work in teams and use data to enhance decision-making about teaching and learning strategies for individual students, groups and classes.
- Assessment of student work as evidence of learning lies at the core Master of Teaching subjects, a key principle being that with a data-driven, evidence-based approach to teaching and learning, teachers can

manipulate the learning environment and scaffold learning for every student, regardless of the student's development or intellectual capacity.

A key question concerning the Master of Teaching is the degree to which it is making a difference. A study by the Australian Education Union (2009) asked 1545 new primary and secondary teachers from across Australia their satisfaction with their training as preparation for teaching. Overall, 40 to 45 per cent claimed that they were 'well' or 'very well' prepared (on a five-point scale) when they began teaching. This figure is similar to the findings from earlier samples of teachers in New South Wales, England, United States of America and New Zealand (Dinham & Scott, 2000; see also US Department of Education, 2011).

When the first MTeach graduates (primary and secondary) were asked the same question as part of an evaluation conducted by the Australian Council for Educational Research (ACER) late in 2010, 90 per cent reported being 'well' or 'very well' prepared when they began teaching. The ACER evaluation found (Scott et al., 2010, p. 4):

All respondents [Primary and secondary graduates, Clinical Specialists, Teaching Fellows, Mentor Teachers, Principals, other stakeholders] agreed that the [MTeach] program had impressive strengths, as evident in the:

- Integration of theory and practice.
- Emphasis on evidence-based practice.
- Increased awareness and engagement with aspects of the profession by Teacher Candidates.
- Development of Candidates, who come into the profession with knowledge of 'best practice'.
- Emphasis on deep reflection and on reflective practice in the course

giving Candidates an opportunity to change as they go along.

- Recognition that Candidates have an important role to play in increasing standards in the profession.
- High levels of support for Candidates from Clinical Specialists, Teaching Fellows and school-based staff.

### **The need for educational leaders to understand and support clinical practice**

These findings are encouraging – although the MTeach is a work in progress – but producing well-trained clinical practitioners is not enough. If real change in teachers' clinical assessment and interventionist capabilities is to occur, school leaders must be informed, supportive and equipped to assist in this process of changing the way teachers think, what they know and how they teach. A key concern is the professional development of the bulk of the teaching profession who may have decades of service ahead of them. Leaders have a key role here.

Marzano, Waters and McNulty found (2005, pp. 10-12):

A highly effective school leader can have a dramatic influence on the overall academic achievement of students ... a meta-analysis of 35 years of research indicates that school leadership has a substantial effect on student achievement and provides guidance for experienced and aspiring principals alike.

Yet Hallinger (2005) observed that despite interest in instructional leadership – leadership of and for teaching and learning – arising from research into effective schools going back as far as the late 1970s (2005, p. 228):

During the mid-1990s, however, attention shifted somewhat away from effective schools and

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instructional leadership. Interest in these topics was displaced by concepts such as school restructuring and transformational leadership.

For a time, transformational leadership became popular; restructuring was endemic (Dinham, 1998) and instructional leadership was relegated, and to some degree derided, as outdated.

However, findings from international research have caused a re-examination of the worth of instructional leadership. Robinson, Lloyd and Rowe concluded from their work on the impact of various leadership approaches (2008, p. 666):

The comparison between instructional and transformational leadership showed that the impact [on student outcomes] of the former is three to four times that of the latter. The reason is that transformational leadership is more focused on the relationship between leaders and followers than on the educational work of school leadership, and the quality of these relationships is not predictive of the quality of student outcomes. Educational leadership involves not only building collegial teams, a loyal and cohesive staff, and sharing an inspirational vision. It also involves focusing such relationships on some very specific pedagogical work, and the leadership practices involved are better captured by measures of instructional leadership than of transformational leadership.

Thus while the importance of instructional leadership had been recognised for three decades or more (see also Chase & Kane, 1983), the approach has only re-gained prominence within the last decade, due in part to a growing focus on the importance

of quality teaching to student achievement as revealed through international student testing regimes such as PISA (the OECD Programme for International Student Assessment, PIRLS (Progress in International Reading Literacy Study) and TIMSS (Trends in International Mathematics and Science Study). Rankings and performance on these measures have increasingly become a matter of concern and importance in many countries (Barber & Mourshed, 2007).

In Australia the imperative for instructional leadership (re-)gained momentum partly due to the context of the National Assessment Program – Literacy and Numeracy (NAPLAN) tests introduced in 2008 and the establishment of the My School website<sup>2</sup> in 2010. National student testing and publication of school performance and student growth data gained prominence, although broader outcomes other than those from standardised testing (i.e., academic, personal, social, see MCEETYA, 2008) are equally important.

### **Instructional leadership for clinical practice**

While original conceptions of instructional leadership focused predominantly on the principal, the notion of distributed leadership – the leadership practices and effects of others in formal leadership positions in schools along with teacher leadership – has become prominent (see Harris, 2009).

Attention is increasingly turning to the *impact* of teaching and leadership on student outcomes (see Day et al., 2009; Barber et al., 2010).

Hattie found from his extensive meta-analytic work (2009, p. 83) that:

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2 See <http://www.naplan.edu.au/> and <http://www.myschool.edu.au/>

School leaders who focus on students' achievement and instructional strategies are the most effective ... It is leaders who place more attention on teaching and focused achievement domains ... who have the higher effects.

Robinson, Lloyd and Rowe (2008: 636) offered a similar view:

The more leaders focus their influence, their learning, and their relationships with teachers on the core business of teaching and learning, the greater their influence on student outcomes.

Barber et al. (2010, p. 7) found:

High-performing ['top' 15%] principals focus more on instructional leadership and developing teachers. They see their biggest challenges as improving teaching and curriculum, and they believe that their ability to coach others and support their development is the most important skill of a good school leader.

Barber et al. also found that a thorough knowledge of teaching and learning on behalf of leaders is essential if teachers are to be developed and supported to be able to move forward the learning of every student in their care (2010, p. 28):

Leadership focused on teaching, learning, and people is critical to the current and future success of schools.

High-performing principals focus more on instructional leadership and the development of teachers.

However, penetrating the often closed classroom door remains a challenge for principals and other leaders. Wahlstrom and Louis have commented (2008, p. 459):

In the current era of accountability, a principal's responsibility for the

quality of teachers' work is simply a fact of life. How to achieve influence over work settings (classrooms) in which they rarely participate is a key dilemma.

Robinson, Lloyd & Rowe's conclusions from their meta-analyses support the existence of a disconnect between approaches to leadership and approaches to improving student outcomes (2008, p. 669):

The loose coupling of school leadership and classroom teaching ... is paralleled in the academy by the separation of most leadership research and researchers from research on teaching and learning, and by the popularity of leadership theories that have little educational content ... Fortunately, the gulf between the two fields is beginning to be bridged by a resurgence of interest in instructional leadership and calls for more focus on the knowledge and skills that leaders need to support teacher learning about how to raise achievement while reducing disparity.

## Conclusion

Quality teaching lies at the heart of attempts to raise student outcomes and to close achievement gaps associated with factors such as socio-economic status, family background, geographic isolation, non-English speaking background and Aboriginality.

Research findings are increasingly compelling on the relationship between instructional leadership, effective teaching and student outcomes yet much work remains to be done. As teaching becomes more evidence-based, clinical and interventionist in nature, it is imperative that school leaders are equipped to guide, support and lead teachers in this process. This central role is recognised in the recent National Professional Standard for

Principals in Australia (AITSL, 2011, p. 2; Dinham, 2011b).

Twenty-first century educational leaders need to be able to 'talk the talk' and more importantly, 'walk the walk' on approaches that place the individual student and his or her advancement at the centre of the school. In order to make best teaching practice common practice (Dinham, Ingvarson & Kleinhenz, 2008, p. 14), preparation for and the enactment of instructional leadership must be congruent with teachers' initial and ongoing professional learning to ensure evidence-based, clinical professional practice occurs in every classroom and for every student.

## References

- AITSL. (2011). *National Professional Standard for Principals*. Melbourne: AITSL. [http://www.aitsl.edu.au/verve/\\_resources/nationalProfessionalStandardForPrincipals\\_July25.pdf](http://www.aitsl.edu.au/verve/_resources/nationalProfessionalStandardForPrincipals_July25.pdf)
- Australian Education Union. (2009). *New Educators Survey 2008*. <http://www.aeufederal.org.au/Publications/2009/Nesurvey08res.pdf> accessed June 2012
- Barber, M., & Mourshed, M. (2007). *How the world's best-performing school systems come out on top*. McKinsey & Company. [www.nctq.org/p/publications/docs/mckinsey\\_education\\_report.pdf](http://www.nctq.org/p/publications/docs/mckinsey_education_report.pdf) accessed June 2012.
- Barber, M., Whelan, F. & Clark, M. (2010). *Capturing the leadership premium: How the world's top school systems are building leadership capacity for the future*. McKinsey & Company. <http://mckinseysociety.com/capturing-the-leadership-premium/>
- Chase, G., & Kane, M. (1983). *The principal as instructional leader: How much more time before we act?* Denver, CO: Education Commission of the States.
- Darling-Hammond, L., & Baratz-Snowden, J. (Eds.). (2005). *A good teacher in every classroom*. San Francisco: Jossey-Bass.
- Day, C., Sammons, P., Hopkins, D., Harris, A., Leithwood, K., Qing, G., Brown, E., Ahtaridou, E., & Kington, A. (2009). *The impact of school leadership on pupil outcomes*. Nottingham: University of Nottingham.
- Dinham, S. (1998). Restructuring: The myths, the realities – and survival. *The Practising Administrator*, 20(3): 4–5, 51.
- Dinham, S. (2006). Teaching and teacher education: Some observations, reflections and possible solutions. *ED Ventures*, 2, 3–20.
- Dinham, S. (2007). *Leadership for exceptional educational outcomes*. Teneriffe, Qld: Post Pressed.
- Dinham, S. (2008). *How to get your school moving and improving: An evidence-based approach*. Camberwell, Victoria: ACER Press.
- Dinham, S. (2011a). Improving the quality of teaching in Australia. *Education Canada*, 51(1), 34–38. <http://www.cea-ace.ca/education-canada/article/improving-quality-teaching-australia>
- Dinham, S. (2011b). *Pilot study to test the exposure draft of the National Professional Standard for Principals – Analysis of Interim Reports*. Melbourne: [http://www.aitsl.edu.au/verve/\\_resources/PilotStudy\\_NPSPrincipals.pdf](http://www.aitsl.edu.au/verve/_resources/PilotStudy_NPSPrincipals.pdf) accessed June 2012
- Dinham, S., Ingvarson, L., & Kleinhenz, E. (2008). *Investing in teacher quality: Doing what matters most, in teaching talent: The best teachers for Australia's classrooms*. Melbourne: Business Council of Australia. <http://www.bca.com.au/Content/99520.aspx> accessed June 2012
- Dinham, S., & Scott, C. (2000). Moving into the third, outer domain of



- teacher satisfaction. *Journal of Educational Administration*, 38(4), 379–396.
- Hallinger, P. (2005). Instructional leadership and the school principal: A passing fancy that refuses to fade away. *Leadership and Policy in Schools*, 4(3), 221–239.
- Harris, A. (Ed.). (2009). *Distributed school leadership: Different perspectives*. Netherlands: Springer Press.
- Hattie, J. (2009). *Visible learning synthesis of over 800 meta-analyses relating to achievement*. London: Routledge.
- Labaree, D. F. (2004). *The trouble with Ed schools*. New Haven: Yale University Press.
- MCEETYA. (2008). *Melbourne Declaration on Educational Goals for Young Australians*. Canberra: MCEETYA. [http://www.mceetya.edu.au/verve/\\_resources/National\\_Declaration\\_on\\_the\\_Educational\\_Goals\\_for\\_Young\\_Australians.pdf](http://www.mceetya.edu.au/verve/_resources/National_Declaration_on_the_Educational_Goals_for_Young_Australians.pdf)
- Marzano, R., Waters, T. & McNulty, B. (2005). *School leadership that works: From research to results*. Alexandria, VA: ASCD.
- McLean Davies, L., Anderson, M., Deans, J., Dinham, S., Griffin, P., Kameniar, B., Page, J., Reid, C., Rickards, F., Taylor, C., & Tyler, D. Masterly Preparation: Clinical practice in a graduate pre-service teacher education program. *Journal of Education for Teaching* [in press].
- Robinson, V., Lloyd, C., & Rowe, K. (2008). The impact of leadership on student outcomes: An analysis of the differential effects of leadership types. *Educational Administration Quarterly*, 44(5), 635–674.
- Robinson, V., & Timperley, H. (2007). The leadership of the improvement of teaching and learning: Lessons from initiatives with positive outcomes for students. *Australian Journal of Education*, 51(3), 247–62.
- Rowe, K. (2003). The importance of teacher quality as a key determinant of students' experiences and outcomes of schooling. Discussion paper prepared for the Interim Committee of the NSW Institute of Teachers. Sydney: NSWIT. <http://www.nswteachers.nsw.edu.au/library/Rowe.html>
- Scott, C., Kleinhenz, E., Weldon, P., Reid, K., & Dinham, S. (2010). *Master of Teaching MGSE: Evaluation Report*. Camberwell, Victoria: Australian Council for Educational Research.
- U.S. Department of Education. (2011). *Our future, teachers: The Obama administration's plan for teacher education reform and improvement*. Washington, DC: U.S. Department of Education. <http://www.ed.gov/teaching/our-future-our-teachers> accessed June 2012
- Wahlstrom, K., & Louis, K. (2008). How teachers experience principal leadership: the roles of professional community, trust, efficacy, and shared responsibility. *Educational Administration Quarterly*, 44(4), 458–495.
- Wright, S., Horn, S., & Sanders, W. (1997). Teacher and classroom context effects on student achievement: implications for teacher evaluation. *Journal of Personnel Evaluation in Education*, 11, 57–67

# Building professional capability in school improvement



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Helen Timperley is Professor of Education at The University of Auckland in New Zealand. Her early career involved teaching in early childhood, primary and secondary education sectors, which formed the basis of her research program focusing on making a difference to those student outcomes valued by the communities in which they live. A particular research emphasis has been on promoting leadership and organisational and professional learning in ways that improve the educational experience of students currently underachieving in our education systems. Professor Timperley has recently completed a best evidence synthesis iteration on professional learning and development that has received major international attention. She has published widely in international academic journals and has written and edited seven books focusing on the professional practice implications of her research in her specialty areas.

## Abstract

Building professional capability is fundamental to schooling improvement. No one will argue with this. The arguments start over the answers to the following questions:

- Who within the system should be the focus of improvement?
- Who should be making the decisions about what to do when?
- What is the starting point?
- What is important to focus on?
- What is a good design?
- Where do evidence and accountability fit?

This paper addresses these questions through a systematic design for inquiry, learning and action to make a difference to outcomes for student learners. The design is based on extensive research into the answers to these questions and includes stages of scanning, focusing, developing hunches, learning, taking action and checking.

## Introduction

In this paper I will outline answers from research into schooling improvement initiatives that have made a significant difference to outcomes for students. I am drawing on a range of research showing high and sustained gains for students in primary and secondary schools (Lai, McNaughton, Timperley & Hsiao, 2009; Timperley & Parr, 2009; 2010). By way of illustration, one of the most effective large-scale initiatives involved 300 primary schools with approximately 100 schools in each of three cohorts. Each cohort showed repeated patterns of improvement, particularly for the lowest achieving students. After taking into account the average expected gain, the average effect size for the final cohort as a whole was 0.44 for reading and 0.88 for writing using

the assessment tools for teaching and learning. This equates to a rate of progress 1.85 times greater than usual for students in schools with a reading focus, and 3.2 times the usual rate for those in writing schools. The rate of progress for those students beginning in the lowest 20 per cent was even larger, with an effect size of 1.13 for reading, and 2.07 for writing (Timperley, Parr & Meissel, 2010). These gains equate to progress of 3.2 times the expectation for the lowest 20 per cent of students for reading, and 6.2 times the expectation of students for writing. The effect sizes were calculated using Cohen's *d* with Hedge's correction. Moreover, a follow-up study of a sample of schools in the first cohort found that 14 of the 16 participating schools either maintained the rate of gain or exceeded it with new groups of students (O'Connell, 2009).

Now to the answers to the questions.

## Who should be the focus?

Whether in conference papers, research articles, the statements of policy makers, or interviews with school leaders and teachers, the answer to this question is nearly always, 'Everyone but me'. Policy makers see their job as developing the overall plan for everyone else to implement. Once the plan is developed, the pieces are put in place, such as better assessments of students' achievement (e.g. NAPLAN) or the introduction of professional standards (e.g. AITSL, 2011), in the hope that those further down the system levels take notice and do something different. Alternatively, it might be researchers who identify problems and solutions for practitioners. School leaders want policies within which they can work, with the human and material resources to do so. If they had those, the problems they experience would disappear. Teachers come away from professional development sessions wishing that those designing them would make them

more applicable to the ever-increasing challenges they face every day in their classrooms.

The answer to this question of focus should, of course, be, 'Everyone, including me'. In the successful literacy initiative I referred to above, those involved at all levels of the system focused on improving literacy outcomes, then deliberately constructed integrated and connected inquiry cycles where everyone from policy makers to students understood the part they needed to play in the improvement effort (Timperley & Parr, 2009).

### Who should be making the decisions?

School improvement efforts are often described as 'top-down' or 'bottom-up'. Top-down involves someone at a higher level of the system (e.g. a department leader) deciding what needs to change and how others lower in the system need to change it. Top-down approaches achieve gains in systems that have a command and control ethos. This does not apply to either New Zealand or Australia. Both our systems rely primarily on persuasion with occasional regulation or legislation.

However, a top-down approach typically achieves slightly more effective results



Figure 1: Inquiry, learning and action spiral

than a bottom-up approach where the system level of focus (e.g. teachers) decide how they should improve (Rowan et al., 2009). The problem with bottom-up approaches is that those who want to improve usually do not know how to do so; if so, they would have already taken action. I consider both approaches to be flawed.

The approach in which I have been involved is one that considers schooling improvement through the lens of designing for inquiry to make a difference (Timperley, Kaser & Halbert, unpublished). In this approach, all layers of the system develop inquiry stances that cross over between layers in ways that promote self- and co-regulated learning. They hold each other to account for doing their part. Together they inquire collaboratively into what is happening for those learners for whom they have responsibility, identify a focus for improvement and work out what is leading to what, decide on the professional learning focus, and take steps to change. Most importantly, all are responsible for checking if the actions they have taken have made enough of a difference. This inquiry, learning and action spiral is illustrated in Figure 1.

The spiral can be used at every system layer from policy makers, to teaching professionals, to the learners themselves. In order to illustrate what it means in practice, I will describe it from a school leader's perspective in some detail. This illustration is followed by a brief summary of how it can be applied to a student learner:

### Scanning

At a school leadership level, scanning requires the gathering of evidence across a number of important areas of outcomes that are valued for learners. Scanning is important because it helps leaders and teachers to get a handle on the health of the school from the perspective of those the system is

designed to serve. Without this wider view, professional learning foci are likely to be informed by readily available test scores that do not tell the whole picture.

Scanning helps leaders and teachers identify where they should focus their future learning in an evidence-informed way, rather than working from perceptions or assumptions of what the issues might be for learners. The process starts to create the motivation and energy for leaders and teachers to engage further.

### Focusing

Scanning will typically identify too many areas to form a manageable schooling improvement focus, so the next circle needs to identify what areas to focus on. Focusing makes serious action possible. If more than one or two areas are selected, teachers become overwhelmed with multiple demands and nothing changes. The focusing question asks, 'Given the patterns in the information from scanning, what is manageable and is likely to be effective in achieving real change?' An important part of focusing involves developing clear goals and targets. Goals and targets that are challenging but achievable motivate effort.

### Developing a hunch

Phases often run into one another and the circles should not be taken as lock-step stages. Evidence from one informs the next. Surprises are inevitable and in many ways hunches about what might be leading to what occur throughout. Hunches guide scanning. They guide focusing. They also guide future action which is why there is a specific phase for developing hunches to answer the question 'What is leading to this situation?'

Before rushing into decisions about an initiative or intervention, it is important to take time to identify

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what sits underneath the information from scanning and focusing so the intervention of choice addresses the deeper issues. If NAPLAN literacy drops off at secondary school level, for example, there are many possible explanations. Two alternatives to explore might be: Are primary schools teaching literacy in ways that adequately prepare students for the demands of subject-specific literacy at secondary school? Alternatively, do secondary teachers expect their learners to read and write intellectually demanding material so the learners have sufficient opportunities to improve their literacy? The answers to these questions lead to very different interventions.

We referred to this process as one of 'developing a hunch' because it is rare to be able to identify definitive causes. Education is more complex than this. However, hunches can be discussed, unpacked and tested in ways that can lead to more sophisticated hunches.

### Learning

The learning phase asks 'What do we need to learn and how can we learn it?' When hunches are seriously investigated with those who need to change their practice to make a difference, the purpose and focus of learning becomes obvious. Typically, there is no need to 'sell' it to students, teachers, or leaders because the purpose is clear and learning is designed to solve a particular issue they have identified in the earlier phases.

Learning new knowledge and skills is fundamental to creating the kinds of change needed to make a difference to the educational experiences of young people. If teachers already knew how to make the needed changes, they would be doing so. Changing in deeply informed ways takes time, must be challenging and take place in a supportive environment.

### Taking action

In reality, if the earlier phase of learning is undertaken over the extended length of time usually needed, then taking action is an integral part of learning. Asking 'What will we do differently?' is built into all learning engagements. If earlier phases have identified an area of focus that teachers care about, then leaders will have difficulty stopping them doing something different. Teachers learn as much through supported trialling of new ideas in practice as they do from more formal professional development. What is important is that the trialling is informed by a deep understanding of why new practices are more effective than what they did before.

However, it is important for leaders to check that something different is happening in classrooms because assumptions can be inaccurate. Under these circumstances, inquiry becomes an end in itself, rather than inquiry for improving outcomes for learners. We have called this spiral one of inquiry, learning and *action* for good reason.

### Checking

The whole purpose for designing inquiry is to make a substantive difference to outcomes that are valued for learners. The checking question asks, 'Have we made *enough* of a difference?' What constitutes enough needs to be decided in the early phases and focus on tough challenges, not just the easy ones.

Change does not always equal improvement. Educational issues are complex and no one's best efforts to do something about them are uniformly successful. If they were, we would not have the persistent challenges of quality and equity pervading our education systems. It is only through careful checking that the effectiveness of efforts to make enough of a difference to learner outcomes can be determined. Usually success is mixed. Some things

improve, others don't. The outcomes of the checking process leads to the next phase of the spiral.

## **An inquiry, learning and action spiral for learners**

Schooling improvement initiatives are designed to benefit learners. If they are not resulting in fairly immediate benefit, then they need to be re-designed. Recent research on formative assessment (Wiliam, 2010) shows that substantial benefit can be gained by involving learners directly in identifying what is going on for them (scanning and focusing), and for them to take greater control of their own learning (developing hunches, learning etc). The voice of learners needs to be heard throughout the spiral, to help schools and systems sharpen their understanding about what is going on, what areas are likely to be of greatest benefit, and what improvements have resulted.

The cycle can also refer to an individual learner. A student in a mathematics class, for example, is constantly scanning across social, emotional and learning areas. They make very active decisions about what they will focus on and develop hunches about what is leading to what and what they need to learn. As any secondary teacher will attest, these decisions do not always promote their intellectual or academic engagement.

Engaging in the inquiry spiral promotes self- and co-regulated learning and self-control. The importance of these processes in influencing academic outcomes is now well documented (Lucas & Claxton, 2010; Aamodt & Wong, 2011). By providing learners with a structure and working with them to engage in a systematic spiral of inquiry, their decision-making processes are more explicit, and can be weighed up for the positive and negative outcomes.

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## The remaining questions

The remaining questions posed as points of argument at the beginning of this paper are largely taken care of through the inquiry, learning and action spiral. The starting point is scanning. This enables those involved to identify possible high leverage, but manageable change possibilities.

The question not addressed is: 'Where does evidence and accountability fit?' The importance of evidence is reflected in the 'How do we know?' question in the centre of the spiral. It applies to all phases. Without carefully designed and collected evidence, the spiral can become the worst of the reflection processes that have no impact on outcomes for learners. In the scanning, focusing and checking phases, evidence is focused on what is happening for learners. In the developing a hunch, learning and taking action phases, evidence about learners is combined with evidence about professional practice and from research about what is most likely to work under particular circumstances.

Accountability should be focused on building widespread capability (Fullan, 2011) at all levels and enough to be making a difference. Each level of the system needs to be accountable to other levels for systematically learning how to make a difference. No one should be exempt from accountability in public education systems or it would be a case of anything goes. To achieve the systems lift, however, accountability must be framed in terms of building professional capability in schooling improvement.

## References

- Australian Institute for Teaching and School Leadership. (2011). *National Professional Standards for Teachers*. Melbourne: Author.
- Aamodt, S., & Wong, S. (2011). *Welcome to your child's brain: From utero to uni*. Oxford: One World.
- Fullan, M. (2011). *Choosing the wrong drivers for whole system reform*. Seminar Series Paper No. 204. Centre for Strategic Education.
- Lai, M., McNaughton, S., Timperley, H., & Hsiao, S. (2009). Sustaining continued acceleration in reading comprehension achievement following an intervention. *Educational Assessment, Evaluation and Accountability*, 1(1), 81–100.
- Lucas, W., & Claxton, G. (2010). *New kinds of smart*. Berkshire, England: Open University Press.
- O'Connell, P. (2009). Is sustainability of schooling improvement an article of faith or can it be deliberately crafted? Unpublished PhD thesis, The University of Auckland.
- Rowan, B., Correnti, R., Miller, R., & Camburn, E. (2009). *School Improvement by Design*. Consortium for Policy Research in Education. [www.cpre.org](http://www.cpre.org).
- Timperley, H., Kaser, L., & Halbert, J. (unpublished). *Designing for Professional Inquiry*.
- Timperley, H.S. (2011a). *Realizing the power of professional learning*. London: Open University Press.
- Timperley, H.S. (2011b). Knowledge and the leadership of learning. *Leadership and Policy in Schools*, 10, 1–26.
- Timperley, H. S. & Parr, J. M. (2009). Chain of influence from policy to practice in the New Zealand Literacy Strategy. *Research Papers in Education*, 24(2), 135–154, 2009.
- Timperley, H. S. & Parr, J. M. (2005). Theory competition and the process of change. *Journal of Educational Change*, 6(3), 227–252.
- Timperley, H., Parr, J., & Meissel, C. (2010). *Making a difference to student achievement in literacy: Final Research Report on the Literacy Professional Development Project*. Report to Learning Media, Wellington.
- William, D. (2010). The role of formative assessment in effective learning environments. In H. Dumont, D. Istance, & F. Benavides. *The Nature of Learning*. OECD.



# Using data to drive school improvement



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Dr Helen Wildy is Professor and Dean of the Faculty of Education at The University of Western Australia. Formerly a Mathematics teacher, she has taught in government and independent schools in Western Australia and Victoria. She currently conducts research and supervises doctoral and Masters students in a range of leadership and school improvement topics. Professor Wildy has been chief investigator or co-chief investigator in research projects worth more than \$4 m since 2000. Her academic papers are published widely in refereed national and international journals. For the past nine years she has worked with school sectors in Western Australia on projects to present national assessment data in formats that are accessible to school leaders and teachers. Professor Wildy is Director of *Performance Indicators for Primary Schools (PIPS) Australia*, a literacy and numeracy assessment program for students entering school, used by over 800 schools in all Australian states and territories.

## Abstract

Driving school improvement or doing the work of the devil? Controversy continues to surround national student assessment in Australia. However, I argue in this paper that testing is neither good nor bad: the devil lies in what people – teachers, school, systems and even parents – do about the tests and the data they generate. The paper reports a small study of the experiences of principals, teachers and curriculum consultants in one educational authority, all of whom have engaged with large-scale assessment data for the past eight years. Narrative accounts are used to describe how responsibility for interrogating, interpreting and applying data has gradually shifted from an external top-down approach to an internal bottom-up model in a planned, sustained and centrally supported manner during that time. Applying lessons learned from international research, this educational authority embraced assessment data as the medium to drive change and to lift expectations about students' learning. With persistence, patience and a modicum of pressure, principals, curriculum leaders and teachers are responding positively and with general optimism.

## Introduction

Driving school improvement or doing the work of the devil? There is no doubt that controversy continues to surround large-scale student assessment in Australia. In Western Australia, in the days leading up to the mid-May NAPLAN tests the media once again sought to arouse the debate, despite more than a decade of population testing of literacy and numeracy. However, I argue in this paper that testing is neither good nor bad; the devil lies in what people – teachers, school, systems and even parents – do about the tests and the data that they generate.

Sharing large-scale assessment data use by professional educators at classroom level, school level and system level can support improving student learning outcomes. However, although assessment data have been available to schools for more than a decade, the uptake of applications has not been as swift, and researchers worldwide are investigating the challenges facing educators. For example, international research groups, such as the ICSEI Data Use Network led by Schildkamp and colleagues at the University of Twente, share research findings among researchers in settings as diverse as the Netherlands, Belgium, Germany, the United Kingdom, Denmark, Cyprus, Slovenia, Canada, New Zealand, the United States of America, Australia, South Africa and Trinidad (<http://www.icsei.net/index.php?id=1302>). During this network's 2012 meeting in Sweden, papers were clustered into themes such as: Data use across educational levels – The interplay between system, city, school and class level; Data use by school leaders and teachers: From describing and explaining to impact; and Using data for improving school and student performance.

This paper presents ways large-scale assessment data are used by teachers, principals and education authorities to improve student learning. Large-scale assessment data referred to here are derived from Western Australian Literacy and Numeracy Assessments (WALNA), NAPLAN, Performance Indicators for Primary Schools Baseline Assessment (PIPS-BLA), and exit assessments from Tertiary Entrance Examinations (TEE), now known as the Western Australian Certificate of Education (WACE).

## Background literature

For at least a decade, educators have recognised that assessment data can stimulate changes to generate improved learning (Aldersebaes, Potter

& Hamilton, 2000). Indeed, a hallmark of successful schools today is the extent to which their principals and leaders are engaged with assessment data to identify where their students are doing well and where improvements are needed (Rothman, 2000). Data abounds, so the question is not whether to access data but how to integrate data in decision making (Protheroe, 2009).

Davenport and Prusak (1998) distinguish between data as 'discrete, objective facts and events' (p. 2), and information which is the outcome of contextualising, categorising and connecting data. This distinction between data and information is critical, because while schools increasingly have access to large-scale data sets, it is the decisions based on that information that guide strategies to improve learning. Critical to becoming assessment-literate (Stiggins, 2001) is the capacity to gather dependable data coupled with the skills to analyse them and link that information to classroom practice. Dedicated time that is embedded in the timetable together with well developed skills of collaboration are also key ingredients (Cromey & Hanson, 2000).

In their review of literature about data-informed curriculum reform, Schildkamp and Kuiper (2010) identify ways in which data are used by teachers: to move students between groups, to evaluate the impact of interventions, to shape professional development, to reflect on teaching practice and to support conversations with parents. Teachers sometimes use assessment data to encourage students to take ownership of their learning (Wayman & Stringfield, 2006). Leaders use data, too, to identify school-wide strengths and weaknesses, and to set priorities, as well as to meet externally imposed accountabilities. Schildkamp and Kuiper (2010) found evidence that data use increases if teachers devote frequent and substantial time to reviewing data and planning. Such

collaboration, they report, reduces the isolation of teachers and enhances professional growth. Collaboration around data may impact positively on schools and students, through increasing teachers' knowledge about teaching, strengthening connections with other educators and generating discussion on school-wide issues.

However, the use of data to drive school improvement is far from being embedded in the routines of schools. For example, Shen and Cooley (2008) found that some principals do not use data for decision making because they lack confidence in interpreting data. When they do use data, according to these researchers, it is more likely to be used for marketing, promotion and reputational benefits to attract enrolments and greater funding, rather than for learning and school improvement. Further, teachers sometimes disassociate their own performance from the performance of their students and at times leaders neither systematically analyse assessment data nor apply their information to review school performance or to set priorities (Schildkamp & Kuiper, 2010). However, the Australian research team led by Dempster reporting on their Principals as Literacy Leaders (PALL) Pilot project (2012) comment on the positive impact on student literacy learning of dedicated time, uniform assessment across the school, collaborative planning and a holistic approach to professional development. Building on earlier work (Wildy, 2004, 2009), this paper reports a study of data use by teachers, school leaders and system-level personnel to drive improvement in student achievement in one educational authority in Western Australia.

## Method

Data were collected from teachers and principals (3 metropolitan, 2 rural; 3 primary schools, 2 secondary schools),

and education authority 'consultants' from a cross-section of regions of the Catholic Education Office of WA (CEOWA). Participants were selected by the CEOWA's senior consultant, to provide robust and varied examples of data use. During interviews participants were invited to describe the ways they used large-scale assessment data to improve student learning. They were asked to demonstrate their analyses, plans, strategies, and reviews of subsequent student achievement. Interviews lasting about one hour were conducted in May 2012 in the school/office setting and ranged over topics that were brought up by participants to supplement the semi-structured interview schedule.

## Data

Interview data were conceptualised thematically and reconstructed into a set of narrative accounts. Two of the narratives are included in this paper. The first narrative provides an account of the shift in responsibility for data use, from principal through curriculum leaders to whole staff, described by one of the 15 CEOWA consultants.

## Using data system-wide

Since 2004 we have adopted a system-wide approach to using assessment data for school improvement. Responsibility for interrogating, interpreting and applying data has gradually shifted from an external top down approach to an internal bottom up model in a planned, sustained and centrally supported manner:

Initially, schools' Western Australian Literacy and Numeracy Assessment (WALNA) data from 2001 onwards were presented by university researchers in accessible formats. The researchers designed a program called NuLitdata showing school means over



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time, box and whisker plots of distributions, individual students' progress and schools' means as value added residuals. Every year principals and curriculum leaders participated in workshops before receiving their schools' data disks for that year.

Increasingly, curriculum consultants were appointed by the CEOWA, with responsibility for a group of schools to work one-to-one with principals, to ensure that data were interrogated rigorously and interpreted correctly. By this phase the workshops conducted by the university researchers had shifted in focus from data interpretation to linking data to school planning and priority setting and NAPLAN data and PIPS-BLA data were included in NAPNuLitdata disks. Workshops for consultants were conducted by the researchers.

The next phase involved consultants working closely with the Associate Principals and coordinators of professional learning (CPLs) in each of their schools. By this phase, principals were expected to be skilled and the aim was to deepen the school-level capacity. Consultants' work included linking data to current initiatives and making plans for the next year.

By now consultants had gained credibility among their schools and were confident to share their skills with the school CPLs. They conducted workshops with the whole school staff, interrogating data, delving deeply, identifying strengths and challenges and setting priorities for the following year. Most importantly, the collaborative process shared responsibility among the staff for articulating the focus for the next

year, aligning that with strategies and resources, and defining what would count as success in making progress. By this phase Year 12 TEE/WACE data from Mathematics, English and Science subjects were included in the software, with links to relevant Year 9 data.

In the last phase, CPLs carry out the interrogation, interpretation and priority setting with their staff. The transition to this final phase involves mentoring of CPLs by the consultants as they prepare for their work with whole school staff. During the handover, the consultant and CPL co-present the planning workshop for the whole staff. By this final phase, schools examine their 2001–2012 performance through interrogation of PIPS (prior to Year 1), through Years 3, 5, 7, 9 WALNA/NAPLAN, to Year 12 TEE/WACE data, through a new online program, Appraise.

The university researchers' role was to educate system executives, principals and consultants. Consultants now support school-based leaders by mentoring and then letting go. Now each school staff interrogates and interprets its data and plans its school improvement.

The second narrative, from the perspective of another of the CEOWA consultants, describes the process within CEOWA schools during which whole school staffs engage with data to set their priorities.

### Professional Learning Communities

Professional Learning Communities (PLCs), now a mandated feature of each CEOWA school, drive school improvement. Consultants help coordinators of professional

learning (CPLs) to run the PLCs to focus their work and target their achievements. PLCs vary across schools but generally last one hour, after school, and are attended by all staff including the principal. But they are run by the CPL or, at their best, by teachers who take turns as leaders.

At the heart of the PLC is professional reading. An article, such as *Teaching students Math problem-solving through graphic representations*, is selected to fit with the priority area (for example, problem solving in Mathematics, middle primary years). The article is circulated in advance with a structured response protocol, such as *Brainstorm and Vote or Four A's Text Protocol*. During the PLC, a strategy such as jigsaw is used to facilitate sharing of responses to the reading. As a whole group, implications for practice are drawn together and linked to a small piece of action research, for example, or a further reading.

The agenda for a PLC would normally include these items: a review of notes about the previous PLC; a small group activity based on the set reading and an articulated outcome; sharing of a teaching strategy; and exploration of data. One example of exploring data is moderation of work samples. This is done in clusters of teachers according to level, with the aim of developing a shared understanding of what counts as high, medium and low quality outcomes from students across all subjects and across all year groups. A group examining Year 2 and Year 3 work samples might be joined by teachers of Year 1 and Year 4 to provide continuity of experience and standards.

The most important sessions are those that examine the large-scale data in preparation for setting the priority for the next year. With the support of the consultant, the CPL presents trends over time across all subjects, and on the basis of the overview and in reference to previous choice of focus, a broad area is identified. Then the data are scrutinised in increasing depth to identify the particular aspect of the area. For example, the distributions are examined for weak and strong subgroups' or individuals' performance; individual items are reviewed to identify strengths and gaps. Then information about the current year's data is examined in relation to data from earlier years. The CPL collates the findings from this session and presents them to the next PLC. Teachers are encouraged to bring relevant school-based data to support or challenge the findings during subsequent PLCs. In this iterative manner, analyses are honed, and skills are developed. And the priority for the next year is set.

Taken together these two narratives give an overview of the general approach to data use by the CEOWA since 2004. Other narratives not included in this paper demonstrate data use to inform decisions about streaming; use of school-wide data other than NAPLAN; use of large-scale data to track individual student progress in a very small rural school; integrating primary and secondary data; use of PIPS-BLA data to stimulate pedagogical change in the early years; and supporting teachers in widely dispersed rural settings.

## Conclusion

Participants in this study do not think they are doing the work of the devil. To a person, they are embracing the opportunities afforded by large amounts

of data that are systematically collected, linked over time, presented in accessible formats, and relevant to their everyday work. With extensive support from credible curriculum consultants, whose expertise they respect, teachers in these schools are routinely engaging in talk about their teaching (Warren-Little, 1982), using data to focus on what is done well and what can be improved. They spend regular time together to challenge assumptions about how well their students are achieving. Instead of stating: 'That is all we can expect from students like ours', principals and teachers set high expectations and ask each other: 'Is this all we can expect from our students?' (Wildy & Clarke, 2012). Senior personnel in this education authority would not claim that every school is using their data to drive school improvement. Indeed, they would argue that the journey for some schools is only beginning. However, it is clear that the journey is considered worth undertaking.

## References

- Aldersebaes, I., Potter, J., & Hamilton, M. (2000). *Programs don't—people do: Insights into schoolwide change*. Portland, OR: Northwest Regional Educational Laboratory.
- Cromey, A., & Hanson, M. (2000). *An exploratory analysis of school-based student assessment systems*. Naperville, IL: North Central Regional Education Laboratory. Online: [www.ncrel.org/re/eval/mi/analysis.htm](http://www.ncrel.org/re/eval/mi/analysis.htm).
- Dempster, N., Konza, D., Robson, G., Gaffney, M., Lock, G., & McKennarley, K. (2012). *Principals as Literacy leaders: Confident, credible, and connected. Research findings from the Principals as Literacy leaders (PALL) Pilot project*. Kingston: Australian Primary Principals Association.
- Davenport, T., & Prusak, L. (1998). *Working knowledge*. Boston: Harvard Business School.
- Protheroe, N. (2009). *Improving teaching and learning with data-based decisions: Asking the right questions and acting on the answers*. Accessed online 22 May 2012: [www.ers.org/spectrum/sum01a.htm](http://www.ers.org/spectrum/sum01a.htm)
- Rothman, R. (2000). *Bringing all students to high standards: Report on National Education Goals Panel Field Hearings*. Washington, DC: National Education Goals Panel.
- Schildkamp, K., & Kuiper, W. (2010). Data-informed curriculum reform: Which data, what purposes, and promoting and hindering factors. *Teaching and Teacher Education*, 26(3), 482–496.
- Shen, J., & Cooley, V. (2008). Critical issues in using data for decision-making. *International Journal of Leadership in Education*, 11(3) 319–329.
- Stiggins, R. J. (2001). *Student-Involved Classroom Assessment*. 3rd ed. Upper Saddle River, NJ: Prentice-Hall, Inc.
- Warren-Little, J. (1982). Norms of collegiality and experimentation: Workplace conditions of school success. *American Educational Research Journal*, 19(3), 325–340.
- Wayman, J., & Stringfield, S. (2006). Data use for school improvement. *American Journal of Education*, 112(4), 549–571.
- Wildy, H. (2004). The Data Club: Helping schools use accountability data. In Wilson, M. (Ed.). *Towards coherence between classroom assessment and accountability* (pp. 155–168). 103rd Yearbook of the National Society for the Study of Education, Part II. Chicago, IL: University of Chicago Press.
- Wildy, H. (2009). Making local meaning from national assessment data. *Professional Educator*, 8(3), 32–35.
- Wildy, H., & Clarke, S. (2012). Leading a small remote school: In the face of a culture of acceptance. *Education 3–13 Special Edition*, 40(1), 1–12.

# Effective strategies for implementing differentiated instruction



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## Abstract

The need for modified curriculum provision for exceptional learners has long been recognised. This requires the differentiation of regular curriculum. For those exceptional learners who have learning difficulties, this differentiation is increasingly seen as the responsibility of classroom teachers. For those students who are gifted and talented, on the other hand, the differentiation has been implemented in alternative ways.

Experts in the provision of education for gifted and talented students attribute this lack of regular classroom teacher involvement to various reasons. One is the relevant professional knowledge of the teacher. This includes an understanding of gifted knowledge and thinking and the ability to integrate this with modifications to the regular curriculum.

This paper on successful differentiation examines how the model of the gifted and talented learner as an expert knower and thinker can be used to differentiate the regular curriculum. It reviews the novice to expert knower transition in terms of its implications for teaching and uses the model to recommend strategies for identifying gifted and talented knowers in terms of their entry level understanding of a topic.

The model has helped teachers to infer how gifted and talented students might understand regular topics on the curriculum. This professional knowledge assists teachers in turn to identify various types of gifted interpretations, to evaluate these in terms of the assessment criteria for the regular curriculum.

## Introduction

Differentiating instruction involves responding constructively to what students know. It means providing multiple learning pathways so that

students can have access to the most appropriate learning opportunities commensurate with their capacity to learn. It involves matching students' approach to learning with the most appropriate pedagogy, curriculum goals and opportunities for displaying knowledge gained (Anderson, 2007; Ellis, Gable, Gregg, & Rock, 2008). This requires the differentiation of regular curriculum.

Differentiation is increasingly recognised as a means for meeting the individual needs of all students and particularly for those who have exceptional learning profiles. For those exceptional learners who have learning difficulties, this differentiation is increasingly seen as the responsibility of classroom teachers. One form of differentiation used to cater for literacy and numeracy underachievement is the *Response to Intervention* approach. This approach uses students' capacity to benefit from the instruction provided to infer their approach to learning and to differentiate subsequent teaching to take account of this (Vellutino, Scanlon, Small, & Fanuele, 2006). Three levels or tiers of teaching differentiations are usually implemented: modification to classroom-based teaching (Tier 1); focused small group interventions (Tier 2); and more intensive intervention comprising 1:1 tutoring (Tier 3) (Wanzek & Vaughn, 2011). The tier in which an exceptional student is located is determined by their knowledge, which includes their ways of thinking and learning.

## Differentiation for gifted and talented learners

The need for modified curriculum provision for gifted and talented learners has long been acknowledged. For these students, however, the differentiation has been implemented in alternative ways that are more removed from the responsibility of the regular

classroom teacher<sup>1</sup>. Colangelo, Assouline and Gross (2004) exemplify this in their report *A Nation Deceived: How Schools Hold Back America's Brightest Students* (Volumes I and II). The report describes 18 main ways in which this can be done. For this paper these have been grouped as follows:

- 1 being located in the classes of chronologically older students, for example, through early entry to kindergarten, primary, secondary or tertiary education, grade-skipping, subject acceleration/partial acceleration
- 2 continuous progress at the gifted students rate of learning, both where this is controlled by the teacher and by the student (self-paced instruction)
- 3 curriculum compacting; the gifted students curriculum is modified, for example, to include less introductory activity, drill, and practice or bigger increments in learning compared to the curriculum
- 4 telescoping the curriculum; the gifted student is taught at a faster rate than peers and is placed in a higher grade
- 5 mentoring
- 6 extra-curricular programs and correspondence courses
- 7 advanced credit is provided; the gifted students' advanced knowledge is credentialed in various ways, for example, the subjects studied at one level receive credit for a corresponding subject at a higher level, the student studies subjects at an earlier age (advanced placement) or receives advanced credit by completing successfully the relevant assessment requirements such as

examinations (credit by examination).

This set of options focuses on accelerating the gifted students through the curriculum, both through grade placement and curriculum modification as a prime means of providing access to differentiated learning experiences. They have been associated with higher achievement for gifted and talented learners (Colangelo, Assouline & Gross, 2004; Field, 2009; Gavin, Casa, Adelson, Carroll, Sheffield, & Spinelli, 2007; Gentry & Owen, 1999; Gubbins, Housand, Oliver, Schader & De Wet, 2007; Reis, Westberg, Kulikowich, & Purcell, 2007; Tieso, 2005).

### **Differentiation for gifted learners in the regular classroom**

#### **Evidence supporting enrichment in the regular classroom**

The focus of differentiation in this paper is on appropriate teaching for gifted students in regular, heterogeneous, mixed ability classrooms. This can be implemented in various ways and has been shown to be effective (Rock, Gregg, Ellis, & Gable, 2008). The use of more challenging mathematics curriculum with gifted third to fifth graders was associated with gains in maths outcomes over a three-year period (Gavin et al., 2007). The use of advanced content across the content areas in intact classrooms was linked with higher outcomes by gifted students (VanTassel-Baska, Zuo, Avery, & Little, 2002). VanTassel-Baska and colleagues observed higher outcomes for the students using this content in language arts, critical reading, persuasive writing and scientific research design skills. Similar findings have been reported for high-ability primary level students learning social studies (Little, Feng, VanTassel-Baska, Rogers, & Avery, 2007).

Provision of enriched and accelerated reading instruction has been associated with higher reading comprehension

and fluency outcomes (Reis, Eckert, McCoach, Jacobs, & Coyne, 2007; Reis, Eckert, McCoach, Jacobs, & Coyne, 2008) by gifted students. This extends to involvement in an online enrichment program (Field, 2009). Provision of differentiated instruction in parallel with a student grouping strategy that allows gifted students with like thinking peers flexible movement in and out of grouping patterns (instructional grouping) has been associated with increased achievement for gifted students (Gentry & Owen, 1999; Kulik, 1992; Kulik & Kulik, 1997; Tieso, 2005). Ability grouping without differentiation has little or no influence on student outcomes (Kulik, 1992; Tieso, 2005). Curriculum compacting, implemented by eliminating content already learnt by gifted and talented students followed by the enriched learning opportunities such as self-selected independent study resulted in higher or similar achievement scores (Reis et al., 1998).

#### **Availability of information about differentiation**

Teachers and schools also have access to information about how to implement differentiation procedures. Tomlinson and Strickland (2005), for example, note that teachers usually differentiate the teaching by modifying one or more of the following: what students learn (the content), how they will learn it (the process), and how they will show what they have learnt (the product). To do this, educators (e.g., Anderson, 2007; Rock et al., 2008; Tomlinson, 2000) recommend that teachers give consideration to the knowledge, interests and abilities students bring to a learning context, the key or essential ideas and skills of the content area, how the students will be grouped or organised for learning (flexible grouping according to common interests, topic or ability) and the important features of the assessment procedures used (these features often include ongoing

<sup>1</sup> In the present context of gifted and talented learning, the regular classroom is the context in which the student is located with broadly same chronological aged peers.



and meaningful assessments that are integrated with the teaching). As well, teachers and schools are encouraged to evaluate regularly the differentiated provision and make necessary modifications to the content, process and products.

### **The practice of differentiation in regular classrooms is infrequent**

Given its reported success as a reasonable solution for accommodating the learning profiles of gifted and talented students, implementing appropriate teaching for gifted students in regular classrooms, the practice of differentiation in regular classrooms has, in practice, been largely unsuccessful (Hertberg-Davis, 2009). It should be noted at the outset that some educators equate this with enrichment and contrast it with acceleration as follows: enrichment refers to the increased depth of study of a particular topic, while acceleration refers to speeding up the instruction. As well, the quality of the learning experiences used for enrichment has been questioned. While some see enrichment and acceleration as mutually exclusive alternatives, others see them as complementary. It is obviously possible that a student involved in an enrichment activity could develop the same understanding of a topic as a student who had been accelerated to a higher grade level.

Evidence of lack of differentiation for gifted and talented students in regular classrooms is readily available. Reis et al. (2004), for example, monitored the extent to which third- and seventh-grade talented readers (students reading at least two grades above their chronological grade placement with advanced language skills and advanced processing capabilities in reading) received differentiated reading curriculum and/or instructional strategies. They found that the talented readers in 75 per cent of the classrooms

received no differentiated reading instruction. They were not exposed to appropriately challenging books or more challenging learning tasks. Reis and Renzulli (2010) commenting on gifted education provision in the United States of America, note that gifted and talented students have access to less rigorous curricula and are less likely to be challenged, especially in elementary and middle school.

### **Reasons for the lack of differentiation**

Van Tassel-Baska and Stambaugh (2005) identify a number of reasons for the lack of differentiation – teachers:

- 1 lack the content knowledge necessary to extend and differentiate the typical curriculum content areas to cater for gifted and talented students
- 2 lack the classroom management skills necessary to support differentiated teaching
- 3 lack the beliefs needed to implement differentiated teaching, such as the belief that students differ in how they learn, that students can acquire knowledge that is not understood by the teacher
- 4 do not know how to accommodate the approaches to learning by gifted students who are from different cultural groups (ethnic, social) or who are also underachievers
- 5 find it hard to locate and use effectively a range of resources that would facilitate teaching the gifted and talented students
- 6 do not have the planning time need to adjust the curriculum for the gifted and talented students
- 7 are not supported or encouraged by the school leadership to value and guide the implementation of differentiated strategies for gifted learners

- 8 lack the relevant pedagogical knowledge and teaching skills for gifted and talented students.

Underpinning these reasons is a lack of relevant professional knowledge in schools (Munro, 2011; 2012):

- 9 teachers knowledge of either or both gifted learning and the associated pedagogy and relevant curriculum
- 10 leadership knowledge about how to provide leadership in the effective provision of education for gifted and talented students.

The influence of insufficient professional knowledge for gifted education provision can be reduced to some extent if teachers use familiar curriculum pathways and tools for describing students content knowledge at any point and for planning their teaching (Munro, 2010). In this context it is easier for teachers to:

- 1 identify more cognitively complex knowledge and understanding in the broad topic areas with which the teachers are familiar and to generate and challenges and enquiry to stimulate students' knowledge; the teachers need only think about one topic at a time
- 2 observe gifted and talented learning and thinking as they observe these students learning the topics at a higher, more complex and sophisticated level on the knowledge pathway. The teachers have a familiar measuring stick for observing gifted students learning
- 3 generate challenges and enquiry to stimulate students' knowledge; the teachers need take account of only one topic at a time
- 4 see gifted learning and thinking; it will be more obvious that some students learn and understand topics at a higher, more complex and sophisticated level on the knowledge pathway.

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In other words, the regular curriculum gives teachers a familiar measuring stick for observing gifted students' learning (Munro, 2010).

### **A strategy for building teacher knowledge about how to differentiate**

The present paper describes an approach to differentiation that synthesises a knowledge of how gifted and talented students learn with the regular school curriculum.

Teachers can differentiate their teaching more effectively when they: (1) understand how these students learn and think; (2) know a range of teaching options for differentiating their teaching; (3) can apply the differentiated teaching to topics in their classroom; (4) have the appropriate motivation orientation; and (5) can read the culture and climate in their school and classroom in terms of this differentiation (Munro, 2010; 2011; 2012).

### **The expert knower as a guiding model**

This paper used the model of the gifted and talented learner as an expert knower and thinker to differentiate the regular curriculum. Drawing on models of expert knowledge and performance (Ericsson & Lehmann, 1996; Ericsson, Patel, & Kintsch, 2000; Farrington-Darby & Wilson, 2006), various researchers including Ericsson and colleagues (Ericsson, Nandagopa & Roring, 2005, 2007; Shavinina, 2007; Sternberg, 2005) have proposed the use of the expert performance framework as a conceptual model for describing gifted knowing and thinking.

This perspective provides a means for unpacking and analysing how gifted and talented students know and learn (Munro, 2010). By identifying the thinking that underpins the knowledge transformation for the novice to expert knower transition, it is possible for teachers to infer how gifted and talented student might interpret and

construct an understanding of regular curriculum topics.

The approach taken in this paper identifies similarities between expert and gifted understanding. Both have more elaborated and differentiated conceptual networks than their non-gifted or non-expert peers (Munro, 2011, 2012). These allow them to interpret new information very rapidly and more broadly and deeply and look for and analyse big picture patterns and rules in information. Both experts and gifted knowers retain knowledge in which they are gifted/expert more efficiently in working memory. They can also use their conceptual networks more automatically. They can see more under the surface general relationships and principles than novices, infer more broadly when monitoring various effects and the implications of their decisions and actions. They can learn a topic by linking simultaneously several aspects at a time, rather than working on one aspect in a sequential way. This allows them to categorise and classify issues and problems more efficiently and completely.

The differences between novice and expert knowing were examined from a slightly different perspective by Bransford and colleagues (Bransford, Sherwood, Vye, & Rieser, 1986; Bransford & Stein, 1984). They asked the question: What are the characteristics of novice learners who are more likely to understand a topic in an expert way? They observed that the more skilled learners were more able to manage and direct their learning activity in a range of ways, for example, to use learning strategies selectively according to specific learning demands at any time, that is a range of metacognitive skills.

The present approach also recognises limitations of the expert performance model for gifted learning. There are multiple ways in which individuals can be experts and with a range of individual difference among them, just as there

are multiple types of gifted knowing and thinking, for example, school house and creative giftedness. The conceptualisation of expert knowledge and performance proposed by some researchers means that gifted learners are more likely than experts to impose their unique subjective patterns and order on information rather than use the taught patterns. Gifted thinkers are more likely to recognise or frame up intellectual challenges or questions in a broad-based way and to generate and use more complex and differentiated links between concepts to form more complex relationships. They are also more likely transfer and apply their knowledge across content area boundaries, and make unusual and far links and generate outcomes that are creative and novel. Their understanding of a topic often has the characteristics of an intuitive and personal semantic theory in the sense described by Schwitzgebel (1999).

Further, while gifted understanding may develop through the same phases as the trend from novice to expert knowing, the current approach proposes that gifted thinking allows individuals to achieve the transitions more rapidly and in a self-initiated and focused way. While non-gifted learners need substantial deliberate practice to achieve expert knowledge, it is proposed that by virtue of their broad-based thinking ability, the gifted learners need much less practice.

This leads to another difference. Some areas or domains of expertise require the use of automatised motor behaviour patterns that allow experts to do their knowledge, that is, they have the motor or action skills and tools to show their expertise. Gifted students may know or understand an idea but lack the skill to actually do it. They link ideas in expert-like knowledge forms that generate easily possibilities and questions but lack the technical skills and the ability to use them to generate expert outcomes.

A related difference is in the

management of the learning towards expertise. Gifted learners are self-managing and direct in their pursuit of understanding; the future expert may be more likely to need external managing and directing. Gifted students often operate as intuitive philosophers because they see that their thinking and knowing is different from that of their non-gifted peers and they try to understand how they and others think and know. This leads them to infer how they think and learn. Hsueh (1997), for example, examined gifted children's theories of intelligence, goal orientation and responses to challenge in reading and mathematics. Gifted children believed strongly that their ability could change, were highly confident about their ability to learn, had strong learning goals, wanted good grades and teacher approval, had mixed responses to performance goal tasks, preferred harder tasks in reading and mathematics, and showed persistence when completing difficult tasks.

In other words, this paper is proposing a modified expert knower model to describe gifted and talented learners, to account for the unique ways in which gifted and talented students learn and, for the multiple ways in which students can be gifted and talented. In particular, the conventional expert knower model is modified to add creativity and for transfer; self-initiated and motivated learning, with motivation more mastery focused and a focus on the gifted students being able to talk about their big picture understanding but not necessarily have the capacity to implement physically the expert understanding.

The version of the novice–expert knower model used here draws on work of Anderson and Schonborn (2008) and adds the type of knowledge described by Subotnik and Jarvin (2005) to the expert understanding.

When exposed to regular classroom instruction, it proposed that students

can potentially form one of three broad interpretations of the teaching information that indicate their understanding of the topic (Munro, 2010, 2011, 2012):

- 1 a novice understanding that essentially represents the internalisation of the teaching information. The information is interpreted in a literal way. Students who form this understanding initially often use the new ideas in restricted ways, understand them in partial, separate and tentative ways and need to try them out to see how they fit. They show superficial recall of specific details. They need to be taught to link and relate the ideas.
- 2 a spontaneous patterned, more general understanding. Some students, without formal instruction, form an understanding that is more than the internalisation of the teaching information. They extend spontaneously the taught ideas and generate patterns from them. They form new concepts and relationships such as possible causal or consequential trends by asking. For example: How / why did the trend / pattern / change direction? They question and speculate about the patterns and generate ideas and possibilities that were not mentioned in the teaching information; How did the patterns affect / contribute to ...?

In other words, these students form interpretations, without being instructed, that are more general. These may be in the form of patterns, rules or more abstract formulations.

- 3 a spontaneous, big picture understanding that is typical in some ways of an expert understanding. Their understanding is broader than that of the patterned understanding. They understand the topic in a big ideas way; they can think about two or more patterns, rules or general propositions at once. As well as formulating rules

and principles, they often link moral / ethical issues with them and see possible moves and options.

They can apply their big ideas understanding to solve problems fluently and automatically. They make decisions that show they are thinking in terms of multiple patterns at once, for example, 'If this happens, then ... , but because of ... I would ... They can plan how they will use their new knowledge in creative, novel ways and use to solve problems and make decisions, manage and use their knowledge more efficiently, monitor how they use it and readily change direction or re-question what they know.

Their understanding frequently includes creative interpretations. They make links between ideas that are novel, functional and un-expected. Their understanding allows them to see possibilities and options that suggest a far transfer of the ideas. This aspect moves the knowledge from the traditional expert descriptions made by some models of the novice–expert knower to the beyond expertise understanding proposed by Subotnik and Jarvin (2005) and that encompasses Sternberg's concept of wisdom as part of the WICS model of gifted knowledge (Sternberg, 2005).

#### **Differentiate the pedagogy from a learning–teaching perspective**

The expert knower model described here has been used to guide classroom teachers to differentiate their teaching from a learning perspective to cater for gifted learners. The model helps teachers to infer how gifted and talented students might understand regular topics on the curriculum. This focus on teacher awareness of enhanced student understanding provides a basis for implementing the most appropriate pedagogy.

The model gives the development of



professional knowledge of teachers to identify various types of gifted interpretations, to evaluate these in terms of the assessment criteria for the regular curriculum and to design and implement the most appropriate teaching. Teachers can use this sequence to differentiate any topic in terms of the teaching to be used.

The mechanics for doing this are discussed in depth in Munro (2012). This paper describes a framework for differentiating the pedagogy from a learning-teaching perspective and for synthesising enquiries gifted and talented students can pursue for a topic taught. Teachers have used the framework to describe gifted students' learning patterns, to cater for them in regular teaching, to audit teaching units for gifted students, to target the explicit teaching of thinking and to guide students to self-monitor and direct their learning.

The framework has also been used to assist, to extend and to stretch the scope of the curriculum, to provide a common language for professional dialogue about gifted learning and for describing learning and knowledge in familiar ways, to see students' areas of exceptional knowledge and thinking, to build teacher confidence in identifying and teaching these students and to identify gifted underachievers.

## Conclusion

This paper began by identifying the issue of the lack of differentiation for gifted and talented students in regular classrooms. It proposed that this was in part due to the lack of professional knowledge in a school about gifted understanding learning and the associated pedagogy and relevant curriculum.

It described how this issue could be resolved in part by equipping teachers and schools with the conceptual tools for describing the understanding of gifted and talented learners. There are two aspects of this: using the familiar

curriculum measuring stick to direct regular student learning and using the novice-expert knower continuum to differentiate topics on it.

Evidence supporting the model of the gifted learner as an expert knower has been supported (e.g., Ericsson, et al., 2005, 2000, 2007; Shavinina, 2007; Sternberg, 2005; Subotnik & Jarvin, 2005). The efficacy of the novice-expert transition as an approach to differentiation as described in this paper is readily testable empirically.

## References

- Anderson, K. M. (2007). Differentiating instruction to include all students. *Preventing School Failure, 51* (3), 49–54.
- Anderson, T.R. and Schönborn, K.J. (2008) Bridging the Educational Research-Teaching Practice Gap: Conceptual understanding, Part 1: The multifaceted nature of expert knowledge, *Biochemistry and Molecular Biology Education 36* (4), 309-315.
- Bransford, J., & Stein, B. (1984). *The IDEAL problem solver*. New York: W. H. Freeman.
- Bransford, J., Sherwood, R., Vye, N., & Rieser, J. (1986). Teaching thinking and problem solving: Research Foundations. *American Psychologist, 41*, 1078–1089.
- Colangelo, N., Assouline, S. G., & Gross, M. U. M. (2004). *A nation deceived: How schools hold back America's brightest students* (Volumes I and II). Iowa City, IA: The Connie Belin & Jacqueline N. Blank International Center for Gifted Education and Talent Development.
- Ellis, E., Gable, R. A., Gregg, M., & Rock, M. L. (2008). REACH: A framework for differentiating classroom instruction. *Preventing School Failure, 52*(2), 31–47.
- Ericsson, K. A., & Lehmann, A. C. (1996). Expert and exceptional performance: Evidence of maximal adaptation to task constraints. *Annual Review of Psychology, 47*, 273–305.
- Ericsson, K. A., Nandagopa, K., & Roring R. W. (2005). Giftedness viewed from the expert-performance perspective. *Journal for the Education of the Gifted, 28*(3–4), 287–311.
- Ericsson, K. A., Patel, V. L., & Kintsch, W. (2000). How experts adapt to representative task demands account for the expertise effect in memory recall: Comment on Vicente & Wang (1998). *Psychological Review, 107*, 578–592.
- Ericsson, K. A., Roring R. W., & Nandagopa, K. (2007). Giftedness and evidence for reproducibly superior performance: an account based on the expert performance framework. *High Ability Studies, 18*(1), 3–56.
- Farrington-Darby, T., & Wilson, J. R. (2006). The nature of expertise: A review. *Applied Ergonomics, 37*, 17–32.
- Field, G. B. (2009). The effects of using Renzulli Learning on student achievement: An investigation of internet technology on reading fluency, comprehension, and social studies. *International Journal of Emerging Technology, 4*, 29–39.
- Gavin, M. K., Casa, T. M., Adelson, J. L., Carroll, S. R., Sheffield, L. J., & Spinelli, A. M. (2007). Project M<sup>3</sup>: Mentoring mathematical minds: Challenging curriculum for talented elementary students. *Journal of Advanced Academics, 18*, 566–585.
- Gentry, M. L., & Owen, S. V. (1999). An investigation of the effects of total school flexible cluster grouping on identification, achievement, and classroom practices. *Gifted Child Quarterly, 43*, 224–243.
- Gubbins, E. J., Housand, B., Oliver, M., Schader, R., & De Wet, C. (2007). Unclogging the mathematics pipeline through access to algebraic understanding. Storrs, CT: The National Research Center on the Gifted and Talented, University of Connecticut.

- Hertberg-Davis, H. (2009). Myth 7: Differentiation in the Regular Classroom Is Equivalent to Gifted Programs and Is Sufficient: Classroom Teachers Have the Time, the Skill, and the Will to Differentiate Adequately. *Gifted Child Quarterly*, 53, 251-253.
- Hsueh, Wen-Chuan (1997). A cross-cultural comparison of gifted childrens theories of intelligence, goal orientation and responses to challenge. Unpublished PhD Dissertation, Purdue University, IN.
- Kulik, J.A. (1992). An analysis of the research on ability grouping: Historical and contemporary perspectives. Storrs, CT: The National Research Center on the Gifted and Talented, University of Connecticut.
- Kulik, J.A., & Kulik, C-L. C. (1997). Ability grouping. In N. Colangelo and G. A. Davis (Eds.), *Handbook of Gifted Education* (2nd ed.). Boston: Allyn & Bacon.
- Little, C. A., Feng, A. X., VanTassel-Baska, J., Rogers, K. B., & Avery, L. D. (2007). A study of curriculum effectiveness in social studies. *Gifted Child Quarterly*, 51(3), 272-284.
- Munro, J. (2010). Using the Victorian Essential Learning Standards to differentiate pedagogy for gifted and talented learners. Paper presented at the 2010 Asia Pacific Conference on Giftedness – Sydney in July 2010.
- Munro, J. (2011). Submission to Victorian Parliamentary Inquiry into the education of gifted and talented students. An individual submission by Dr John Munro. Downloaded from [http://www.parliament.vic.gov.au/images/stories/committees/etc/Past\\_Inquiries/EGTS\\_Inquiry/Submissions/96\\_Dr\\_John\\_Munro.pdf](http://www.parliament.vic.gov.au/images/stories/committees/etc/Past_Inquiries/EGTS_Inquiry/Submissions/96_Dr_John_Munro.pdf) on 16 May, 2012.
- Munro, J. (2012). The expert knower model as a conceptual tool for understanding gifted and talented knowledge. Occasional Paper (in press). East Melbourne: Centre for Strategic Education.
- Reis, S. M., Eckert, R. D., McCoach, D. B., Jacobs, J. K., & Coyne, M. (2008). Using enrichment reading practices to increase reading fluency, comprehension, and attitudes. *Journal of Educational Research*, 101(5), 299-314.
- Reis, S. M., Gubbins, E. J., Briggs, C. J., Schreiber, F. J., Richards, S. Jacobs, J. K., Eckert, R. D. & Renzulli, J. S. (2004). Reading instruction for talented readers: Case studies documenting few opportunities for continuous progress. *Gifted Child Quarterly*, 48(4), 315-331.
- Reis, S. M., McCoach, D. B., Coyne, M., Schreiber, F. J., Eckert, R. D., & Gubbins, E. J. (2007). Using planned enrichment strategies with direct instruction to improve reading fluency, comprehension, and attitude toward reading: An evidence-based study. *The Elementary School Journal*, 108, 3-24.
- Reis, S. M., & Renzulli, J. S. (2010). Is there still a need for gifted education? An examination of current research. *Learning and Individual Differences*, 20(4), 308-317.
- Reis, S. M., Westberg, K. L., Kulikowich, J. M., & Purcell, J. H. (1998). Curriculum compacting and achievement test scores: What does the research say?. *Gifted Child Quarterly*, 42, 123-129.
- Rock, M., Gregg, M., Ellis, E., & Gable, R. A. (2008). REACH: A framework for differentiating classroom instruction. *Preventing School Failure*, 52(2), 31-47.
- Schwitzgebel, E. (1999). Childrens Theories and the Drive to Explain. *Science & Education*, 8 (5), p.457-488.
- Shavinina, L.V. (2007). On the advancement of the expert performance approach via a deep understanding of giftedness. *High Ability Studies*, 18(1), 79-82.
- Sternberg, R. J (2005). The WICS Model of Giftedness. In Sternberg, R. J. & Davidson, J. E. ( Eds.), *Conceptions of Giftedness* (2nd ed.) (pp. 327-342). West Nyack, NY: Cambridge University Press.
- Subotnik, R. F., & Jarvin, L. (2005). Beyond expertise: Conceptions of giftedness as great performance. In Sternberg, R. J., & Davidson, J. E. ( Eds.), *Conceptions of Giftedness* (2nd edn.) (pp. 343-357). West Nyack, NY: Cambridge University Press.
- Tieso, C. (2005). The effects of grouping practices and curricular adjustments on achievement. *Journal for the Education of the Gifted*, 29(1), 60-89.
- Tomlinson, C. A. (2000). Differentiation of instruction in the elementary grades. *ERIC Digest*. Available: [www.ericdigests.org/2001-2/elementary.html](http://www.ericdigests.org/2001-2/elementary.html)
- Tomlinson, C. A., & Strickland, C. A. (2005). *Differentiation in practice: A resource guide for differentiating curriculum, grades 9-12*. Alexandria, VA: ASCD.
- VanTassel-Baska, J., & Stambaugh, T. (2005). Challenges and possibilities for serving gifted learners in the regular classroom. *Theory Into Practice*, 44(3), 211-217.
- VanTassel-Baska, J., Zuo, J. L., Avery, L. D., & Little, C. A. (2002). A curriculum study of gifted student learning in the language arts. *Gifted Child Quarterly*, 46, 30-44.
- Vellutino, F. R., Scanlon, D. M., Small, S. G., & Fanuele, D.P. (2006). Response to intervention as a vehicle for distinguishing between reading disabled and non-reading disabled children: Evidence for the role of Kindergarten and first grade intervention. *Journal of Learning Disabilities*, 39(2), 157-169.
- Wanzek, J., & Vaughn, S. (2011). Is a three-tier reading intervention model associated with reduced placement in special education? *Remedial and Special Education*, 32(2), 167-175.

# Improving school practices for Aboriginal and Torres Strait Islander students: The voices of their parents and carers

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**Brian Giles-Browne**

*Dare to Lead*

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Mr. Giles-Brown is the National Schools Coordinator for the *Dare to Lead* project. *Dare to Lead* is run by the Principals Australia Institute and funded through DEEWR, State and Territory Jurisdictions and the support of individual schools. His role is to support staff in the development and implementation of professional development tools and strategies in all states and territories, as well as across all sectors and jurisdictions.

Mr Giles-Brown was a New South Wales Primary Principal holding the position at Coonamble, Riverstone and Moruya. During this period he chaired the NSWPPA Aboriginal Education reference group and sat on the Director Generals Advisory Committee for Aboriginal Education. He was the recipient of the NSWPPA Award for Excellence in Leadership of Aboriginal Education.

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**Gina Milgate**

*Australian Council for Australian Research (ACER)*

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Ms. Gina Milgate is a Kamilaroi and Wiradjuri woman from New South Wales and is the Indigenous Liaison Officer (ILO) at the Australian Council for Educational Research (ACER). She provides leadership and knowledge on a wide range of Aboriginal and Torres Strait Islander issues across ACER. A key part of her role is to ensure that ACER's activities in Indigenous education are underpinned by its values and leadership behaviours, and that research undertaken in Indigenous communities is culturally respectful, responsive and based on integrity.

Ms Milgate has led and been involved in a range of projects in Aboriginal and Torres Strait Islander education that have informed policy and practice. She has been involved in research and projects that have involved a high level of consultation with urban, regional, remote and very remote Aboriginal and Torres Strait Islander communities. She has facilitated school and community based research and has presented her findings to a range of stakeholders. Ms Milgate led a major project that evaluated training in the delivery of health services to Indigenous people in Central Australia and was part of a research team that provided the Victorian state government with recommendations that informed policy on Indigenous education and employment.

Ms Milgate has experience in planning and implementing strategies that are responsive to fulfilling the needs of Aboriginal and Torres Strait Islander people and communities in a culturally appropriate manner. She has been a consultant for Mindmatters and developed and delivered professional development to schools and communities in Queensland, Northern Territory, Victoria and New South Wales focusing on social and emotional wellbeing of Aboriginal and Torres Strait Islander children, family and communities.

In 2010 she was seconded to the Department of Education and Early Childhood Development in Victoria for six months, where she worked in the Aboriginal Early Years Branch as a Senior

Policy and Project Advisor and Manager. Her work involved a high level of engagement with key stakeholders from the community level to the ministerial level to support Aboriginal children and families in early childhood. She was a member of the Aboriginal Inclusion Board and developed an Aboriginal Early Childhood Workforce Strategy. Prior to her appointment at ACER, Ms Milgate was teaching and researching in the areas of marketing, organisational behaviour and strategic management at the University of New England.

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## Abstract

**Imagine the vision that Aboriginal and Torres Strait Islander parents and carers have for their child's education: what would it look like?**

'We expect the school to care for our children, treat them as individuals, to educate them and to keep us really informed about how well they are performing at school'

**What would the first teachers of Aboriginal and Torres Strait Islander students say about what they believe to be an effective school for their children?**

'We want the school to cater for the individual needs of the kids and that means that they know the children they teach'

This paper illustrates the voices of Aboriginal and Torres Strait Islander parents and carers about their children and education. The *Dare to Lead* Collegial Snapshot Process (CSS) has been a vehicle for Aboriginal and Torres Strait Islander parents and carers to share their wisdom and provide answers to questions that schools regularly ask about improving outcomes for Aboriginal and Torres Strait Islander students.

*Dare to Lead* in partnership with the Australian Council for Educational Research (ACER) has begun to mine and analyse the data that have been collected through the CSS by the former since 2007. This presentation will focus on the data collected from Aboriginal and Torres Strait Islander parents and carers in 2011. A key purpose of this paper is to identify the factors that Aboriginal and Torres Strait Islander parents and carers are identifying as important to creating an effective school for their children and the whole school community.

## Introduction

Improving the educational outcomes for Aboriginal and Torres Strait Islander students continues to be a high priority for national and state governments and jurisdictions. The consistent thread across all governments is to reduce the gap in education attainment and achievement from early childhood to adult learning for Aboriginal and Torres Strait Islander students. The key centres that play a role in addressing this priority are places of learning; early learning centres, schools and post-school education institutions. It is critical that these places of learning are equipped with the skills and resources needed to meet this challenge. The engagement with Aboriginal and Torres Strait Islander parents and carers can assist these places of learning to implement policies and practices that meet the needs of their students and, as a result, assist in meeting this national priority.

The aspirations that Aboriginal and Torres Strait Islander parents and carers have for their children are similar to those of other parents and carers.

'We want our children to be happy and want to come to school'

This presentation will focus on data collected from Aboriginal and Torres Strait Islander parents and carers in 2011 through the CSS undertaken by *Dare to Lead*. The CSS is an avenue for stakeholders in the school community to share openly their vision, perspectives and suggestions about Aboriginal and Torres Strait Islander education in their school communities. The presentation will highlight the strategies that Aboriginal and Torres Strait Islander parents and carers have recognised as important and believe can support school communities.

## Dare to Lead

*Dare to Lead* is a project funded by the Australian Government with the support of the **Minister for School Education, Early Childhood and Youth** with a focus on improving educational outcomes for Aboriginal and Torres Strait Islander students through school leadership development. The *Dare to Lead* project began in 2000 when representatives of the four peak principals' associations met at a national forum and agreed that Aboriginal and Torres Strait Islander education would be their highest priority. It is an initiative of the profession and specifically of Principals Australia Institute acting on behalf of its members and their associations. The *Dare to Lead* program is now in its fourth phase, with currently over 50 per cent, (more than 5600), of all Australian schools signed on as coalition members.

## Aboriginal and Torres Strait Islander education

The Aboriginal and Torres Strait Islander Education Action Plan 2010–2014 identifies six domains of priority, including:

- Readiness for School,
- Engagement and Connections,
- Attendance,
- Literacy and Numeracy,
- Leadership,
- Quality Teaching and Workforce Development and
- Pathways to Real Post-School Options to contribute to improving outcomes in Aboriginal and Torres Strait Islander education at a local, systemic and national level (MCEECDYA).

At the heart of the local level are families and communities. Families and communities are the people that can provide schools with an understanding

of their child's needs and aspirations and a picture of their vision for their child's education. Furthermore, each state and territory has developed strategic plans to inform policy and practice in Aboriginal and Torres Strait Islander education.

### **Collegial Snapshot Process**

The CSS is the medium that *Dare to Lead* uses to collect data from the school community in relation to Aboriginal and Torres Strait Islander education. The CSS is a point in time 'snapshot' of the school and is a confidential and collegial process for the profession by the profession. The school principal invites *Dare to Lead* into their school to gather both evidence-based and anecdotal data to make informed decisions about planning in Aboriginal and Torres Strait Islander education in their school. The information is collected from eight groups including:

- 1 School leaders
- 2 Aboriginal and Torres Strait Islander students
- 3 Aboriginal and Torres Strait Islander parents and carers
- 4 Aboriginal and Torres Strait Islander staff
- 5 Teachers
- 6 Other students
- 7 Other parents
- 8 Support staff

Each group are asked similar questions about Aboriginal and Torres Strait Islander education in the school relating to school leadership, cultural environment, quality teaching, curriculum, community engagement, student health and wellbeing, curriculum and governance and processes. In addition to interviewing each group of stakeholders, *Dare to Lead* collects and analyses school data relating to

enrolment, attendance, suspensions, NAPLAN, management plans, curriculum documents and newsletter. Upon completion of the visit and data collection, *Dare to Lead* provides the school principal with feedback through a formal report. The recommendations and commendations resulting from the report can lead to follow-up professional development and a return CSS process two years after the initial one.

### **Aboriginal and Torres Strait Islander parents and carers**

In 2011, *Dare to Lead* conducted 173 Collegial Snapshots across Australia, including 49 urban schools, 73 provincial schools, 18 rural schools and 33 remote schools. There were 510 Aboriginal and Torres Strait Islander parents and carers participating in these Snapshots. The Aboriginal and Torres Strait Islander parents and carers shared openly their thinking, ideas and the aspirations they have for their children and how schools can embed and bring their ideas to life throughout the school community.

### **Findings**

Since the conception of the *Dare to Lead* program, coalition member school communities have participated in the CSS, engaged in professional learning and embedded practice into their school fabric to improve educational outcomes for Aboriginal and Torres Strait Islander students through school leadership development. The aforementioned eight groups identified seven broad key themes that can support the improvement of outcomes for Aboriginal and Torres Strait Islander students including cultural environment, quality teachers, community engagement, student health and wellbeing, curriculum, school leadership

and governance and processes. The following sections illustrate the voices of Aboriginal and Torres Strait Islander parents and carers.

### **Cultural environment**

*'NAIDOC Week is a big thing in the school, kangaroo stew, boomerangs – it is a joyous celebration of being Aboriginal'*

The cultural environment of a school was identified as a key theme to create an effective school for Aboriginal and Torres Strait Islander children and the school community. The key factors that Aboriginal and Torres Strait Islander parents and carers highlighted included the observation of protocols, celebrating special cultural events, cultural respect, community connection, cultural awareness and value of Aboriginal and Torres Strait Islander staff as important factors in contributing to providing an effective school for their children and the school community.

### **Quality teachers**

*'I want the passions from the teachers to be within – that this is important to our state, our country, being challenged by their values'*

The quality of teaching was another key theme in creating an effective school for Aboriginal and Torres Strait Islander children and the whole school community. The key factors that Aboriginal and Torres Strait Islander parents and carers highlighted included the role of AEWs, teacher cultural awareness, social management, educational expectations, knowing the students, parent and teacher relationships, personalised learning plans, staff professional learning/training, and student and teacher relationships.

### **Community engagement**

*'I am often asked to come into school – that makes me feel valued'*



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The engagement with the community and what this engagement looks like, feels like and sounds like was recognised as a key theme to build relationships and partnerships between the school and broader community. The key factors that Aboriginal and Torres Strait Islander parents and carers highlighted included the inclusion of community role models and mentors in schools, Elders, parents and carers participating in school activities, community being involved in decision making, schools providing a welcoming environment for the community and the school being aware of and understanding local family and community issues.

### Student health and wellbeing

*'My child is very happy at school, he won't even give the gate time to open, but he has to wait to 8.30 am'*

The health and wellbeing of Aboriginal and Torres Strait Islander students was another theme identified across the eight groups as contributing to creating an effective school for Aboriginal and Torres Strait Islander children and the whole school community. The key factors that Aboriginal and Torres Strait Islander parents and carers highlighted included strategies to support students, aspirations and career development, behaviour, feeling safe and happy, sense of acceptance and belonging, cultural pride and identity, self-confidence and transitions.

### Curriculum

*'All students could learn more about the local Aboriginal culture and history'*

The curriculum in schools was a further key theme identified throughout the CSS. The key factors that Aboriginal and Torres Strait Islander parents and carers highlighted when developing curriculum frameworks included embedding Aboriginal and Torres Strait Islander perspectives in the curriculum for all

students, embedding cultural programs and activities, the school offering good educational opportunities, the school providing student-centred learning and the value of Aboriginal and Torres Strait Islander staff.

### School leadership

*'The best thing about the school is that the principal knows all the parents (he knows their names)'*

The leadership of the school was another key theme emerging from the Collegial Snapshot Process. The key factors that Aboriginal and Torres Strait Islander parents and carers highlighted included effective communication, educational expectations, established standards and policies, understanding and respecting parental views of school atmosphere, comfort and environment, developing positive staff and student relations and parent and staff relations and the visible presence of the principal throughout the school community.

### Governance and processes

*'Parents and community need to be more involved in school decision making and being involved in the school Aboriginal Education Team will be a good way to facilitate this'*

The school governance and processes for decision making also emerged as highly important. Key factors that Aboriginal and Torres Strait Islander parents and carers highlighted in relation to governance arrangements and processes for decision making included governance structures in schools, funding, communication, involving the community in decision making, embedding established standards and policies, involving parents and carers in school committees and the rate of staff turnover.

### Conclusion

The Dare to Lead Collegial Snapshot Process has been a culturally safe,

engaging and empowering way for Aboriginal and Torres Strait Islander parents and carers to share their knowledge and ideas about what makes an effective school for their children. The wealth of information from Aboriginal and Torres Strait Islander parents and carers in 2011 complemented by the school data has provided an evidence-base to inform future analysis of the Collegial Snapshot Process.

### Acknowledgments

The authors would like to acknowledge the Aboriginal and Torres Strait Islander parents and carers for sharing their knowledge, vision and ideas in an authentic, honest and informative way. We thank the principals for inviting us into their schools. We are very grateful for the passionate and motivated Dare to Lead team who have collected and collated this data since the program commenced. We thank the Dare to Lead Steering Committee for their leadership, encouragement and advice. We are appreciative of the Dare to Lead Patrons and Ambassadors who promote the program and who empower school communities to 'Dare to Lead'. We are thankful of the staff at ACER who assisted in coding and analysing the data.

### References

Ministerial Council for Education, Early Childhood Development and Youth Affairs (2010). *Aboriginal and Torres Strait Islander: Education Action Plan 2010–2014*. MCEECDYA and Education Services Australia.

# Effective teaching: Lessons from mathematics



**Mike Askew**

Monash University, Vic

Dr Mike Askew is Professor of Primary Education at Monash University, Melbourne. Prior to that he was Chair Professor of Mathematics Education at King's College London. He is internationally regarded as a leading expert on primary mathematics education and has directed many research projects including the influential *Effective Teachers of Numeracy in Primary Schools*, *Raising Attainment in Numeracy* and *Mental Calculations: Interpretations and Implementation*. Dr. Askew was deputy director of the five-year Leverhulme Numeracy Research Programme, examining teaching, learning and progression in number from age 5 to age 11. The findings from such research have influenced policy in England and abroad. Recently he was lead author of a review into international comparisons in mathematics education *Values and Variables* (Nuffield Foundation).

## Abstract

Teachers of mathematics face a double challenge. The first challenge is addressing the short-term needs of learners in meeting expected standards. But there is also the challenge of the long-term needs of learners developing productive dispositions towards the unanticipated mathematics that they will encounter beyond schooling. Teaching that concentrates only upon delivering a pre-determined body of mathematical knowledge may meet the short-term needs, but not the longer ones. Teaching that attends to the processes of learning and doing mathematics is more likely to meet both sets of needs. The Australian curriculum for mathematics encapsulates these process aspects through the four proficiencies of fluency, reasoning, problem-solving and understanding. This presentation examines the research behind learning these proficiencies and the implications for teaching practices. I will look at teaching practices that appear to be effective in helping learners develop these proficiencies and also at what may be barriers to such practices being more widely adopted.

## Introduction

ACARA (Australian Curriculum and Assessment Reporting Authority) sets out three overarching aims for the mathematics curriculum, one of which being to ensure that students:

are confident, creative users and communicators of mathematics, able to investigate, represent and interpret situations in their personal and work lives and as active citizens. (ACARA, 2011)

In bringing about this aim, the curriculum has two dimensions: the content strands and the proficiencies. The content strands are familiar:

number and algebra, measurement and geometry, statistics and probability. Perhaps less familiar and possibly more challenging to current models of mathematics teaching are the four proficiencies that cut across the content:

- Fluency
- Understanding
- Problem solving
- Reasoning.

These proficiencies describe 'how content is explored or developed, that is, the thinking and doing of mathematics' (ACARA, *ibid.*) and 'the actions in which students can engage when learning and using the content' (ACARA, *ibid.*). Given the unpredictability of the mathematics that students of today may need in their lives of tomorrow, these proficiencies are important in promoting the 'mathematical habits of mind' (Cuoco, Goldenberg and Mark, 1996) and productive dispositions (National Research Council, 2001) that learners will need to engage with when meeting new mathematics.

Viewing the proficiencies as the actions through which students learn the content presents a challenge to the popularly held view that they need to learn the content first – addition, equivalent fractions, algebraic manipulations or whatever – and only subsequently apply it to solving problems, or to be able reason about it. It also presents a challenge to teaching.

I have some difficulty with understanding as an 'action' – I can develop understanding, I can draw on understanding, I can demonstrate understanding, but I'm not clear how I 'do' understanding. I prefer to think of understanding as the outcome of doing the other proficiencies – engaging in problem solving, reasoning about the 'why' of mathematics and being fluent in the 'how' of mathematics are the



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building blocks of understanding. In what follows I will therefore focus on fluency, problem solving and reasoning.

The call to think about proficiencies as 'actions' can sound contradictory to the everyday use of 'proficient' as a degree of expertise. We would not describe someone stumbling through 'chopsticks' as a proficient piano player. But learning to play the piano involves engaging in actions before one is fully skilled in them – there is no waiting to become fully fluent in, say, playing scales before being expected (and encouraged) to play a tune. Becoming a proficient piano player means working with all of the musical proficiencies – scales, reading music, playing sonatas – from the beginning. Becoming a proficient mathematician requires working with all of the mathematical proficiencies – fluency, problem solving, reasoning and understanding – from the beginning. And by mathematician here I mean anyone using mathematics in his or her life. Everyone is a mathematician.

Taking the proficiencies seriously means moving from seeing school mathematics as a body of knowledge for learners to acquire to seeing it as an activity for learners to engage in – in the words of Brent Davis, moving from seeing mathematics as *preformed* to mathematics as *performed* (Davis & Sumara, 2006).

### Teaching through mathematical proficiencies

Teaching mathematics through engaging learners in the actions of the proficiencies has pedagogic implications. In particular, no one-size-fits-all pedagogy enables the enactment of all proficiencies. Effective teaching arises out of repertoires of pedagogies. Two particularly salient aspects of such repertoires are varying the organisation of groups and the orchestration of classroom dialogue.

### Teaching and group work

Generally group work is promoted as good for learning, but nuanced research findings indicate the importance of grouping students in particular ways for particular purposes. Classroom grouping decisions need to take into account:

- group size
- group interactions
- group composition
- group culture
- and how each of these interact with intended learning outcomes and the learning tasks set.

#### Group size

In an extensive review of research, Kutnick and colleagues summarise the evidence for the relationship between group size and learning task (Kutnick, Sebba et al., 2005). They identified paired work as best for developing understanding, provided the partners trust each other and can work well together. Trust and cooperation seem to be more important to considerations when selecting pairs to work together than factors such as matching on attainment levels (more on this below). Small groups appear to be best suited to enrichment tasks.

Practice and revision, however, appears best done individually as tasks can be differentiated and time on task is more focused on the necessary practising. Thus, aspects of mathematics teaching focused on developing fluency are best matched to individual work (and perhaps set as homework, since practice should not require a teacher to hand).

#### Group interactions

A key feature of the effective group work is the development of what emerges from the task being more

than the sum of the individual efforts. Researchers have variously referred to this as *groupsense* (Ryder & Campbell, 1989), or *intersubjectivity* (Rogoff, 1990; Wertsch, 1991). In Mercer's terms, group members move beyond interacting, to *interthinking* (Mercer, 2000).

#### Group composition

Studies of learning outcomes reveal that a predictor of who may learn most from group work is the participant asking the most questions of the others in the group. The evidence also shows that the person answering the most questions makes the next highest learning gains (Webb, 1989).

Webb's research shows that group composition in terms of range of attainment can affect the extent of and participation in such questioning and answering. Groups studied where the range of attainment was narrow were characterised by scant questioning and answering going on. Where group members are similar in attainment it seems that either they get on with tasks on the assumption that everyone in the group knows what to do, or they assume that others in the group will not be able to help. If the attainment range was broad, the participants at the extremes of the range engaged in most of the questioning and answering, thus limiting the opportunity for those in the middle to gain as much from the group interactions. Thus, it seems that groups need to have some range of attainment, but not too broad a range.

#### Group tasks

Tasks for pairs or groups to work on need to be carefully chosen and beyond the grasp of any individual member of the group, linking back to Davis and Sumara's (2006) point about planning for the collective: if tasks are chosen on the basis of being appropriate for

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the level of individual attainment, they may not be sufficiently challenging to provoke interthinking.

This was exemplified by a project with a school in the East End of London. Standards (as judged by National Test results) were extremely low and the teaching largely focused on trying to raise the attainment of individuals. Working with the school over two years, we focused on paired work and providing challenging tasks for pairs (once we got over the resistance from the learners who were unused to this style of teaching), which students could not have succeeded in individually. Although not the only intervention in the school, standards rose dramatically and students typically began to comment on how easy they found the National Tests, which indeed were much simpler than tasks worked on in class.

To summarise, tasks need to be chosen that require 'resources (information, knowledge, heuristic problem solving strategies, materials and skills) that no single individual possesses, so that no single individual is likely to solve the problem or accomplish the task objectives without at least some input from others' (Cohen, 1994).

### Group culture

For groups to function well, research also indicates that all group members must believe that both their own and their partners' contributions are important. Meyers (1997) found that 'individuals exert less effort in groups when they believe that their work is not critical to the collective'.

We cannot take this mutual valuing of contributions for granted as research by Jenny Young-Leveridge from the University of Waikato New Zealand shows. Students she interviewed expressed the importance of sharing their solution methods with their peers as well as the contradictory view that listening to others' explanations was not

that important!

Despite the evidence that good group work leads to results that are more than the sum of individual efforts, the evidence is that while students may sit together in groups, the enactment of effective group work is still limited. Why might this be so?

One possible reason is the dominance of discourse of teaching being about meeting individual needs. Davis and Sumara (2006) argue that teaching needs to attend to the needs of the group and that with that in place, the needs of individual learners then fall into place. If we shift attention to planning for the group rather than the individuals in the group, then the research into group learning outcomes indicates a shift is required in thinking about the level of difficulty of tasks selected. It seems commonsense to assume that mixed attainment groups or pairs working together may lead to the lower attaining students advancing towards the level of attainment of the higher attaining students, but those higher attaining students not gaining as much from the experience. Research does show, however, that even when group members have differing levels of attainment, the more advanced students can progress as much as their less advanced peers (Damon & Phelps, 1988, Schwarz, Neuman, & Biezuner, 2000) – the old saying of 'two heads being better than one' appears to hold true. Conversely, closely matched groups have been found to make little progress.

In many mathematics lessons a range of solutions may be presented but as a form of show-and-tell rather than to provoke dialogue. Ideas need to 'bounce off' each other for mathematics to emerge (Davis & Sumara, 2006), which will not happen if students are not attending to, building on or arguing against each others' explanations. Good group work and appropriate tasks can provoke socio-cognitive conflict –

differences amongst group members – with research findings supporting the impact of this on the learning of individuals (e.g. see Ames & Murray, 1982; Bearison, Magzamen & Filardo, 1986). All this points to the importance of classroom dialogue in effective teaching.

### Dialogue and effective teaching

Much of the advice in the mathematics educational literature is similar to the notion of 'accountable talk' that Lauren Resnick and colleagues introduced to highlight that classroom talk must be judged against something. Classroom talk can be accountable to three things: building the community, reasoning and knowledge (Michaels, O'Connor & Resnick 2008).

Resnick's research shows that developing accountable talk directed to building community is possibly the easiest to implement in classrooms. Teacher moves like asking 'Who agrees with what Lynne has just said?' 'Jennie, you had a different idea, how does that fit?' 'Who can re-explain in their own words what Russell has just said?' can change the dynamic of classroom dialogue from one of 'show-and-tell' to one of collective engagement with the mathematics.

The talk that then arises also has to be accountable to reasoning – the arguments and ideas learners produce must be commensurate with the logic of mathematical argument. And the talk must also be accountable to knowledge: the mathematics that emerges must eventually be correct. Resnick suggests, perhaps surprisingly, that it is easier to encourage talk that is accountable to reasoning than it is to produce talk that is accountable to knowledge. She bases this claim on the observation that children can produce well-reasoned arguments but grounded in ideas that are mathematically incorrect. For example, a ten-year-old I once met

reasoned cogently that 9 was an even number as nine cubes could be split into three equal groups: the logic of his reasoning was correct, but it didn't fit with the mathematically accepted definition of even.

Finally, despite the evidence showing the power of dialogue in promoting learning, there is also continuing evidence of the dominance of closed questions in mathematics lessons that do not provoke the sort of dialogue that would lead to socio-cognitive conflict and individual learning. A seminal study by Stein and colleagues hints at why this might be so (Stein, Grover & Henningsen, 1996). Working together, the researchers and teachers planned a series of lessons designed to engage learners in cognitively challenging mathematical tasks. When the researchers watched these lessons actually being enacted in classrooms they found that only one-third of the lessons actually maintained the challenge as they played. In two-thirds of the lessons the challenges were reduced to following procedures that the teachers pointed out to the learners or in some cases the lessons became non-mathematical. One of the factors in lessons that maintained the challenge was teachers 'sustained pressure for explanation and meaning'. Sustained pressure – effective teaching doesn't come easy.

## References

- ACARA. (2011). *The Australian Curriculum. Mathematics F to Y10*. Canberra: ACARA.
- Ames, G. J., & Murray, F.B. (1982). When two wrongs make a right: Promoting cognitive change by social conflict. *Developmental Psychology*, 18, 894–897.
- Bearison, D. J., Magzamen, S., & Filardo, E. C. (1986). Socio-cognitive conflict and cognitive growth in children. *Merrill-Palmer Quarterly*, 32, 51–72.
- Cohen, E.G., (1994). Restructuring the classroom: conditions for productive small groups. *Review of Educational Research*, 64, 1–35.
- Cuoco, A., Goldenberg, E. P., & Mark, J., (1996). Habits of mind: An organizing principle for a mathematics curriculum. *Journal of Mathematical Behavior*, 15(4), 375–402.
- Damon, W., & Phelps, E. (1988). Strategic uses of peer learning in children's education. In T. J. Berndt & G. W. Ladd (Eds.), *Peer relations in child development* (pp. 135–157). New York: John Wiley.
- Davis, B., & Sumara, D. (2006). *Complexity and education: Inquiries into learning, teaching and research*. Mahah, NJ & London: Lawrence Erlbaum Associates.
- Kutnick, P., Sebba, J., Blatchford, P., Galton, M., & Thorp, J. with Ota, C., Berdondini, L. & MacIntyre, H. (2005). *An extended review of pupil grouping in schools*. London: DfES.
- Mercer, N. (2000) *Words and minds: How we use language to think together*. London: Routledge.
- Meyers, S.A. (1997). Increasing student participation and productivity on small-group activities for psychology classes. *Teaching of Psychology*, 24, 105–115.
- Michaels, S., O'Connor, C. & Resnick, L., (2008). Deliberative discourse idealized and realized: Accountable talk in the classroom and in civic life. *Studies in Philosophy and Education*, 27, 283–297.
- National Research Council. (2001). *Adding it up: Helping children learn mathematics*. Washington DC: National Academy Press.
- Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social context*. Oxford: Oxford University Press.
- Ryder, J., & Campbell, L. (1989). Groupsense: When groupwork does not add up to 'groupwork'. *Pastoral Care in Education*, 7, 22–30.
- Schwarz, B.B., Neuman, Y., & Biezuner, S. (2000). Two wrongs may make a right... If they argue together!. *Cognition and Instruction*, 18, 461–494.
- Stein, M. K., Grover, B., & Henningsen, M. (1996). Building student capacity for mathematical thinking and reasoning: An analysis of mathematical tasks used in reform classrooms. *American Educational Research Journal*, 33(2), 455–488.
- Webb, N. M. (1989). Peer interaction and learning in small groups. *International Journal of Educational Research*, 13(1), 21–39.
- Wertsch, J.V. (1991). A sociocultural approach to socially shared cognition. In L. B. Resnick, J. M. Levine, & S. D. Teasley (Eds.), *Perspectives on socially shared cognition*. Washington: American Psychological Association.

# Lessons for improvement from international comparative studies



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## Abstract

Results from international comparative studies of student achievement provide perspectives on potentials for improving learning outcomes among Australian students. Two of the important international comparative studies are the Organisation for Economic Cooperation and Development (OECD) Programme for International Student Achievement (PISA) and the Trends in International Mathematics and Science Study (TIMSS) conducted by the International Association for the Evaluation of Educational Achievement (IEA). This paper focuses on reading and mathematics achievement.

## Features of PISA and TIMSS

PISA and TIMSS allow students' performances to be compared across countries, over time, among jurisdictions within Australia and between groups of students. PISA and TIMSS have much in common, but they provide complementary information about student achievement. Both studies are based on carefully developed assessment frameworks that define what is assessed. They are based on sound reliable instruments that measure accurately what they were designed to measure. Both are designed to assess changes in student achievement over time by including common items that provide links across successive assessment cycles. Both make use of item response theory (albeit with different variants) as the basis for their analysis.

There is a difference in the focus of the assessments that are employed. PISA asks how well 15-year-old students are able to apply understandings and skills in reading, mathematics and science to everyday situations. TIMSS, on the other hand, looks at how well Year 4 and Year 8 students have mastered the factual and procedural knowledge taught in school mathematics and science curricula. PISA and TIMSS also differ in some

important design features. PISA defines the population of interest to be 15-year-old students in school, whereas TIMSS defines its populations of interest to be students in Grades (Years)<sup>1</sup> 4 and 8. This difference is important for comparisons of results among countries and among jurisdictions within Australia. PISA has been conducted every three years since 2000 with one of the domains (reading, mathematics or science) being the major domain in turn for each cycle so that, for example, reading was the major domain in 2000 and in 2009 (Lokan, Greenwood, & Cresswell, 2001; Thomson, De Bortoli, Nicholas, Hillman, & Buckley, 2011). TIMSS has been conducted every four years since 1995 with mathematics and science having equal weight in each cycle.

## Achievement in reading literacy in PISA 2009 and 2000

### Reading in PISA 2009: International comparisons

On the basis of the PISA results for 2009 (see Table 1) it can be inferred that Australian 15-year-olds perform moderately well (on average) in reading literacy. Australian 15-year-olds performed similarly to their peers from New Zealand, Japan and Netherlands, but significantly less well than 15-year-olds from Korea, Finland, Singapore, Hong Kong and Canada (as well as the city of Shanghai) (Thomson, De Bortoli, Nicholas, Hillman, & Buckley, 2011, p. 52). The average score for Australian students in reading literacy was 515 scale points compared to the OECD average of 493 points on a scale where the OECD average standard deviation is 100 points (OECD, 2010a).

Table 1 also indicates the spread of student scores by the difference between the 10<sup>th</sup> and 90<sup>th</sup> percentile. In

<sup>1</sup> In international studies the term Grades is used whereas in Australia Years is used.



the case of Australia this difference was 254 points in 2009 compared to the OECD average of 241 points. In other words, Australia has a significantly wider spread of scores than for the OECD average. Among OECD countries Australia has a spread of scores that is significantly lower than only Israel, France and Luxembourg. Its spread is not different from a group of 13 other countries with spreads from 241 to 266, which include New Zealand, Sweden, the United States of America and the United Kingdom. Its spread is greater than 17 countries including Norway, Denmark, Canada, Finland and Korea that have spreads ranging from 239 to 200.

#### **Changes in reading achievement in Australia from PISA 2000 to PISA 2009**

Between 2000 and 2009 the average achievement in reading literacy for Australia declined from 528 to 515 a difference that is small but statistically significant. Over that same period, there was no significant change in the range of reading literacy scores for Australia. Other countries to record a significant decline included Ireland, Sweden, the Czech Republic, Spain, Finland, France and Iceland. Seven countries recorded a significant improvement (with gains of 13 to 40 scale points) in mean reading scores (OECD, 2010b).

Over the period from 2000 to 2009 there was no change in the relative performance of females and males or between Indigenous and non-Indigenous or students in metropolitan and non-metropolitan locations (see Table 2) (Thomson et al., 2011). Nor was there any change in the strength of the relationship of achievement with socioeconomic and cultural background. There was a small change in the difference in reading scores between students whose home language was English and those whose home language was a language other than English. This arose as a result of a decline in the achievement of the former group

while there was no change in the achievement of the latter group.

There did appear to be a decline in the percentage of students in proficiency level 5 and above (18% in 2000 compared to 13% in 2009), but no significant change in the percentage of students below level 2 (13% in 2000 compared to 14% in 2009) (OECD, 2010b). The significantly larger drop in the percentage in the upper proficiency levels compared to the lack of change in the bottom proficiency levels indicates that in addition to a general shift of the distribution to the left there has been a small change in the shape of the distribution.

There were differences among jurisdictions in the change in mean reading scores between 2000 and 2009. In Tasmania (31 points), South Australia (31 points), New South Wales (23 points) and the ACT (21 points) there were significant declines. There were no significant changes in Western Australia, the Northern Territory, Victoria or Queensland (Thomson et al., 2011).

#### **Changes in students' reading activities**

PISA provides data on students' reports of their engagement in reading for enjoyment using responses to the same questions in 2000 as in 2009 (OECD, 2010b). The amount of time spent reading for enjoyment, and how much students enjoy reading, is positively associated with reading achievement. This relationship applies to both males and females, but the gap between males and females is smaller when reading for enjoyment is more frequent (Thomson et al., 2011). Between 2000 and 2009 there was a decline in the percentage of Australian 15-year-old students who read for enjoyment on a daily basis, for at least some time, from 67 per cent to 63 per cent. The decline was from 60 per cent to 53 per cent among males and was not statistically significant among girls. However, this change was

evident in 22 other countries, many of which experienced no significant decline in reading achievement scores.

#### **Achievement in mathematical literacy in PISA 2009 and 2000 Mathematics in PISA 2009**

On the basis of the PISA results for 2009 (see Table 3) it can be inferred that Australian 15-year-olds perform moderately well (on average) in mathematical literacy. Australian 15-year-olds performed similarly to their peers from New Zealand, Belgium, Germany and Estonia, but significantly less well than 15-year-olds from 12 participating countries (including six OECD countries: Korea, Finland, Switzerland, Japan, Canada and the Netherlands (Thomson et al., 2011, p. 52). The average score for Australian students in mathematical literacy was 514 scale points ( $\pm 5$  points) compared to the OECD average of 496 points ( $\pm 1$  point) on a scale where the OECD average standard deviation is 100 points. The spread of student scores in mathematical literacy for Australia, as indicated by the difference between the 10<sup>th</sup> and 90<sup>th</sup> percentile, was 242 points, which is not significantly different from the OECD average of 237 points (OECD, 2010b).

#### **Changes in mathematics achievement in Australia from PISA 2003 to PISA 2009**

It was not until 2003 that mathematics literacy was a major domain in PISA and so trends are measured from that cycle onwards (OECD, 2004). Between 2003 and 2009 the average achievement in reading literacy for Australia declined from 524 to 514; a difference that is small but statistically significant. There was no change in the spread of mathematics scores (with the range from the 10<sup>th</sup> to 90<sup>th</sup> percentiles being 246 points in 2003) and 241 points in 2009. Other OECD countries to record a significant decline in mathematics scores from 2003 to 2009 were the Czech Republic (24 points), Ireland (16

points), Sweden (15 points), France (14 points), the Netherlands (12 points) and Denmark (11 points). OECD countries to record a significant increase over same period were Mexico (33 points), Turkey (22 points), Portugal (21 points), Greece (21 points), Italy (17 points) and Germany (10 points).

For 2003 where mathematical literacy was the major domain it was possible to consider the subscales of mathematical literacy. In that cycle Australian students did, relatively, a little better on the uncertainty subscale than on mathematical literacy overall and, relatively, a little less well on the quantity subscale than on mathematical literacy overall. Scores on the space and shape as well as the change and relationships subscales were almost the same as the overall mathematical literacy scores (Thomson, Cresswell & De Bortoli, 2004).

Over the period from 2003 to 2009 there was no change in the relative performance of females and males, Indigenous and non-Indigenous, students of different socioeconomic background or students in different geographic locations (see Table 4). There was a change in the difference in mathematics scores between students whose home language was English and those whose home language was a language other than English. This arose as a result of a decline in the achievement of the former group, while there was no significant change in the achievement of the latter group (Thomson et al., 2011).

As was observed for reading literacy, there did appear to be a decline in the percentage of students in mathematics proficiency level 5 and above (20% in 2003 compared to 16% in 2009), but no significant change in the percentage of students below level 2 (14% in 2003 compared to 16% in 2009). The larger drop in the percentage in the upper proficiency levels compared to the lack of change in the bottom proficiency

levels indicates that there has been a small change in the shape of the distribution.

There were differences among jurisdictions in the change in mean mathematics scores between 2003 and 2009. In South Australia (26 points), the ACT (20 points), Western Australia (19 points) and New South Wales (14 points) there were significant declines. There were no significant changes in other jurisdictions (Thomson et al., 2011).

## **Achievement in mathematics in TIMSS**

### **Mathematics achievement in 2006/7**

In TIMSS Australian students perform comparatively less well on tests of mathematics knowledge than in PISA. At Year 4, 11 of the TIMSS countries in 2006/7 (including England and the United States of America) scored significantly higher than Australia, which performed at the same level as Denmark, Hungary and Italy (see Table 5). At Year 4 there was no significant difference between the mean score for females of 513 and that for males of 519. The international average between-student standard deviation for the scale was 100 points. Although there were differences among countries in the scores of males and females, on average there was no difference between females and males. Indigenous students had mean scores 91 points lower than that of non-Indigenous students. Students from metropolitan locations had mean scores 30 points greater than those from provincial locations (with remote students lower still) (Thomson, Wernert, Underwood, & Nicholas, 2008).

In mathematics at Grade 8 nine countries (including Korea, Singapore, Japan, England and the United States of America) achieved significantly higher mean mathematics scores than Australia and the TIMSS scale average. The Australian mean for Year 8 mathematics of 496 scale points was not significantly

different from eight other countries (Lithuania, the Czech Republic, Slovenia, Armenia, Sweden, Malta, Scotland and Serbia), and was not significantly different from the international mean. At Year 8 males had a mean score for mathematics of 504, which was significantly higher than the mean of 488 for females. On average, across all countries the score for males was greater than that for females. However, interestingly, in 25 countries there was no significant difference between females and males, and females achieved significantly higher average scores than males in 16 countries (many of these being in the Middle East). Indigenous students had mean scores 70 points lower than that of non-Indigenous students. Students from metropolitan locations had mean scores not significantly different from students from provincial locations (but the scores of remote students were 30 points lower). Students whose parents had a university degree had a mean score of 546 points compared to students whose parents had not completed secondary school who had a mean score of 472 points (see Table 5).

### **Changes in mathematics achievement in 2006/7**

For TIMSS mathematics it is possible to examine changes over a 12-year period since 1994/5 through 2002/3 to 2006/7. In Year 4 the mean TIMSS mathematics score for Australian students increased significantly by 22 scale points from 494 through 499 to 516 score points. Thus, the increase was mainly from 2003 to 2007. Eight countries showed an increase over this period of time (including England and the United States of America).

In Year 8 the mean TIMSS mathematics score for Australia declined by a statistically significant 13 points from 509 to 496 points in 2006/7. Five countries (including England, Korea and the United States of America) significant improvements between 1994/5 and



2006/7 and ten countries had lower scores in 2006/7 than in 1994/5 (Thomson et al., 2008).

### **Differences between PISA and TIMSS assessments**

PISA and TIMSS adopt different population definitions and sampling strategies. PISA is based on 15-year-olds, whereas TIMSS is based on a Year level (Year 4 or Year 8). As a consequence, countries (and jurisdictions within countries) will have differing balances of Year levels represented in the sample of 15-year-olds in PISA depending on their age–grade distribution. Conversely, countries (and jurisdictions) will have different ages represented in their grade-based samples in TIMSS. Wu (2008) has shown that this has some effects on the differences in between-country comparisons based on these studies.

Furthermore, as a consequence of different mathematics assessment frameworks PISA and TIMSS have different balances of numbers of items across the mathematics sub-domains. Based on a careful analysis of the items in TIMSS 2006/7 and PISA 2006, Wu (2008) has shown that there is a much stronger representation of 'data' items in PISA mathematics than in TIMSS Grade 8 mathematics. Countries in which students perform well on data record relatively higher scores on PISA than on TIMSS (other things equal). There is no clear answer concerning what is the correct balance of items across domains, but it does mean that comparisons need to be informed by knowledge of assessment frameworks.

### **Conclusion**

Much of the commentary about results from PISA and TIMSS have focused on patterns within each cycle at a point in time. My view is that as much, and possibly more, can be learned from studying changes between cycles as from studying high achieving countries.

It does appear that there have been small declines in average achievements in lower secondary reading and mathematics over recent years and that these declines appear to apply uniformly across most groups of students. This means that most of the existing inequalities among groups of students have remained the same. It also appears that the extent of the decline is a little more marked among relatively high-achieving students than relatively low-achieving students. This suggests that improvement initiatives need to be broadly based. Other analyses from PISA suggest that approaches to learning (including the extent to which students learn to monitor their own learning) are associated with higher achievement.

The variations among Australian jurisdictions in the extent of the declines suggests that there may be some systemic factors associated with curricula, the availability of qualified teachers or school organisation that may be linked to the declines in achievement in the lower secondary years. It is also of interest that the pattern in primary schools (at least in mathematics) is one of a small improvement in performance.

Longitudinal studies based on PISA in Canada have indicated that achievement in reading and mathematics are powerful predictors (net of the influence of other correlated social and demographic factors) of continuing in education and succeeding in entering the labour force (OECD, 2010c). For that reason it is important to follow through any indication \ that achievement in those areas might be declining, even if it is only by a small amount.

### **References**

Lokan, J., Greenwood, L., & Cresswell, J. (2001). *15-up and counting, reading writing and reasoning: How literate are Australia's students?* Melbourne: ACER.

Organisation for Economic Cooperation and Development. (OECD). (2010a). *PISA 2009 Results: What students know and can do*. Paris: OECD.

Organisation for Economic Cooperation and Development (OECD). (2010b). *PISA 2009 Results: Learning trends*. Paris: OECD.

Organisation for Economic Cooperation and Development (OECD). (2010d). *Pathways to success: How knowledge and skills at age 15 shape future lives in Canada*. Paris: OECD.

Organisation for Economic Cooperation and Development (OECD). (2004). *Learning for tomorrow's world: First results from PISA 2003*. Paris: OECD.

Organisation for Economic Cooperation and Development (OECD). (2001). *Knowledge and skills for life: First results from PISA 2000*. Paris: OECD.

Thomson, S., Cresswell, J., & De Bortoli, L. (2004). *Facing the future: A focus on mathematical literacy among Australian 15-year-old students in PISA 2003*. Melbourne: ACER.

Thomson, S., De Bortoli, L., Nicholas, M., Hillman, K., & Buckley, S. (2011). *Challenges for Australian Education: Results from PISA 2009*. Melbourne: ACER.

Thomson, S., Wernert, N., Underwood, C., & Nicholas, M. (2008). *TIMSS 07: Taking a closer look at mathematics and science in Australia*. Melbourne: ACER.

Wu, M. (2008). *A comparison of PISA and TIMSS 2003 achievement results in mathematics*. Paper presented to the annual meeting of the American Educational Research Association, New York, April.

Table I OECD country-level PISA reading statistics for 2009 and 2000

Country	PISA Reading 2009			PISA Reading 2000			Score Diff	Range Diff
	Mean score	Std Error	Range	Mean score	Std. Error	Range		
Australia	515	2.3	254	528	3.5	262	-13	-8
Belgium	506	2.3	263	507	3.6	280	-1	-17
Canada	524	1.5	231	534	1.6	242	-10	-11
Chile	449	3.1	214	410	3.6	233	40	-19
Czech Republic	478	2.9	241	492	2.4	242	-14	-1
Denmark	495	2.1	216	497	2.4	250	-2	-34
Finland	536	2.3	223	546	2.6	225	-10	-2
France	496	3.4	272	505	2.7	238	-9	34
Germany	497	2.7	248	484	2.5	284	13	-36
Greece	483	4.3	246	474	5.0	253	9	-7
Hungary	494	3.2	236	480	4.0	244	14	-8
Iceland	500	1.4	248	507	1.5	238	-7	10
Ireland	496	3.0	238	527	3.2	240	-31	-2
Israel	474	3.6	289	452	8.5	282	22	7
Italy	486	1.6	246	487	2.9	233	-1	13
Japan	520	3.5	253	522	5.2	218	-2	35
Korea	539	3.5	200	525	2.4	175	14	25
Mexico	425	2.0	217	422	3.3	224	3	-7
New Zealand	521	2.4	266	529	2.8	279	-8	-13
Norway	503	2.6	237	505	2.8	267	-2	-30
Poland	500	2.6	231	479	4.5	260	21	-29
Portugal	489	3.1	226	470	4.5	255	19	-29
Spain	481	2.0	224	493	2.7	218	-12	6
Sweden	497	2.9	252	516	2.2	238	-19	14
Switzerland	501	2.4	243	494	4.3	266	7	-23
United States	500	3.7	253	504	7.1	273	-4	-20
OECD Average	496	0.5	241	496	0.8	247	1	6

Note: Range is the difference between 10th and 90th percentiles  
 Data source: OECD (2010) PISA 2009 Results: Learning Trends. Paris, OECD

What does research tell us about effective strategies?

**Table 2** PISA reading statistics for groups of Australian students in 2009 and 2000

	PISA 2009		PISA 2000		
	Mean	S.E.	Mean	S.E.	
<b>Gender</b>					
Females	533	2.6	546	4.7	
Males	496	2.9	513	4	*
Difference		3.1	<b>34</b>	5.4	
<b>Indigenous status</b>					
Non-Indigenous	518	2.2	531	3.4	*
Indigenous	436	6.3	448	5.8	
Difference	<b>82</b>	6.7	<b>83</b>	6.7	
<b>Language background</b>					
English language at home	518	2	535	3.6	*
LBOTE	509	8.9	504	7.5	
Difference	10	8.3	<b>31</b>	7.4	
<b>Immigrant status</b>					
Australian born	515	2.1	532	3.6	*
Immigrant background	524	5.8	520	6.7	
Difference	<b>-10</b>	5.8	12	6.6	
<b>Location</b>					
Metropolitan	521	2.9	535	4.8	*
Non-metropolitan	496	4	518	7	*
Difference (metro-non-metro)	<b>25</b>	5.1	<b>17</b>	8.8	
<b>Educational, social and cultural status (ESCS)</b>					
Top quarter	562	1.7			
Upper quarter	532	1.5			
Lower quarter	504	1.9			
Bottom quarter	471	2.1			
Difference (Top-Bottom)	<b>91</b>	2.7			
Slope of relationship with achievement	<b>46</b>	1.8	<b>47</b>	2.7	
<b>Distribution in upper and lower proficiency levels</b>					
Percentage in Level 5 and above	13	0.8	18	1.2	*
Percentage below level 2	14	0.6	13	0.9	
Difference	-1	1.0	<b>5</b>	1.5	*

Notes: Differences between groups that are significant are shown in bold  
Differences across cycles that are significant are designated with a \*

Table 3 OECD country-level PISA mathematics statistics for 2009 and 2003

Country	PISA Mathematics 2009			PISA Mathematics 2003			Score Diff	Range Diff
	Mean score	Std Error	Range	Mean score	Std. Error	Range		
Australia	514	2.5	241	524	2.1	246	-10	-5
Belgium	515	2.3	273	529	2.3	284	-14	-11
Canada	527	1.6	224	532	1.8	225	-6	0
Czech Republic	493	2.8	241	516	3.5	249	-24	-8
Denmark	503	2.6	224	514	2.7	236	-11	-12
Finland	541	2.2	212	544	1.9	214	-4	-1
France	497	3.1	261	511	2.5	239	-14	22
Germany	513	2.9	257	503	3.3	269	10	-12
Greece	466	3.9	228	445	3.9	242	21	-14
Hungary	490	3.5	238	490	2.8	241	0	-3
Iceland	507	1.4	235	515	1.4	233	-8	2
Ireland	487	2.5	214	503	2.4	221	-16	-6
Italy	483	1.9	239	466	3.1	247	17	-8
Japan	529	3.3	242	534	4.0	258	-5	-16
Korea	546	4.0	229	542	3.2	236	4	-8
Luxembourg	489	1.2	253	493	1.0	239	-4	14
Mexico	419	1.8	203	385	3.6	221	33	-18
Netherlands	526	4.7	234	538	3.1	241	-12	-7
New Zealand	519	2.3	250	523	2.3	256	-4	-6
Norway	498	2.4	221	495	2.4	238	3	-16
Poland	495	2.8	229	490	2.5	231	5	-2
Portugal	487	2.9	238	466	3.4	228	21	10
Slovak Republic	497	3.1	245	498	3.3	241	-2	4
Spain	483	2.1	234	485	2.4	229	-2	5
Sweden	494	2.9	240	509	2.6	243	-15	-4
Switzerland	534	3.3	257	527	3.4	256	7	0
Turkey	445	4.4	243	423	6.7	260	22	-16
United States	487	3.6	238	483	2.9	251	5	-13
OECD Average	499	0.6	237	500	0.6	241	-1	-4

Note: Range is the difference between 10th and 90th percentiles  
 Data source: OECD (2010) PISA 2009 Results: Learning trends, Paris, OECD

What does research tell us about effective strategies?

**Table 4** PISA mathematics statistics for groups of Australian students in 2009 and 2003

	PISA 2009		PISA 2003		
	Mean	S.E.	Mean	S.E.	
<b>Gender</b>					
Females	509	2.8	515	2.9	
Males	519	3.0	526	3.2	
Difference	<b>-10</b>	4.1	<b>-11</b>	4.3	
<b>Indigenous status</b>					
Non-Indigenous	517	2.5	526	2.1	*
Indigenous	441	5.3	440	5.4	
Difference	<b>76</b>	5.9	<b>86</b>	5.8	
<b>Language background</b>					
English language at home	516	2.2	529	2	*
LBOTE	517	8.9	505	6.1	
Difference	-1	9.2	<b>24</b>	6.4	*
<b>Immigrant status</b>					
Australian born	511	2.5	527	2.1	*
First generation	526	3.3	522	4.7	
Overseas born	518	6.4	525	4.9	
Difference (AB-FG)	-15	4.1	5	5.1	*
Difference (AB-OB)	-7	7.2	2	6.8	
<b>Location</b>					
Metropolitan	520	3.1	528	2.5	*
Provincial	499	3.7	515	4.4	*
Remote	465	15.8	493	9.6	
Difference (metro-provincial)	<b>21</b>	4.8	13	5.1	
Difference (metro-remote)	<b>55</b>	16.2	<b>35</b>	10.6	
<b>Educational, social and cultural status (ESCS)</b>					
Top quarter	561	3.1	572	2.9	
Upper quarter	530	3.0	537	3.1	*
Lower quarter	503	2.5	513	2.3	
Bottom quarter	471	2.6	479	4.1	*
Difference (Top-Bottom)	<b>90</b>	4.0	<b>93</b>	5.0	
Slope of relationship with achievement					
<b>Distribution in upper and lower proficiency levels</b>					
Percentage in Level 5 and above	16	0.8	20	0.7	*
Percentage below level 2	16	0.6	14	0.7	
Difference	0	1.0	<b>6</b>	1.0	*

Notes: Differences between groups that are significant are shown in bold  
Differences across cycles that are significant are designated with a \*

**Table 5** TIMSS mathematics statistics for 2006/7

Grade 4 Mathematics			Grade 8 Mathematics		
Country	Mean	SE	Country	Mean	SE
Hong Kong SAR	607	3.6	Chinese Taipei	598	4.5
Singapore	599	3.7	Korea, Rep. of	597	2.7
Chinese Taipei	576	1.7	Singapore	593	3.8
Japan	568	2.1	Hong Kong SAR	572	5.8
Kazakhstan	549	7.1	Japan	570	2.4
Russian Federation	544	4.9	Hungary	517	3.5
England	541	2.9	England	513	4.8
Latvia	537	2.3	Russian Federation	512	4.1
Netherlands	535	2.1	United States	508	2.8
Lithuania	530	2.4	Lithuania	506	2.3
United States	529	2.4	Czech Republic	504	2.4
Germany	525	2.3	Slovenia	501	2.1
Denmark	523	2.4	TIMSS Scale Avg.	500	
Australia	516	3.5	Armenia	499	3.5
Hungary	510	3.5	Australia	496	3.9
Italy	507	3.1	Sweden	491	2.3
Austria	505	2	Malta	488	1.2
Sweden	503	2.5	Scotland	487	3.7
Slovenia	502	1.8	Serbia	486	3.3
TIMSS Scale Avg.	500		Italy	480	3
Armenia	500	4.3	Malaysia	474	5
Slovak Republic	496	4.5	Norway	469	2
Scotland	494	2.2	Cyprus	465	1.6
New Zealand	492	2.3	Bulgaria	464	5
Czech Republic	486	2.8	Israel	463	3.9
Norway	473	2.5	Ukraine	462	3.6
Ukraine	469	2.9	Romania	461	4.1
Georgia	438	4.2	Bosnia and Herzegovina	456	2.7
Iran	402	4.1	Lebanon	449	4
Algeria	378	5.2	Thailand	441	5
Colombia	355	5	Turkey	432	4.8
Morocco	341	4.7	Jordan	427	4.1
El Salvador	330	4.1	Tunisia	420	2.4
Tunisia	327	4.5	Georgia	410	5.9
Kuwait	316	3.6	Islamic Rep. of	403	4.1
Qatar	296	1.0	Bahrain	398	1.6
Yemen	224	6.0	Indonesia	397	3.8
			Syrian Arab Republic	395	3.8
			Egypt	391	3.6
			Algeria	387	2.1
			Morocco	381	3
			Colombia	380	3.6
			Oman	372	3.4
			Palestinian Nat'l Auth.	367	3.5
			Botswana	364	2.3
			Kuwait	354	2.3
			El Salvador	340	2.8
			Saudi Arabia	329	2.9
			Ghana	309	4.4
			Qatar	307	1.4

What does research tell us about effective strategies?



# A personal and collective commitment to a focus on school improvement

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**Mark Campling**

*Department of Education and Training  
Queensland*

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Mr. Mark Campling leads educational reform across 1283 Education Queensland schools as Assistant Director-General, State Schooling Implementation. He has almost three decades of principal and executive management experience in a diverse range of Queensland schools and regions. Mr Campling is currently leading several major initiatives including the *Curriculum into the classroom* project, an Australian-first set of digital planning materials to support Education Queensland teachers implementing the Australian Curriculum. He has also established innovative Teaching and Learning audits to foster a collaborative and self-reflective approach to school performance improvement. His contribution to leadership and professional development in education has been recognised with life membership of the Queensland Association of State School Principals.

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**Stephen Savvakis**

*Department of Education and Training  
Queensland*

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Mr. Stephen Savvakis is currently Principal of Trinity Bay State High School in the City of Cairns, Far North Queensland. Previously he was the principal of Emerald State High School in Central Queensland and deputy principal in the South Burnett area and on the Gold Coast.

During 2011 Mr Savvakis conducted teaching and learning audits across the state, providing feedback to secondary schools. In addition, he provided presentations to school teams on how to use the audit instrument to bring about school improvement.

Mr Savvakis has been an active member of the Queensland Secondary Principals' Association (QSPA). In 2006 he received a Leadership Award from QSPA for his work in the organisation and his support of principal professional development in the Far North of Queensland.

Now that he has returned to his school, Mr. Savvakis' focus is to influence teaching and learning in every classroom to bring about better learning outcomes for students.

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**Jane Sedgman**

*Department of Education and Training  
Queensland*

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Ms. Jane Sedgman is Principal at Ascot State School Brisbane and has worked in state primary schools for 35 years. Her professional interests are differentiation, gifted education and school leadership.

Ms Sedgman's current roles include:

- Principal Coach, Metropolitan Region, which involves coaching five principals
  - Principal Facilitator for Queensland Educational Leadership Institute (QELI) Future Leader Program, which involves facilitating the leadership work of ten teachers
  - Co-Chair Queensland Association of State School Principals (QASSP) Standing Committee Teaching/Learning, Literacy/Numeracy, which involves representing the views of Queensland primary school educators.
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## Abstract

To support schools in their journey towards improvement, Education Queensland has introduced a raft of innovative strategies to make a difference to student learning outcomes across a large and diverse state. One of these strategies is the Teaching and Learning Audit. This audit allows schools to look beyond student performance and explore their strategies, programs and practices against world-class standards in curriculum, assessment teaching and learning. The instrument was developed by the Australian Council for Educational Research in consultation with education personnel and a wide range of stakeholders. The audit is conducted in schools by high-performing, highly trained and independent Queensland principals who gather data from a range of areas. This data is collected using several techniques to review school planning documents, school and classroom practices and individual student work. Judgements are made about school practices against defined criteria that are categorised as eight dimensions. Schools are given a detailed report that clearly outlines commendations, recommendations and affirmations, which are used to inform their planning

processes. The results are also used by Education Queensland to inform whole-of-state strategic planning processes. Already schools have shown significant improvement in teaching and learning processes with the vast majority showing positive change from one year to the next. Principals are reporting high levels of satisfaction with this intensive process of collaborative self-reflection, with satisfaction ratings consistently exceeding 90 per cent. This paper describes the audit instrument, outlines the process and reflection tools, and details progress in two Queensland state schools.

## Introduction

Education Queensland has ambitious expectations for world-class curriculum teaching, learning and assessment practices and is auditing every school against these expectations. The Teaching and Learning Audit is an Australian first that provides school leaders with useful, independent perspectives on how they are performing. Most importantly, the audit process facilitates conversations throughout the system around the nature of excellent school practice. The first audits were conducted in 2010 and there is already evidence of improvement. Director-General Julie Grantham observes that the audit is 'proving to be a powerful tool in examining and understanding what quality world-class teaching and learning looks like'. Overall, many schools are making better use of school audit data to shape change, from the office to the classroom, that enhances the effectiveness of teaching and learning.

The Australian Council for Educational Research (ACER) was commissioned to develop a Teaching and Learning audit instrument in 2009, based on international research on school improvement. The audit instrument was also based on Education Queensland's *Roadmap for P-10 curriculum, teaching, assessment and*

*reporting* (DET, 2010) as well as the findings and recommendations from the report (Masters, 2009). The consistent and evidence-based audit process was developed in collaboration with a stakeholder reference group that included representatives of the Queensland Teachers' Union, the Queensland Council of Parents and Citizens' Associations and principals' associations.

To further support schools with the audit process, a Teaching and Learning Audit Reflection Tool provides examples of outstanding school improvement practices, reflective questions and suggested professional readings. The tool assists principals and school leaders in further analysing and understanding outstanding school improvement practices. In addition, the tool can be used to show how schools have committed to an improvement agenda across a diverse range of situations, including rural, special and low socio-economic schools with Indigenous enrolments.

## The audit instrument

The audit instrument outlines critical aspects of curriculum, teaching, learning and assessment, categorised as eight dimensions (see Table 1). Considered as leadership practices, the dimensions are directly related to achieving school-wide improvements in teaching and learning (Masters, 2012). Each dimension is described in the audit instrument along with examples of how the dimension may be evidenced in schools. In addition, each dimension has four stages of development to provide all schools with a frame of reference for setting challenging improvement targets and monitoring long-term progress.

The four stages of development – Low, Medium, High and Outstanding – extend from commonly observed levels of practice (Low and Medium) to rarely observed but aspirational levels (High

**Table 1.** Teaching and Learning Audit dimensions

1	An Explicit Improvement Agenda
2	Analysis and Discussion of Data
3	A Culture that Promotes Learning
4	Targeted Use of School Resources
5	An Expert Teaching Team
6	Systematic Curriculum Delivery
7	Tailored Classroom Learning
8	Evidence-based Teaching

and Outstanding). Medium represents a solid level of practice; High, an excellent level; and Outstanding, a level that is only likely to be seen in a handful of schools in most education systems internationally. Some Queensland schools are already demonstrating outstanding practice in one or more areas of their work.

### **The audit process**

The audit process involves an independent and experienced school principal visiting the school and talking with staff, students, the Parents and Citizens President, other key personnel and community groups over one to two days. This auditor gathers a range of perspectives from the school community on strategies, programs and practices. In addition, the auditor reviews teaching and learning documents such as whole-of-school curriculum planning, the school's English, Mathematics and Science programs, units of work, pieces of assessment and other relevant school data.

Evidence is collected about each dimension of the audit instrument (see Table 1) to determine a school's level of development. A report is prepared detailing key findings, including commendations (for exemplary practice), affirmations (for areas of effective practice) and recommendations (indicating areas for development). Following the presentation of the report to the Principal, development plans are initiated to improve practices. All staff, Parents and Citizens committees and parents are involved in the improvement plans and processes.

### **Feedback from principals**

Feedback from principals indicates the audit instrument is an efficient and a highly effective way to improve school practices. To Principal of Cavendish Road State High School Sharyn Donald

the instrument quickly provides the information needed to develop an explicit improvement agenda with staff. Similarly, to Principal of Rochedale State School Liam Smith, the audit 'strips the school bare of its pretensions and airs and drills down into what the school is really doing for and to students'. Further insight from Principal of Aspley State School Andrew Duncan suggests the audit provides 'clear guidance on what is required to improve student performance'.

As Ormiston State School Principal Anthony Palmer suggests the feedback can be confronting but is useful in providing information and direction for improvement. At Cavendish Road State High School, the feedback was well received by the executive leadership team who indicated that the audit team had developed a realistic overview of the position of the school. At Pacific Pines State High School, feedback from the audit was immediately shared with the school community and became the basis of the school's improvement agenda. For Ascot State School Principal Jane Sedgman, the report recommendations led to a coaching program to better examine and improve teaching pedagogy. In other cases, principals found the audit report validated and enhanced the school's current practices and performance.

An unexpected benefit of the audits is the way they develop a sense of awareness about the impact of school practices and policy. Principal Liam Smith reports the process, the quality of the questions and the 'ah ha moments' provides the stimulus for growth. Similarly, Pacific Pines State High School Principal Bob Coupland advocates that for the audits to be valuable, a climate of 'absolute trust and shared understanding that the ultimate goal is improved outcomes for students' needs to be fostered by principals so that teachers openly share reflections with auditors.

### **Trinity Bay State High School**

Trinity Bay State High School in Cairns provides a secondary education for boys and girls from Years 8 to 12. The school's student population has steadily increased over the last decade to 1420 students in 2012. Approximately 35 per cent of students identify as Indigenous and a small number of students attend the school as a result of migrant settlement programs. Approximately 38 per cent of students identify as from families where English is spoken as a second language. The school caters to students in mainstream classrooms and students with visual hearing and speech or language impairments.

With a team of committed teachers and specialist programs and learning initiatives in place, Principal Stephen Savvakis wanted to explore further improvements to teaching and learning. The outcome of the audits provided him with the information he sought:

'The audits highlighted the need to place students and their outcomes at school at the centre of our teaching and learning practices. It was clear that we had to have explicit targets for school improvement and more importantly for teachers to use data to inform their teaching. It was time to have an explicit school-wide pedagogy and agreed standards of teaching practice within the school!' (May 2012)

Stephen Savvakis also drew on the audit instrument data showing the importance of strong leadership in driving a school-wide focus on teaching and learning. He noted:

'It is essential to have clear expectations for professional practice and for school leaders to deliver this message in a consistent fashion so that it becomes part of the culture of teaching and learning in the school!' (May, 2012)

Using the audit instrument report findings, Stephen Savvakis has begun working to positively change the school's teaching and learning culture. He has observed changes in practices at the school. For example, teachers are developing a shared commitment to improving practice and routinely using data to inform their work. In addition, he has noticed that teachers are tailoring lessons according to student needs and sharing practices with their colleagues. A consistent teaching methodology is now understood and applied in every classroom.

Driving change based on research and improving outcomes for students has assisted in creating a culture of common acceptance and understanding of good teaching practice. In addition, the number of staff meetings has been reduced and the number of faculty meetings increased to support teachers to develop collaborative practices. This has enabled middle managers to have the professional conversations needed to drive change and model best practice for teachers. These school-wide mechanisms have helped teachers analyse data and provide feedback to students about their learning. In doing this, students are taking responsibility for their own learning, much the way that teachers review the effectiveness of their teaching.

### **Ascot State School**

Ascot State School has an enrolment of approximately 750 students from Prep to Year 7. The school achieved an audit rating of 'outstanding' in the three dimensions of *Targeted use of school resources*, *Systematic curriculum delivery* and *Tailored classroom learning* (see Table 1).

Teachers at the school regularly collect data on the achievements, progress, strengths and weaknesses of individual students to make professional judgements about individual needs.

With this data, teachers are able to tailor teaching and learning activities. As part of this, the student support committee meets fortnightly to oversee support services for individual students. The school also has a differentiation specialist teacher who provides coaching and resources to teachers in the area of practice. To Principal, Jane Sedgman, while the audit confirmed the school's strong performance across the audit instrument's dimensions, it provided vital feedback to further refine and improve many processes. She recalled that:

'It was clear we needed to focus on how we deliver teaching and learning. We had strong data collection procedures, but in response to the audit report we reduced the timeframe from ten to five weeks to gather evidence of student achievement in English and mathematics. We now assess tasks, moderate student results, collate data and look at student progress within that timeframe.' (May 2012)

Practices affirmed by the auditors are year level team meetings with administrators to discuss the standards of work being taught to students. These meetings provide the school leadership team with a thorough understanding of the work being taught and the standards being achieved. Consistency in the implementation of the curriculum is considered important at the school as well as the standards applied to teaching and learning of students' work. The process has enabled teachers to develop a clear understanding of student progression.

The audit outcomes have also had a positive impact on differentiation of student learning. Jane Sedgman reported that:

'We have magnified our focus on student achievement, so where we always differentiated year, unit and lesson plans, now every student

has individual reading, spelling, number and social targets. We further support the differentiation process with coaching for teachers in these targeted areas.' (May 2012)

Feedback provided by the auditor across the eight dimensions has led to whole-school improvement. Jane Sedgman believes that she now has a greater realisation of what school improvement is all about, commenting that 'you can understand it from books but it's the process of self-reflection and review that makes you clearly comprehend it'.

### **Conclusion**

The audits are supporting schools to review teaching and learning practices that drive improvement through clear expectations, focused resourcing and consistent and common language. The audits extend beyond student performance data and drive deep into practices, from the office to the classroom and into student work. The system is also benefiting from having a better understanding of how best to support school leaders in their work. The audit instrument also provides a particularly promising framework for leadership development. It potentially focuses school leaders on the very practices that improve teaching and learning.

This world-class, Queensland-led initiative has garnered great interest from other educational jurisdictions. By employing this uniquely reflective framework for improvement, Queensland state schools can move from strength to strength to improve outcomes in all school communities.

The audit instrument will continue to be used as a way to drive school improvement in 2012.

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## References

- DET. (2010). *Roadmap for P–10 curriculum, teaching, assessment and reporting*. <http://education.qld.gov.au/curriculum/roadmap/index.html>
- Masters, G. (2009). *A shared challenge: Improving literacy, numeracy and science learning in Queensland primary schools*. Australian Council for Educational Research. Available at <http://education.qld.gov.au/mastersreview/pdfs/final-report-masters.pdf>
- Masters, G. (2012). *Teaching and Learning Audit School Improvement Framework*. Available at <http://www.acer.edu.au/c2e/teaching-and-learning-audit>

# The influence of teaching strategies on student achievement in higher order skills



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Professor Patrick Griffin holds the Chair of Education (Assessment) at the University of Melbourne and is the Director of the Assessment Research Centre. He is the Associate Dean in the Melbourne Graduate School of Education. Professor Griffin has published widely on assessment and evaluation topics including competency development, language proficiency, literacy and numeracy, professional standards, and online assessment and calibration.

Professor Griffin is currently the Executive Director of the Assessment and Teaching of 21<sup>st</sup> Century Skills project, a multi-year, multi-national public-private-academy partnership project sponsored by Cisco, Intel and Microsoft.

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## **Abstract**

Over the past seven years the Assessment Research Centre at the Melbourne Graduate School of Education has worked with the Catholic Education Office in Melbourne. The work has emphasised the development of reading comprehension performances by students, which were promoted and assisted by teachers targeting instruction to the level of development or the Vygotsky zone of proximal development (1974). The hypothesis was that if the teachers targeted instruction where students were most ready to learn, improvements in performance would be pronounced. By and large this has remained the case for the Catholic schools in Melbourne. Four years ago the project was expanded to include DEECD schools in Victoria and expanded to focus on mathematics as well as reading comprehension. Similar results were obtained but gains were less pronounced. The hypothesis was still that if targeted instruction could be aimed at the level of development or the zone of proximal development, increased improvement would be achieved. It became clear that most of the improvement occurred at lower levels of proficiency. Smaller gains were made at the higher order skills level of reading comprehension or mathematics.

This was examined further using a series of workshops with teachers. The participating teachers were able to freely offer options and strategies for student development in mathematics and reading at lower order skill levels. However, they were unable to provide strategies to develop higher order skills in either mathematics or reading comprehension. This led to some intriguing issues associated with the rhetoric of 'closing the gap' and may have serious implications for both in-service and pre-service teacher education.

## **Introduction**

This project examined the way teachers used data to teach literacy and numeracy. It examined the implications of a shift from a deficit model to a developmental approach. In recent PISA results Australia's position had slipped while other countries had improved. McGaw (2008) argued that improving nations encourage high-performing students as well as low performers to improve, whereas Australia focuses on remedial action for low-performing students. Our objective is to enable teachers to use data within a developmental framework to improve performance of *all* students. The teachers work in a culture where evidence is challenged and discussed rather than one in which there is only mutual endorsement of shared teaching strategies. They become increasingly skilled in the theory and application of assessment and the developmental construct they are teaching and better able to link evidence of student learning readiness to targeted intervention.

The study had its origins in a project with the Catholic Education Office (Melbourne) (CEOM). In 2004 the CEOM began trials of a range of reading tests in 20 schools, seeking advice on how the test data could be used to improve students' reading comprehension. The pilot study was known as the LAP (Learning Assessment Project) (Murray & Rintoul, 2008; Griffin, Murray, Care, Thomas, & Perri, 2008). Professional Learning Teams of teachers (PLTs) were led by the schools' literacy coordinators. The PLT members engaged in collaborative discussions based on challenging peer evidence of learning and links between intervention and learning gains. Gains in reading comprehension were compelling (Griffin et al., 2008). Several hypotheses were formulated and this study examined and systematically tested those hypotheses in order to generalise and scale up the procedures



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across systems, year levels and subjects.

The premise was that teachers who used a specific style of evidence-based teaching, and operated within a developmental learning paradigm had an increased effect on student learning outcomes. The study examined the role of collaborative teaching teams (PLTs) in the use of data to enhance decision-making regarding teaching and learning strategies. The pilot work suggested that with a data-driven, evidence-based approach to teaching and learning, teachers could manipulate the learning environment and scaffold learning for every student, regardless of the student's development or intellectual capacity (Griffin, 2007). In the LAP project, teachers were shown how to differentiate between deficit and developmental teaching and learning approaches. The pilot study was exploratory and explanations for the improved outcomes were suggested, but have not been tested.

The relationship between teacher behaviour; knowledge and values with student learning is the key issue addressed. The criterion was measured using standardised tests of reading and mathematics. The effectiveness of the intervention was assumed to depend on teacher knowledge and understanding of how best to use assessment data to improve learning outcomes. In examining this relationship teachers were assisted in interpreting data and in linking their interpretation to targeted intervention in a differentiated instruction framework model (Perkins, 2006). There is a convergence of research that this is an effective practice in improving teaching and learning (Snow, Burns & Griffin, 1998; Taylor, Pearson, Peterson & Rodriguez, 2005).

Merely having and using tests is, on its own, an insufficient condition to inform teaching and improve learning (Halverson, Grigg, Prichett, & Thomas, 2005). Ways to access and interpret test

data in an evidence-based approach to teaching and learning was central. Using standardised assessments formatively requires that tests can provide sufficient information to profile students' learning and to identify the zone of intervention for individual students. It also requires teachers to link their interpretation of data at both group and individual levels to teaching interventions to examine and explain any improvement in student learning. This has been enhanced by a process of critical and collaborative analysis and discussion of data (Griffin et al., 2008). The common theme among previous studies has been that it is essential to have a process by which teachers can be engaged in interpreting the data, linking the information to their own teaching, and testing the links using the discourse of evidence and accountability among peers. Teachers often do not link their teaching to student achievement, but attribute outcomes to factors beyond their control, such as home background. This is despite evidence that teacher/classroom effects can account for up to 60 per cent of the variance in student achievement (Alton-Lee, 2004).

Teachers need to understand their own practice and how it affects student achievement. They need an understanding of the developmental nature of the construct areas in which they teach, and this must precede or underpin their understanding of the developmental assessment. Critical and collaborative discussions, where teachers test their ideas about these links, are an important vehicle for doing this. Team-based models are an effective form of professional development in comparison to traditional workshop models. Change in teaching practice can occur when teachers are engaged in examining their own theories of practice (Deppeler, 2007). The LAP project emphasised this approach which in this project will be implemented in more than 100 schools, over six year

levels, and in literacy and numeracy.

Teachers' collaborative reflections have been linked to improved student achievement (Phillips et al., 2004) and changed teacher perceptions (Timperley & Alton-Lee, 2008). Collaborations in professional learning teams enable teachers to have access to a greater number and divergence of theories to test their own against, particularly if the community draws on differing expertise, but it can be a slow and painful process of cultural change (Ladson-Billings & Gomez, 2001). In the LAP study, it was hypothesised that this approach instilled a peer approach to accountability within the team and enabled teachers constructively to draw on and challenge the expertise and experience of their colleagues (Griffin et al., 2010). Teams of teachers, school leaders, policymakers and researchers appeared to accelerate learning when they were involved in rigorous examinations of teaching and learning, rather than comfortably sharing ideas. The shift from sharing to challenge was important and facilitated when the discourse of challenge was based on observable evidence – what students do, say, write or make; not on the interpretation or inferences that are deduced from that evidence (Griffin, 2007). This changed the discourse from a teacher-centred mode to student-based evidence.

Deficit approaches to diagnosis of student learning focus on the things that students cannot do and are insufficient to improve learning. In particular they focus on a 'rescue' package for low achievers. Developmental models scaffold existing knowledge bases of all students. They focus on readiness to learn and follow a generic thesis of developing the student. For this approach the expertise of the teacher both in content and in developmental learning and assessment is critical (Wilson & Draney, 1999).

The normal practice in teacher

professional development programs and in pre-service training is to focus first on teaching strategy. The LAP study made it explicit that there was a prior student condition that had to be measured and generalised to a level of development. Only after these steps was it appropriate to design intervention linked to an overall level of development (Griffin et al., 2008; Murray & Rintoul, 2008). Resource allocation and decision making about instruction then follow the generalisation.

In this study it was proposed to measure learning team activity and cohesion and to relate the discussion to clarification of decisions and their links to learning outcomes. In LAP, how teacher teams developed the capacity to use data to improve student learning was also linked to the way in which teacher teams developed data-driven instructional systems to improve classroom practice and monitor student learning. Griffin et al. (2006, 2007) and Alton-Lee (2008) have shown how team leaders and teachers developed formative feedback systems. Timperley and Alton-Lee (2008) have also shown that teachers in teams need to develop as members of their teams. Cohorts of teachers learned how to challenge each other and use evidence to discuss specific issues in a professional experience-based learning approach. Follow-up and support was needed in the school. Professional development was shown to match the learning needs of students so that the new skills can transfer into the classroom.

The LAP project incorporated learning opportunities for teachers consistent with principles that underpinned the CLaSS project (Hill & Crévola, 1997) as a school improvement strategy (Hill, Crévola & Hopkins, 2000). It was also consistent with the recommendations of Fullen, Hill and Crévola (2006), who highlighted the importance of professional learning. They identified three core elements

that enhanced sustained change in schools: personalization, precision and professional learning. They argued that assessment for learning, although frequently spoken about, was not broadly or effectively practised in schools. In this study the emphasis is placed on assessment for teaching.

### Method

The LAP project provided the opportunity to integrate Fullen et al.'s (2006) emphasis on professional learning with Johnson's (2000) recommendations on the effectiveness of teams working at different levels. Level 1 teams consisted of teachers operating in the classroom, level 2 teams consisted of the team leaders, and level 3 teams consisted of the research and system level project management personnel. Within each level team members were accountable to each other rather than to an external system or top-down accountability structures. Their work suggested that the combination of internal, work-based and external input of theory and practice may have the best chance of improving teacher effectiveness if it is linked to PLT activities. The outcomes of the LAP project and other studies discussed above led to a range of research propositions:

- 1 Student achievement is a function of teacher pedagogy, values, beliefs, knowledge and peer accountability.
- 2 Teachers' classroom pedagogy and use of resources is a function of their theoretical and practical knowledge, beliefs and peer accountability.
- 3 Teachers' beliefs, values and attitudes about evidence-based and developmental learning are a function of peer accountability, their theoretical knowledge of the construct they are teaching, and the theory and practice of assessment and data interpretation.

- 4 A supportive but challenging environment of a PLT is a function of teachers' theoretical and practical knowledge and understanding of the constructs they are teaching and of data use and assessment.
- 5 Peer accountability and increased emphasis on an evidence based culture and challenge within PLTs is a function of networking PLTs across schools.

A relational function linking student achievement ( $Y_i$ ) with teacher characteristics ( $T_x$ ) summarises the literature and the propositions set out in the foregoing discussion.

$$Y_i = f\{T_a, T_b, T_u, T_k\} / X, Z \text{ and } H, \quad (1)$$

where ...

$T_b$  is the domain of teacher beliefs, values and attitudes about influences on student learning, teacher roles and class and school actions. Measures of attitudes, beliefs and values associated with developmental models, accountability and peer collaboration will be developed and used to monitor these factors and their relationship to student learning outcomes;  $T_u$  is the domain of teacher use of strategies, resources and data. Measures of pedagogical activities and evidence-based use of data in the classroom and of the accountability mechanisms within the PLT will be developed and monitored;  $T_k$  is the domain of teacher knowledge and expertise relevant to classroom management and teaching and the learning outcomes associated with the professional development sessions including understanding of theory and practice of the constructs they are teaching as well as understanding of assessment and reporting and data interpretation;  $T_a$  is the domain of teacher peer accountability. Measures of peer accountability and the use of challenge in the team will be developed. Evidence-based decision making and PLT culture will be developed to

examine the relationships between student achievements and intervention strategies. X, Z and H represent the given characteristics of the student, the school and home background respectively. Measures of each of the teacher domains will be developed in order to test the propositions. Measures of variation can be obtained through an examination of the effects of training and monitoring. This can be achieved via a survey of teacher variables such as beliefs, attitudes and the learning outcomes of PD sessions. Student achievement in the key learning outcome will be measured using standardised tests of reading comprehension and mathematics. The overall conceptual model is illustrated in Figure 1. This paper examines the link between the teaching strategy for reading comprehension and mathematics and the level of skill being developed among the students in those disciplines.

## Results

A series of tests were constructed in reading comprehension in mathematics, covering the year levels from Grade 3 through to Grade 10. The tests were all delivered online and student results were fed back to the teachers in terms of skill levels rather than scores. In order to produce the skill levels, individual test items were analysed for the cognitive skill involved. This skills audit provides the skills descriptions that enables the item response modeling variable maps to be interpreted in terms of levels of proficiency on an underpinning learning progression or construct. Levels on the construct were interpreted in terms of reaching skill competencies for the reading test and numeracy skills were interpreted for the mathematics underlying constructed. The reading progression shown in Figure 2 yielded reports which were given to teachers. The reports indicated which level on the progression each student had reached and these were interpreted as levels of Vygotskian (1970) readiness to learn. Teachers were encouraged

to intervene and devise reading or mathematics strategies as appropriate to move each student from one level to the next. This targeted or differentiated instruction approach was the core of the project.

This approach has been shown to be successful and to increase in effectiveness the longer the school remains in the project and the longer the strategies were involved. It indicates that this is a slow but effective approach to improving student achievement over a long period of time. It is not an instant success strategy because it involves a change in teaching practices and a change in the school culture associated with the use of data. These take time. Teachers needed to learn how to reorganise their class to enable ability grouping for instructional purposes and how to use data to make instructional decisions. Hattie's (2009) data indicates that an average annual growth could be expected for an effect size of 0.4. Table 1 below illustrates that these results are not only achieved but are double

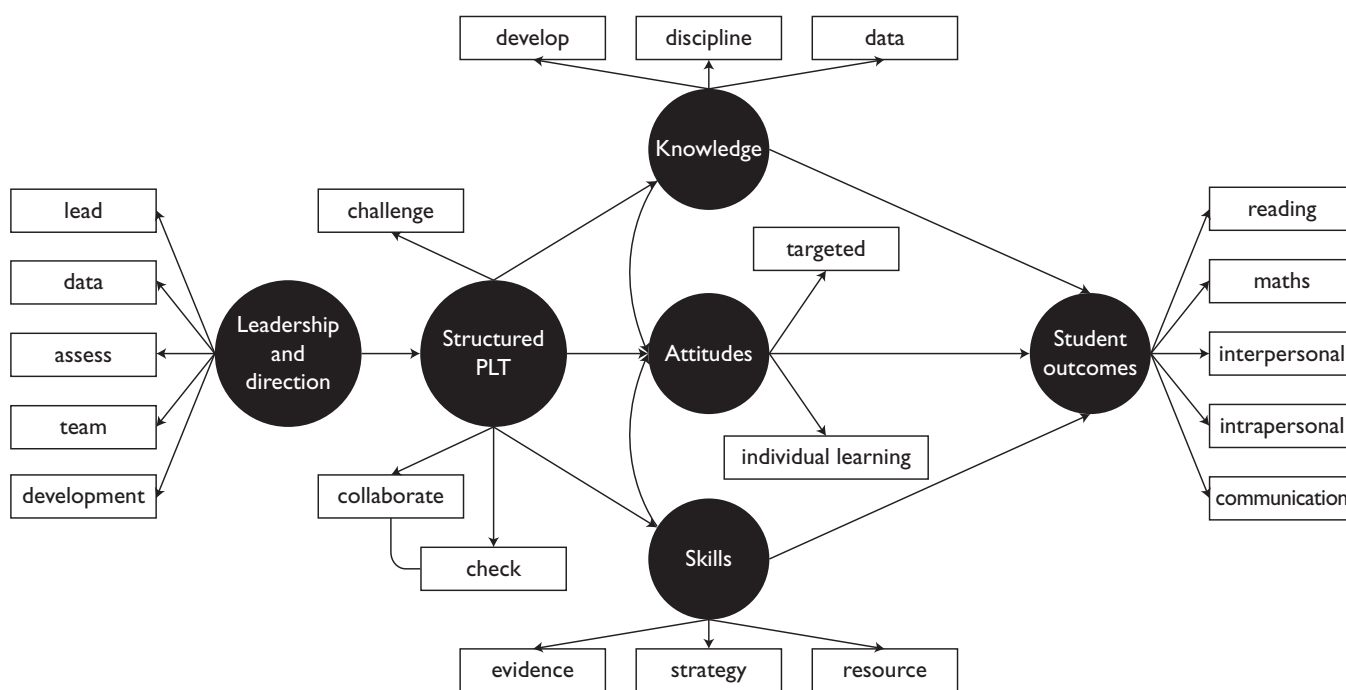


Figure 1. Conceptual framework for explaining variance in student learning outcomes

or even triple those reported by Hattie (2009) and increase with time involved in the project..

It is not a uniform growth. Major gains were achieved at the lower levels of proficiency. A bar chart indicates

(Figure 3) shows the growth taking place across all levels with diminishing numbers of students remaining at the lower levels of proficiency and increasing numbers at higher levels of reading proficiency. But this may be deceptive. A cumulative frequency chart

indicates that growth is predominant at the lower levels, but diminishes at higher levels of reading comprehension. An even more pronounced effect is noticed in numeracy development. This is illustrated in Figure 4. This effect is replicated over grade levels

Level	Reading skill description
A	Insufficient data to assign a level
B	Matches words and pictures involving concrete concepts and everyday objects; follows short simple written instructions; locates familiar words in a short one-line text; matches words to pictures and follows short familiar instructions
C	Matches words and pictures involving prepositions and abstract concepts; uses cuing systems (by sounding out, using simple sentence structure and familiar words) to interpret phrases by reading on; reads familiar words and identifies some new words; uses simple and familiar prepositions and verbs to interpret new words; matches and recognises words and simple phrases
D	Interprets meaning (by matching words and phrases, completing a sentence, or matching adjacent words) in a short and simple text by reading on or reading back; uses context and simple sentence structure to match words and short phrases; uses phrases within sentences as units of meaning; locates adjacent words and information in a sentence
E	Reads on or reads back in order to link and interpret information located in various parts of the text; interprets sentence and paragraph level texts; matches phrases across sentences; reads forwards and backwards in order to locate information in longer texts
F	Reads on and reads back in order to combine and interpret information from various parts of the text in association with external information (based on recalled factual knowledge) that 'completes' and contextualises meaning; locates, interprets, and reads forward to join multiple pieces of adjacent information; uses multiple pieces of information to interpret general purpose of a document; paraphrases and interprets non-adjacent pieces of information
G	Reads on and reads back through longer texts (narrative, document or expository) in order to combine information from various parts of the text so as to infer the writer's purpose; interprets, and draws inferences from different types of texts by reading backwards and forwards to confirm links between widely separated information pieces; extracts information from a non-traditional (left to right) document; makes judgements about an author's intentions or purpose beyond the text content
H	Locates information in longer texts (narrative, document or expository) by reading on and reading back in order to combine information from various parts of the text so as to infer the writer's personal beliefs (value systems, prejudices, and/or biases); combines several pieces of information from a range of locations in complex and lexically dense text or documents; analyses detailed text or extended documents for an underlying message; identifies meaning from different styles of writing
I	Locates information in longer and dense texts (narrative, document or expository) by reading on and reading back in order to combine information from various parts of the text so as to infer and evaluate what the writer has assumed about both the topic and the characteristics of the reader; can develop and defend alternative points of view to those of the author
J	Combines and evaluates the relevance of multiple pieces of information from a range of locations in complex and lexically dense text or documents in order to determine how the message is constructed; analyses and compares parts of the various texts for cohesion and contribution to an underlying message; explains the deeper significance of sub messages in the text, and differentiate between analogy, allegory; identifies innuendo and undertone in the text

Figure 2. Developmental progression for Reading comprehension

What does research tell us about effective strategies?

**Table 1:** Effect sizes for growth over time by grade level

	Grade 3	Grade 4	Grade 5	Grade 6
Year 1	0.68	0.51		
Year 2	0.84	0.83		
Year 3	1.01	1.04	1.1	1.06

in that growth is greatest in Grade 3 but diminishes as the proficiency level increases.

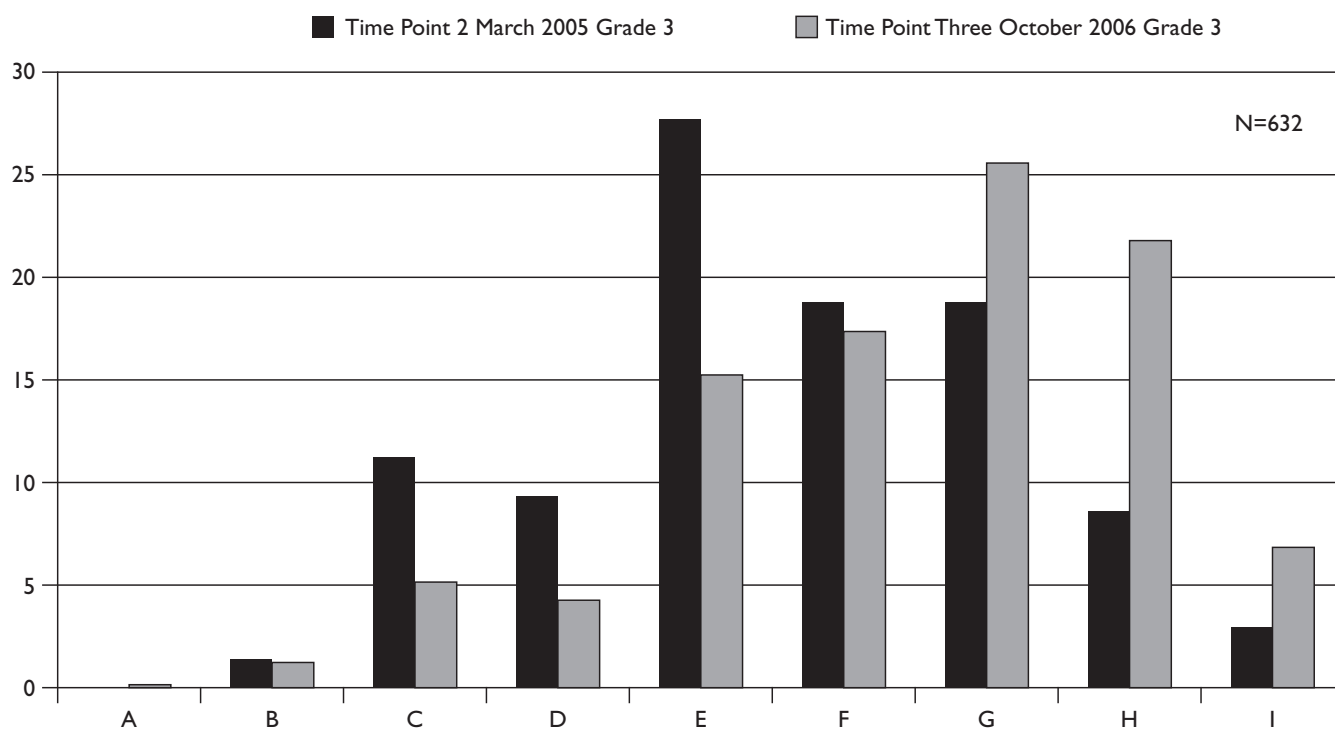
The lack of growth in higher order skills is not as pronounced in schools where the differentiated opportunities to learn are implemented. Growth does occur at the higher levels and can be seen to emerge over a three-year period. This is shown in Figure 4.

In an effort to understand how this occurred, workshops were organised with leading teachers from schools where greatest growth had been identified. An interesting and disturbing outcome was identified. Teachers were proficient in

recommending strategies for developing lower order skills among their students. However, they were unable to identify strategies at the top levels of the reading or mathematics continua. The results of these workshops are presented in Table 2a and 2b. The level of proficiency is shown in the left column of the table – levels are A through L, with L being the most sophisticated or the highest order of skill. Level A was used to indicate that insufficient data was obtained in order to make a decision largely because students have not completed enough work to illustrate their competence in mathematics. Across the top of the

table the labels indicate the number of suggestions made in the workshop (113 approaches to differentiated instruction), which the teachers then examined for suitable strategies. They classified the strategy according to its potential use: they could use the suggested teaching strategy without modification; they could use it if it was modified; and they could use it but it would have to be applied to a different level to that suggested. The results are presented in Table 2a and 2b for numeracy and literacy respectively. Of the 147 strategies that could be identified for mathematics across all levels 73 per cent were associated with number skills, only 1 per cent was associated with space geometry. Only 3 per cent were associated with the higher order skill levels of the learning progression.

A similar pattern emerged for strategies associated with teaching reading comprehension. More than 400 strategies were identified, of which the teachers decided that they could



**Figure 3.** Distribution of Reading levels over test retest measures for Grade 3

use 72 without modification, 79 if they were modified and a further seven if they could be applied to a different proficiency level to that recommended.

The trend in both tables indicates that there are numerous strategies for teachers to help develop lower order skills. However, the workshop was bereft of suggestions for strategies for the development of higher order skills at the top of the developmental progression.

The teachers in the workshop came from schools where improvement in the test scores was most marked over a six-month period with test and retest measures. These were teachers whose students demonstrated the largest improvement and therefore it was assumed that these teachers

had available the widest of potentially successful strategies. This was not an artifact of selecting schools with high ability students. The teachers were from schools where the improvement covered all levels of this proficiency scale. However, even with a selection of schools and teachers based on student results, larger improvement was focused at the bottom end of the scale or the development of low order skills and not at levels of higher order skills. The possible explanations for a lack of strategies at higher order skill levels included the following:

I The format or language of the proficiency levels inhibited teachers' interpretation. This in turn diminished their capacity to offer suggestions of intervention strategies and resources.

- 2 Strategies for higher order skills development are not documented in that they are identified and implemented intuitively.
- 3 Intervention strategies are reliant on commercially prepared resources. This means that teachers implement the strategies without necessarily understanding how they link to a developmental framework.
- 4 Teachers lack confidence in being able to articulate their own strategies despite the evidence that their students improve.
- 5 Teachers have no systematic record on which to draw on in terms of articulating teaching and intervention strategies for students developing at levels of higher order capabilities.

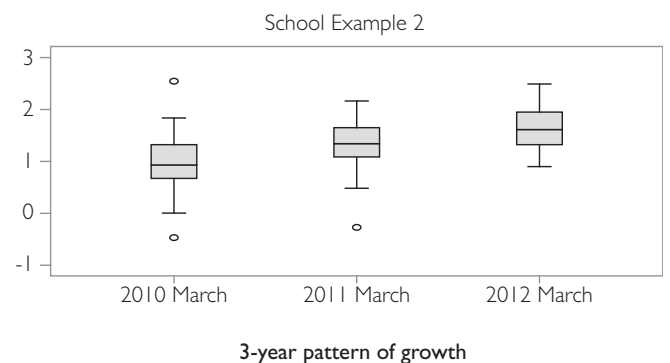
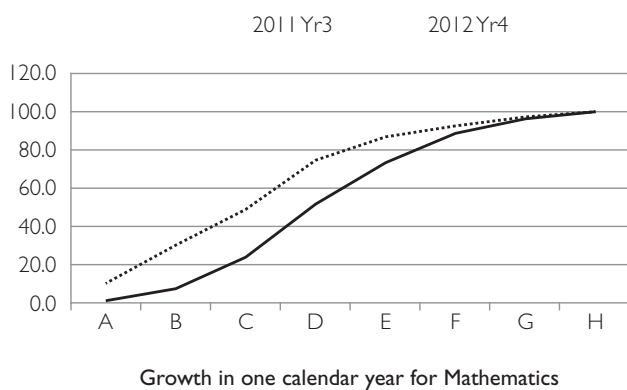
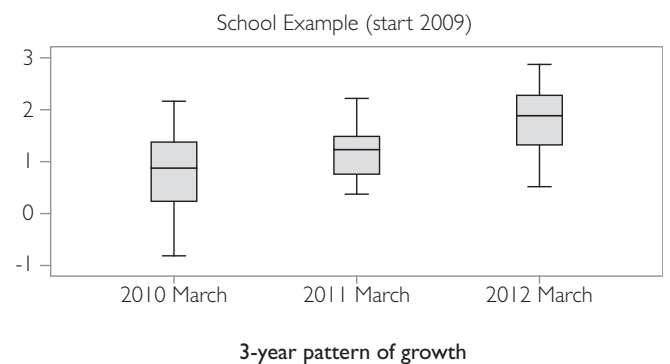
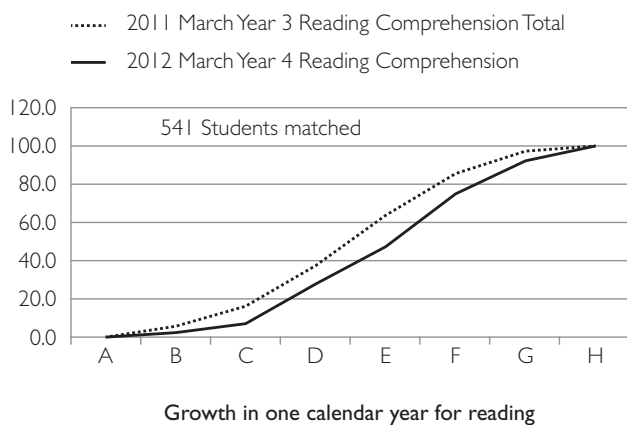


Figure 4. Growth patterns for Grades 3 to 4 in one year and three years

What does research tell us about effective strategies?



- 6 Teachers do not know how to intervene with students at a higher order level.

The last explanation may be unpalatable. But the replication of the plateauing effect with students at higher order levels may be due to the final rationale offered. It may be that the emphasis on 'closing the gap' means that teachers are encouraged to emphasise intervention at the bottom end of the proficiency scale. The logic says that students at the top end of the scale are higher ability students. As such they should be able to improve at a faster rate than those at the lower levels. This study is showing the opposite. Students at the bottom levels of the proficiency scale are improving rapidly. Students at the top end of the scale are hardly improving at all. The link to teacher strategies and teacher resources is a disturbing link.

Because of the way in which the developmental progressions are formulated it is possible to argue that each level in the progression should provide an opportunity for developing skills amongst the students already placed at that level. Because the scales are developed using item response modeling with the response probability of 0.5, students at each level of the scale have approximately 50 per cent chance of being able to demonstrate skills at that level. Lower ability students are identified as being at the lower order skill levels associated with their Vygotskian zone proximal development. This applies to students based at a higher order skill levels as much as it applies to students based at the lower order skill levels. The ability of the students is matched to the difficulty of the skills embedded in the levels on the developmental progressions. Hence it can be expected that the higher ability students have the same chance of success at the higher order skills as do the lower ability students have of success in the lower order skill levels.

**Table 2a:** Frequency of suggested Math strategies by level

Level	Suggestions	Decision re strategy			total
		use	modify	re level	
L	0	0	0	0	0
K	1	0	1	0	1
J	2	0	4	0	4
I	2	0	5	0	5
H	7	2	6	0	6
G	11	13	10	1	10
F	9	24	6	0	30
E	9	25	4	0	29
D	23	4	15	0	19
C	7	2	5	0	7
B	37	4	6	0	10
A	2	5	3	2	10
misc	3	0	0	0	0
total	113	79	65	3	147

**Table 2b:** Frequency of suggested Reading strategies by level

Level	Suggestions	Decision re strategy			Total
		Use	Modify	Re-level	
L	0	0	0	0	0
K	0	0	0	0	0
J	0	0	0	0	0
I	35	16	3	0	19
H	37	12	7	3	22
G	75	19	29	4	52
F	83	0	0	0	0
E	27	0	0	0	0
D	48	8	10	0	18
C	57	12	11	0	23
B	76	5	17	0	76
A	2	0	2	0	2
Misc	0	0	0	0	0
Total	440	72	79	7	158

Teachers were less able to offer intervention strategies at the top end of the proficiency scale, but they were able to offer numerous intervention strategies at the bottom end of the scale. Emphasising improvement at the bottom end of the skill level continuum perhaps indicates that the rhetoric of 'closing the gap' may be denying students at the top end of the scale an opportunity for accelerated progress. It also suggests that at a national or state level overall improvement is constrained by the emphasis on intervention at the bottom end while allowing the top end students to develop unaided. This perhaps means that if this is a systemic problem replicated in the PISA and NAPLAN data there may be a national and systemic problem of a lack of teaching strategies or resources to encourage higher ability students to improve or progress at a rate commensurate with their ability. Perhaps there is a need for a shift in rhetoric.

## References

- Alton-Lee, A. (2004). *A Collaborative Knowledge Building Strategy to Improve Educational Policy and Practice: Work in progress in the Ministry of Education's Best Evidence Synthesis Programme*. Paper presented for the Symposium at the New Zealand Association for Research in Education National Conference - Turning the Kaleidoscope.
- Deppeler, J. (2007). Collaborative inquiry for professional learning. In A. Berry, A. Clemens, & A. Kostogriz, (Eds.), *Dimensions of Professional Learning*. Rotterdam: Sense Publishers.
- Griffin, P. (2007). The comfort of competence and the uncertainty of assessment. *Studies in Educational Evaluation*, 33, 87–99.
- Griffin, P., Murray, L., Care, E., Thomas, A., & Perri P. (2010). Developmental assessment: Lifting literacy through Professional Learning Teams. *Assessment in Education: Principles, Policy & Practice*, 17(4), 383-397.
- Halverson, R., Grigg, J., Prichett, R., & Thomas, C. (2005). *The New Instructional Leadership: Creating Data-Driven Instructional Systems in Schools (WCER Working Paper No. 2005-9)*. Madison: University of Wisconsin Center for Education.
- Hattie, J.C. (2009). *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement*. London & New York: Routledge, Taylor & Francis
- Hill, P.W., & Crévola, C. (1997). The literacy challenge in Australian primary schools. *IARTV Seminar Series, No. 69*, November; 1997.
- Hill, P., Crévola, C., & Hopkins, D. (2000). Teaching and Learning as the Heartland of School Improvement. *IARTV Seminar Series*. December. No. 100. Melbourne.
- Johnson, R. (2000). Research: Teachers as Investigators. In D.P. Chambers (Ed.), *CLICK: Computers and Learning in Classrooms K-6*. Department of Science and Mathematics Education, University of Melbourne.
- Ladson-Billings, G., & Gomez, M.L. (2001). Just showing up: Supporting early literacy through teachers' professional communities. *Phi Delta Kappan*, 82(9), 675–680.
- Fullen, M., Hill, M., & Crévola, C. (2006). *Breakthrough*. Sydney: Corwin Press.
- McGaw, B. (2008). *The research culture and strategy for improvement*. Presentation at the University of Melbourne Planning Seminar, Mt Elisa, Melbourne Business School, October, 2008.
- Murray, L., & Rintoul, K. (2008). *The Literacy Assessment Project. An initiative of the Catholic Education Office for continuous school improvement in literacy*. Paper presented at the Australian Council for Educational Leaders, Melbourne, September, 2008.
- Perkins, D. (2006). *Teaching for understanding*. Retrieved 18 October 2011, from <http://www.pz.harvard.edu/Pls/DP.htm>
- Snow, C. E., Burns, M. S., & Griffin, P. (1998). *Preventing reading difficulties in young children*. Washington: National Academy Press.
- Taylor, B. M., Pearson, P. D., Peterson, D., & Rodriguez, M. C. (2005). The CIERA School Change Framework: An evidence-based approach to professional development and school reading improvement. *Reading Research Quarterly*, 40(1), 40–69.
- Timperley, H., & Alton-Lee, A. (2008). Reframing teacher professional learning: An alternative policy approach to strengthening valued outcomes for diverse learners. *Review of Research in Education*, (32), 328–369.
- Vygotsky, L. S. (1974). *Thought and language*. Boston: MIT Press.
- Wilson, M., & Draney, W. (1999). *Developing maps for student progress in the BEAR Assessment System*. Berkeley: University of California Press.

# SimScientists: An example of how technology can support differentiated instruction in the classroom



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Dr. Michael Timms directs the Division of Assessment and Psychometric Research at ACER, which develops high quality assessments and conducts cutting edge research in educational measurement. He is highly experienced in running educational research and development projects and is a recognised leader in the development of innovative ways to assess students in electronic-learning environments. Dr. Timms's research is widely published in peer-reviewed journals and has been presented at many conferences.

Prior to joining ACER, Dr Timms was Associate Director of the Science, Technology, Engineering and Mathematics (STEM) Program at WestEd, a preeminent educational research and development organisation in the United States of America. He led large-scale research studies in STEM education, with special focus on computer-based assessment projects, especially through the SimScientists research program ([www.simsScientists.org](http://www.simsScientists.org)). He has been involved in the development of two assessment frameworks for the US National Assessment of Educational Progress, for which he was awarded the Paul Hood award for excellence in educational research at WestEd. Dr Timms has experience in leading evaluation research projects for other educational research grant recipients, such as universities, and has managed large-scale item development projects across many content areas. He is knowledgeable about the education systems of Australia, the United States and the United Kingdom.

## Abstract

This paper reports on a study of how simulation-based science assessments can become transformative components of multi-level, balanced science assessment systems. Parts of the study involved the design of the assessments so that they provided differentiated instruction directly to individual students and, through reporting and recommendations, informed teachers' differentiation of their instruction to support groups of students who were struggling with particular aspects of the learning. The project studied the psychometric quality, feasibility and utility of simulation-based science assessments designed to serve formative purposes during a unit and to provide summative evidence of end-of-unit proficiencies. The frameworks of evidence-centered assessment design shaped the specifications for the assessments. The *SimScientists* program at WestEd, a US educational research and development organisation, developed simulation-based, curriculum-embedded, and unit benchmark assessments for two middle school topics, Ecosystems and Force & Motion. These were field-tested in three US states. Students performed better on the interactive, simulation-based assessments than on the static, conventional items in the post test. Importantly, gaps between performance of the general population and English language learners and students with disabilities were considerably smaller on the simulation-based assessments than on the post tests.

## Introduction

When you look into any classroom you will find diversity among the learners. For example, students may differ in their cultural background, in their command of the language in which

instruction is being delivered, or in their readiness for learning the next topic. They may have different learning styles and some may have diagnosed learning disabilities. These are just a few of the ways in which learners may differ from one another. Differentiation of instruction is an approach in which the teacher actively seeks to meet the needs of the diverse range of learners in his or her classroom and it has long been recognised that, when done successfully, learning improves for all students, not just a proportion of them.

Allan and Tomlinson (2000) identify three key elements of differentiated instruction: readiness, interest and learning profile. This paper focuses on the first of those three elements, the readiness of students for the instruction that is about to take place. For differentiation of instruction based on student readiness, there needs to be a system of assessment of the students' current knowledge and skills in the domain so that instructional judgements can be made about gaps in learning and what to do about them. However, we know from recent studies that it is challenging for teachers to design, create and run effective formative assessment in the classroom and produce robust results on student learning (Herman, Osmundson, Ayala, Schneider, & Timms., 2006; Furtak et al., 2008). To implement formative assessment in effective ways takes time, especially in the scoring of student work, and teachers have scant amounts of time to do so and definitely cannot do it 'on-the-fly' as instruction unfolds in real time. A solution to the problem is to use computer technology in such a way that assessment tasks are truly formative in that they monitor student learning against established instructional goals and produce informative reports to both the learner and to

the teacher. This paper describes how the *SimScientists* program at WestEd created an innovative assessment system that helps to differentiate instruction through the use of simulations in assessment of science understanding and inquiry skills.

## Background

The *SimScientists* program developed two suites of simulation-based assessments (Ecosystems and Force & Motion) for use in middle school classrooms as part of the *Calipers II* project funded by the National Science Foundation. For each topic, simulation-based, curriculum-embedded assessments provided opportunities for classroom-level formative assessment, off-line reflection activities that reinforced and extended the targeted concepts and inquiry skills, and simulation-based unit benchmark assessments that provided summative proficiency data. To increase accessibility for students who needed accommodations, audio and screen magnification accommodations along

with support for completing the assessment over multiple class periods were provided. The assessment suites were field tested with over 5000 middle school science students in three US states (Nevada, North Carolina and Utah).

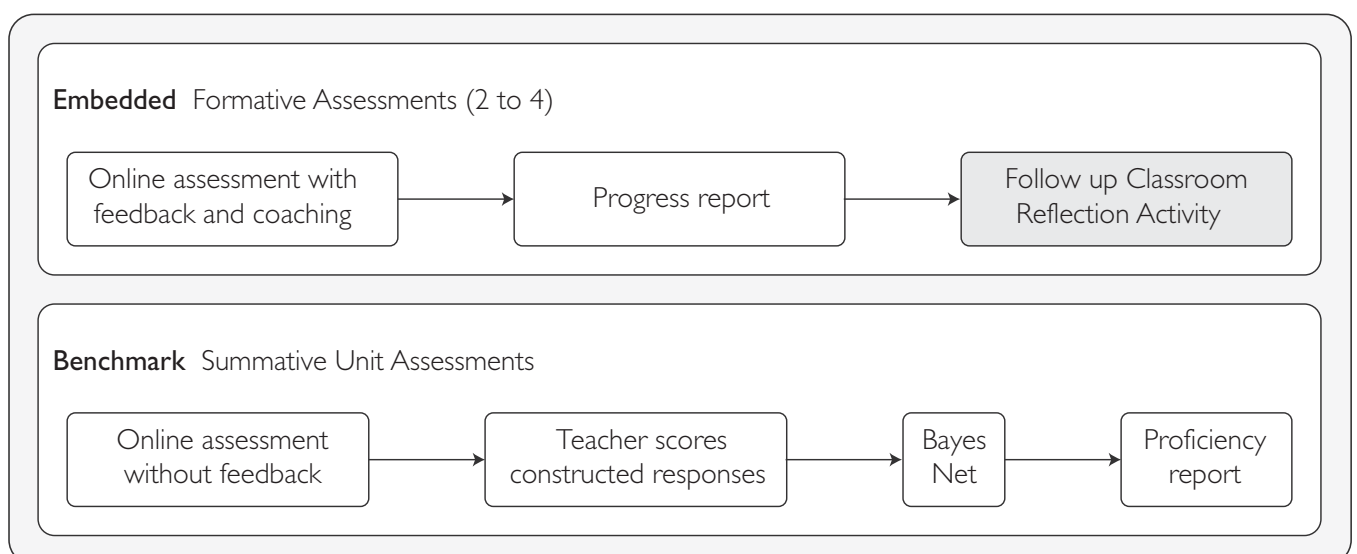
## Design principles of the *SimScientists* modules

The *SimScientists* assessments for Ecosystems and Force & Motion were designed to be (1) embedded within curriculum units that could serve formative assessment purposes by providing immediate feedback, monitoring progress, and informing needed adjustments for differentiated instruction, and (2) administered at the end of a unit as summative measures of proficiency on the targeted science content and inquiry practices. In order to take a principled approach to formative assessment and the differentiation of instruction, the *SimScientists* assessments are based on an integrated framework that takes

account of a range of assessment and science learning principles as detailed below.

- Evidence-Centred assessment Design. For differentiated instruction to take place there must be reliable and valid assessment of students' readiness that aligns with follow-up instruction and Evidence-Centred assessment Design (ECD) provides a robust framework for design of such assessments. ECD facilitates assessment coherence by linking the targets to be assessed with evidence of proficiency on them, and with tasks and items eliciting that evidence (Messick, 1994; Mislevy & Haertel, 2007). The process begins by specifying a student model of the knowledge and skills to be assessed. The ECD design process aligns the student model with an evidence model that specifies which student responses are evidence of targeted knowledge and skills, how student performances are to be analysed, and how they will be reported. The student and evidence model

## Embedded in Classroom Instruction



**Figure 1:** Diagram of the sequence of activities in the embedded formative assessments and the benchmark summative assessments in the *SimScientists* assessment suites.

are then aligned with a task model that specifies features of the tasks and questions intended to elicit student performances that provide evidence of the targeted knowledge and skills. Finally, the scoring and reporting methods are aligned to the assessment tasks and items.

- Formative assessment. Formative assessments play a critical role in differentiating instruction. Formative assessments combine gathering evidence of learning progress with scaffolding that functions as additional differentiated, individualised instruction. Effective formative assessment provides 'short term feedback so that obstacles can be identified and tackled' (Black, 1998, p. 25) and is an important strategy for improving student learning, particularly for low-ability students. Contingent feedback and follow-up instruction that include explanations and worked examples have been shown to promote student achievement (Bangert-Downs, Kulik, Kulik, & Morgan, 1991; Dassa, Vazquez-

Abad, & Ajar, 1993; Pashler et al., 2007). Effective feedback includes strategies such as eliciting multiple responses to the same question, asking for evidence to support predictions and explanations, asking for comparisons of ideas and predictions with those of other students, providing evidence of a principle or concept previously discussed or presented, and making connections to other ideas and concepts from prior investigations (Herman et al., 2006). 'On-the-fly' assessment by the teacher, assessment conversations, and curriculum-embedded assessments are all acknowledged as effective, research-based strategies for guiding science instruction (Duschl et al., 2007). The SimScientists curriculum-embedded assessments were designed to provide these features of effective formative assessment – ongoing collection of evidence of learning progress, immediate feedback to students, and customised scaffolding/coaching. These features provided

a degree of differentiation in instruction as students who needed more assistance received deeper scaffolding. In addition, as detailed later in this paper, information gleaned from the scaffolding process was summarised and reported to teachers for use in further differentiation of follow-up instruction.

### Description of the SimScientists assessments

The *SimScientists* assessment suites are composed of two or three embedded formative assessments that the teacher inserts into a unit at key points and a summative benchmark assessment at the end of the unit. Figure 1 shows sequence of activities in the embedded formative assessments (in the upper part of the diagram) and the benchmark summative assessment (in the lower part of the diagram). The processes are described in detail further on in this paper.

The *SimScientists* assessments represent a shift from testing discrete factual



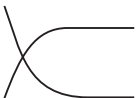
Model Level	Model Level Descriptions	Content Targets by Model Level	Science Practices by Model Level
<b>Component</b> 	What are the components of the system and their rules of behavior?	Every ecosystem has a similar pattern of organization with respect to the roles producers, consumers, and decomposers that organisms play in the movement of energy and matter through the system.	Identify and use scientific principles to distinguish among components
<b>Interaction</b> 	How do the the individual components interact?	Matter and energy flow through the ecosystem as individual organisms participate in feeding relationships within an ecosystem.	Predict, observe, and describe interactions among components.
<b>Emergent</b> 	What is the overall behavior or property of the system that results from many interactions following scientific rules?	Interactions among organisms and among organisms and the ecosystem's nonliving features cause the populations of the different organisms to change over time.	Predict, observe, and investigate changes to a system. Explain changes to a system using knowledge about the interactions among its components.

Figure 2: Student model for ecosystems, including model levels, content targets and inquiry practices.



content to a focus on connected knowledge structures that organise concepts and principles into crosscutting features of all systems – components, interactions and emergent behaviours – and the inquiry practices used to investigate them. For example, the student model for the Ecosystems assessment suite (Figure 2) is based upon a three-level model of a science system, which is applied to content standards for middle school ecosystems and associated inquiry practices. The student model that is applied in the assessment is shown in Figure 2. The first two columns describe the generic system model levels – components, interactions and emergent behaviour. The third column describes the model levels and more specific content targets for ecosystems. The last column includes the science inquiry targets for each level.

Each of the assessment suites contained embedded (formative) assessments (two in Ecosystems and three in Force & Motion) that were inserted into instruction when the teacher deemed the prerequisites complete. During the embedded assessments, students completed tasks such as making observations, running trials in an experiment, interpreting data, making predictions and explaining results. They used various methods such as selecting from a choice of responses, changing the values of variables in the simulation, drawing arrows to represent

interactions in a system and typing explanations to complete these tasks. For all but the typed responses, the assessments gave students feedback and graduated levels of coaching so that they had multiple opportunities to correct their errors and confront their misconceptions, with increasing scaffolding based on the amount of help needed. For typed responses, students were given opportunities first to revise their response based on criteria (a student-friendly version of a rubric) and then to self-assess their revised response by comparing it to a sample answer.

Figure 3 presents screenshots of two *SimScientists* embedded assessments that provided immediate feedback and coaching as students interacted with the simulations. In the left screenshot, students are asked to draw a food web showing the transfer of matter and energy between organisms based on prior observations made of feeding behaviours in the novel ecosystem. When a student draws an incorrect arrow, a feedback box coaches students to observe again by reviewing the animation and to draw the arrow from the food source to the consumer. Feedback also addresses common misconceptions. Because the assessments capture the values and variables students select during investigations, *SimScientists* assessments are able to provide coaching for inquiry

practices, too. The right screen shot shows feedback and coaching for an investigation of population changes.

The feedback that a student receives is differentiated based on their needs. When a student makes a response and clicks on the 'Next' button in the bottom right of the screen, the system evaluates their work on that screen through applying a logic structure that determines the correctness and, if incorrect, the nature of the misconception that the student has. Figure 4 shows an example of the logic structure applied when a student has submitted their foodweb.

Depending on the misconception a student has, she will get a sequence of hints targeted to remedy that misconception. The first level of hint tells the student that she has made a mistake and to try again. The second level of hint points out to the student the concept or rule that she should have applied. The third and final level of hint provides sufficient feedback to allow the student to make a correct response, although it is up to the student to make the final correction herself.

In order to provide a further phase of differentiated instruction, data on the students' need for assistance during the embedded assessments are gathered in a database in the learning management system. Each hint provided is coded to a learning goal and so, by counting

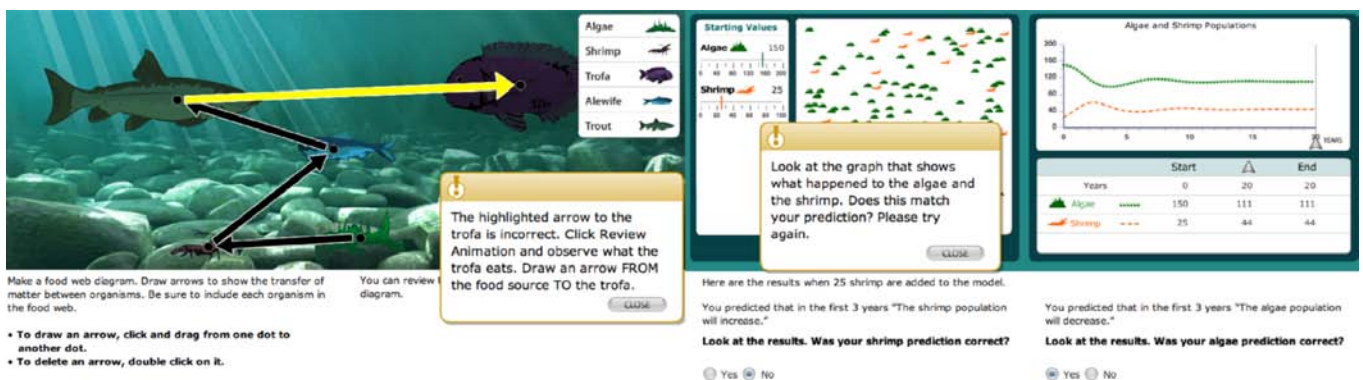


Figure 3: Two screenshots that show how *SimScientists* embedded assessments provide feedback and coaching to students.

What does research tell us about effective strategies?



the number of hints delivered on each learning goal, the system measures which learning goals a student was struggling with. This enables a report to be provided to students and teachers at the end of each assessment (Figures 5 and 6). These progress reports provided the kind of descriptive feedback that helps students connect their success in the assessment to their effort (Covington, 1999; Maehr & Midgley, 1996). Based upon the amount of coaching students needed to complete the assessment, the LMS generated a progress report that indicated whether a student is 'On Track, Making Progress, or Needs Help' for each content and inquiry target.

As a support for further differentiation of instruction by the teacher, the progress reports signal the teacher to adjust instruction during subsequent reflection activities. The curriculum-embedded formative assessments also captured and analysed the type and amount of help (feedback and coaching) that students needed to complete

assessment tasks. From these data, the LMS parsed students into three groups: (A) those who needed no feedback or only minimal feedback that indicated an error without providing any coaching; (B) those who typically needed coaching that describes the scientific principles to be applied; and (C) those who often needed worked examples before they could respond correctly. An example of the progress report that indicates what reflection activity group the student should be in is shown in Figure 6. These categories were intended to assist teachers in making subsequent decisions about differentiating additional instruction. The teacher decided whether to follow the recommendations of the system in forming the groups for the follow-up reflection activity that took place in the next instructional period.

As research shows that teachers may not be skilled at providing differentiated instruction, in this project, we created 'reflection activities' that were designed to provide different, but complementary

activities for students classified into groups A, B and C. For example, in the Ecosystem suites, reflection activities stress the big idea that all ecosystems share the same organisational structure and that similar behaviours (e.g. population changes) emerge from this structure. Groups engaged in scientific discourse in order to transfer their science content knowledge and inquiry skills to three new ecosystems (Savanna, Galapagos, Tundra) and prepare presentations that were evaluated by both students and teachers. Figure 7 shows an example of the Galapagos ecosystem classroom materials used.

In the reflection activities a 'jigsaw' instructional model had students organised in small groups that focused on particular aspects of the ecosystems that the class was analysing. The focus of the group depended on the reason for being assigned to that group. For example, a student assigned to group B because he was having difficulty understanding the relationships among producers, consumers and

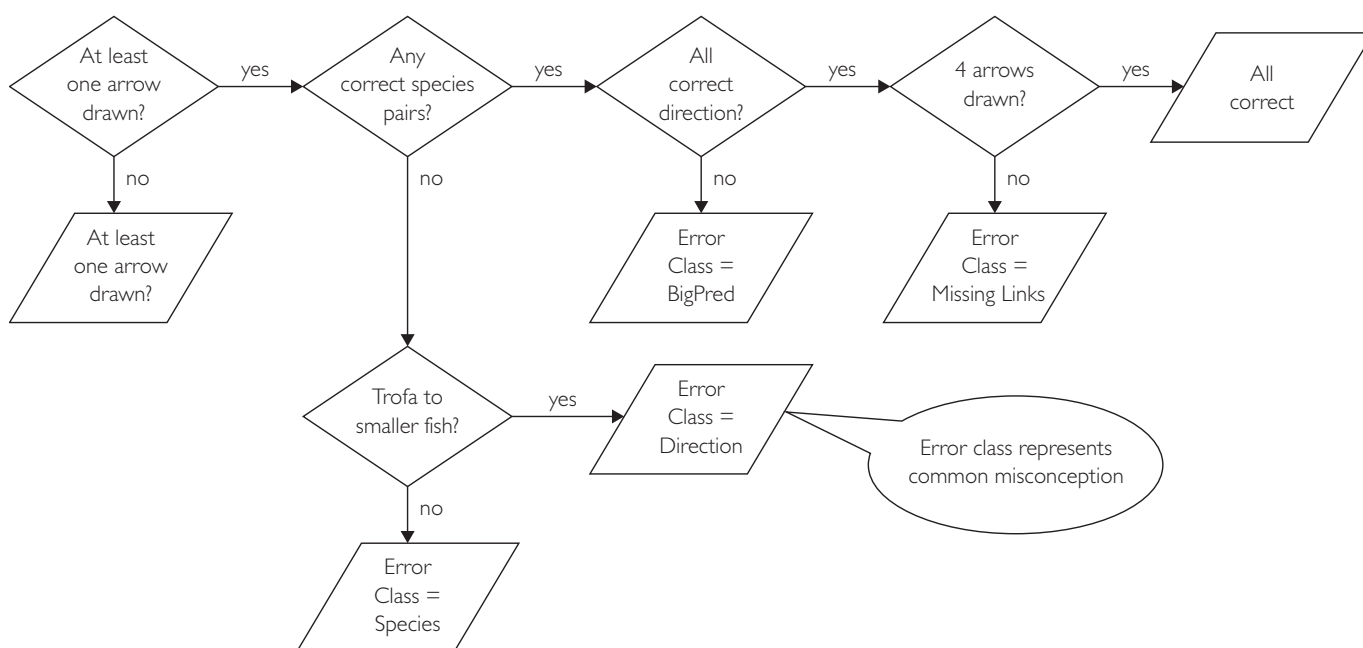


Figure 4: Example of a rule-based method – a decision tree for diagnosing student misconceptions in the SimScientists Ecosystems embedded assessment.

decomposers in the ecosystem would be engaged in activities that involved examining those relationships across the ecosystem. When the small groups had finished their tasks, the classes would work together as a whole to present their findings and together build a complete foodweb diagram for the whole ecosystem as no single group held all the information necessary to do that.

At the end of the curriculum unit, students completed the benchmark assessment, which consisted of tasks and items parallel to those in the embedded assessments, but transferred into a new context. For example, the embedded assessments for the ecosystems suite were set in a lake ecosystem (see Figure 3); the benchmark assessment used the same activities, but the setting was a grasslands ecosystem with different organisms and different, although parallel, interactions. In this way, students could not simply memorise the material from the embedded

assessments, and had to show that they could transfer their knowledge and inquiry practices. No coaching was provided in the summative benchmark. Upon completion of the benchmark assessment, the teacher used the LMS to score students' written responses using a rubric specified by the assessment designers. These scores, along with the scores from machine-scored tasks, were evaluated by the LMS using a Bayes Net to produce summative proficiency reports to both students and the teacher on the relevant state science standards and specific content and inquiry targets addressed. The benchmark assessment report classifies an individual's proficiency level (Below Basic [BB], Basic [B], Proficient [P], Advanced [A]) for the content categories (roles, interactions, populations) and on the inquiry targets, (e.g. design, conduct, evaluate). As illustrated in Figure 8, the system provides the teacher with a class-level report on the content and inquiry proficiencies (upper half of Figure 8) and the teacher can also view

a report that lists individual student performances (lower part of Figure 8). The generation of these reports is described in the methods section.

## Methods

A large-scale field test of the Ecosystems and Force & Motion assessments was conducted to establish the psychometric quality of the *SimScientists* assessments, the feasibility of implementing them in the classroom, differential student performance (in particular, for ELL and SWD students), their utility for teachers, and to propose models for integrating simulation-based assessments into state assessment systems. The field test sought to answer four research questions, two of which are relevant to differentiated instruction:

- 1 Do teachers find the assessments useful in monitoring and adjusting instruction for their students?
- 2 Do the assessments work well for English language learners and students with disabilities?

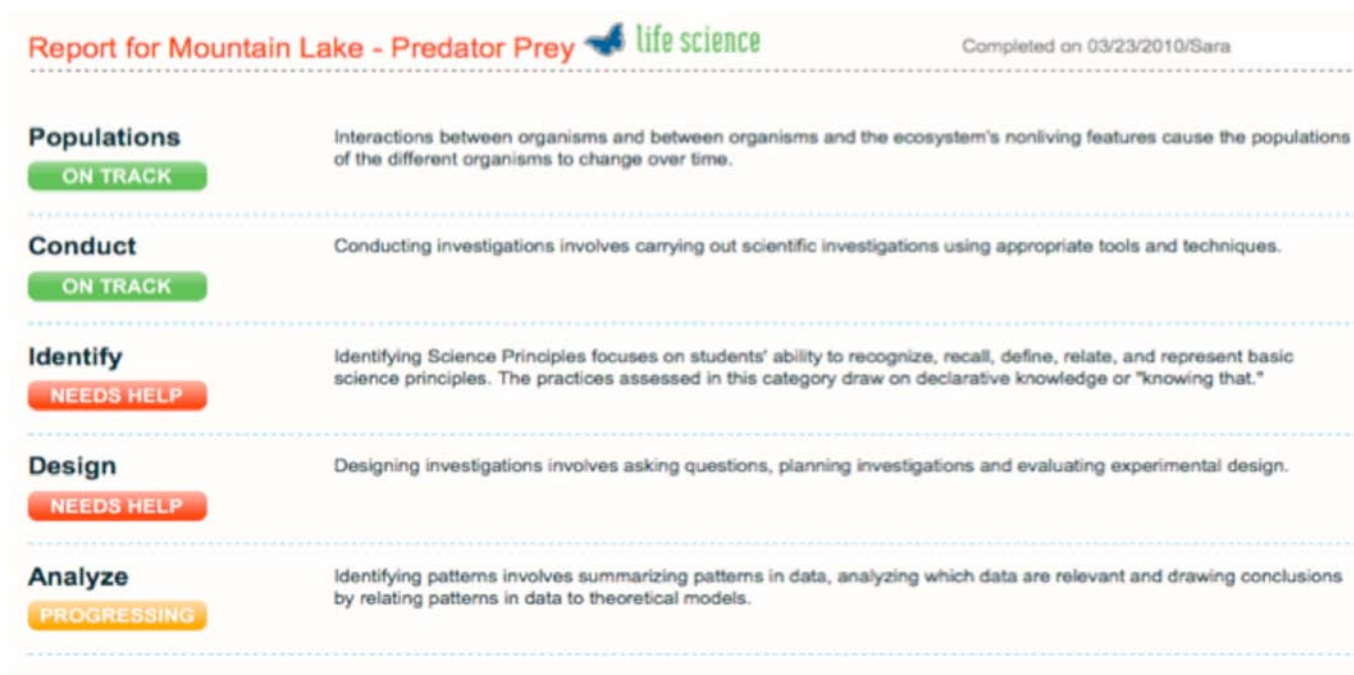


Figure 5: Example of a progress report for students at the end of an embedded assessment.

What does research tell us about effective strategies?

## Participants

Fifty-five teachers and their 5867 students from diverse schools in three US states (North Carolina, Nevada and Utah) participated in the field test. A total of 3529 students tested the Ecosystems assessments and 1936 students tested Force & Motion. Students were approximately evenly divided between males and females. Of the 5660 students for whom we have complete data, approximately 12 per cent were students with disabilities and about 6 per cent were classified as English language learners. Approximately 34 per cent were eligible for free or reduced-price lunches (indicative of low socio-economic status). Ethnicities represented included Caucasian (66%), Hispanic (13%), African-American (11%), Asian (4%); the remaining 6 per cent were identified as multiracial, Native-American, Pacific Islanders, or unknown ethnicity.

## Materials

As described in greater detail earlier, the Ecosystem assessment suite consisted of two simulation-based embedded assessments and a unit benchmark assessment. The Force & Motion suite consisted of three embedded assessments and a benchmark assessment. The Ecosystem suite took place in seven class periods, not including the teachers' regular instruction on the topic, while the Force & Motion suite required nine class periods.

## Data collection

Data collected from the *SimScientists* assessments included observable events, such as answers to questions, inputs to simulations, the full text of constructed responses, and arrows drawn and were coded to the relevant science content or inquiry targets. Students also completed a 30-item post test relevant to each topic. Other data

collected included student demographic data; surveys of teachers before and during the implementation of the assessments; 56 classroom observations; case studies of 8 teachers in 5 schools; and interviews with teachers after implementation.

## Analyses

Feasibility and utility were examined by teacher surveys, computer logs, and the case studies conducted by the external evaluator, the Center for Research and Evaluation of Standards and Student Testing at the University of California, Los Angeles. Descriptive statistics summarised assessment completion rates from computer logs, teacher responses about the quality and utility of the assessments on the surveys, frequencies of categories of observed teacher and student activities and engagement, and common themes in teacher interviews.

ASSESSMENT: Mountain Lake - Food Web CLASS: Period 7 Go!

NH Needs Help P Making Progress OT On Track

Reflection Activity PDF

Group A students needed little help on either roles or interactions  
 Group B students needed help with interactions, but not with roles.  
 Group C students needed help with understanding the roles of organisms in an ecosystem.

Student	Refl Gr.	Roles	Interactions	Identifying	Using
Student 1	C	P	NH	NH	OT
Student 1	C	NH	NH	NH	NH
Student 3	A	OT	OT	OT	OT
Student 4	A	OT	OT	OT	OT
Student 5	C	NH	NH	NH	NH
Student 6	C	NH	NH	NH	P
Student 7	C	P	NH	NH	P
Student 8	C	NH	NH	NH	NH
Student 9	C	NH	OT	NH	P
Student 10	B	OT	NH	OT	P

Figure 6: Example of a report to the teacher that recommends which group a student should be placed in for the small-group instructional activities in the reflection activity that follows the embedded assessment.

The technical quality of the assessment system was examined primarily through analyses of student responses to the assessments. To determine whether the categorisations of students from the embedded assessments were reasonable, the assignments of students to the different groups, A, B, and C, in the embedded assessments were analysed to see if the groups differed in their performances on the benchmark assessments. To judge the performance of the assessment items and the overall reliability of the assessment system, a multidimensional partial credit Item Response Model (IRT) was fitted to the benchmark response data.

## Results

In answer to the first research question, which asked whether teachers find the assessments useful in monitoring and adjusting instruction for their students,

the study showed that teachers were able to use the curriculum-embedded simulation assessments to serve formative purposes as evidenced by the implementation evaluation. Teachers indicated that the embedded assessment progress reports prompted adjustment of subsequent instruction during the unit. Both teachers and students commented on the value of the immediate, individualised feedback and coaching. The coaching provided scaffolding in the form of additional instruction that strengthens the learning benefit of the curriculum-embedded assessments.

Evidence of the effectiveness of the differentiation method used came from the use of a one-way Analysis of Variance (ANOVA) to test for differences among the three classifications of students (groups A, B and C) in their performance on the benchmark assessments. Data from the first Ecosystems embedded

assessment showed that performances on the Ecosystems benchmark differed significantly across the three classification groups on both science content,  $F(2, 2729) = 338.30, p = .000$  and on inquiry practices  $F(2, 2729) = 23.21, p = .000$ . Similarly, for the second Ecosystems embedded assessment performances on the Ecosystems benchmark differed significantly across the three classification groups on both science content,  $F(2, 2737) = 153.36, p = .000$  and on inquiry practices  $F(2, 2737) = 29.85, p = .000$ . Likewise, data from the first Force and Motion embedded assessment showed that performances on the Force and Motion benchmark differed significantly across the three classification groups on both science content,  $F(2, 1341) = 64.92, p = .000$  and on inquiry practices  $F(2, 1341) = 100.99, p = .000$ . Similarly, for the second Force and Motion embedded

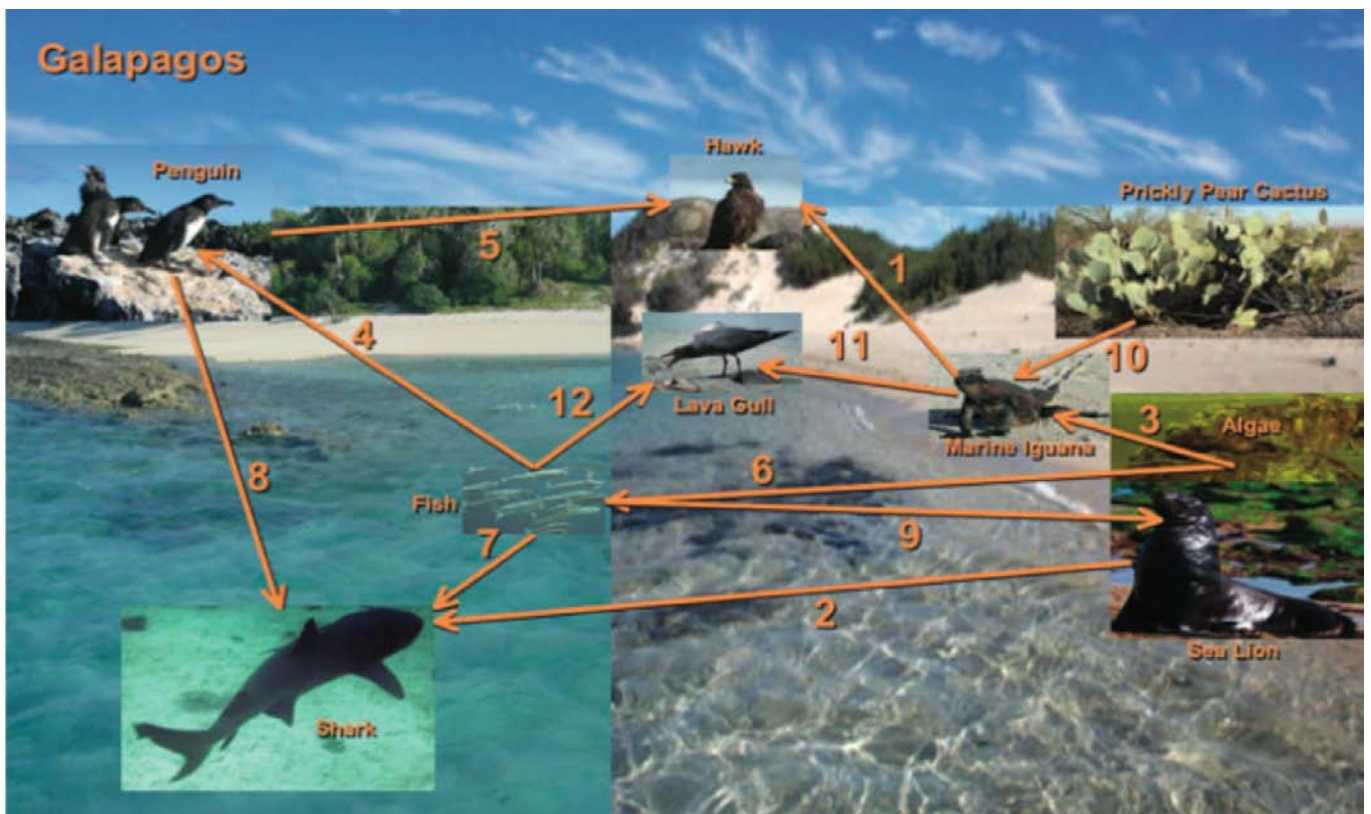


Figure 7: Example of classroom supplemental materials used in reflective activity lesson on the Galapagos ecosystem.

What does research tell us about effective strategies?



assessment, performances on the Force and Motion benchmark differed significantly across the three classification groups on both science content,  $F(2, 1262) = 97.19, p = .000$  and on inquiry practices  $F(2, 1262) = 83.70, p = .000$ . The pattern was repeated for the third Force and Motion embedded assessment performances that differed significantly for the three classification groups on science content,  $F(2, 1281) = 72.04, p = .000$  and on inquiry practices  $F(2, 1281) = 83.98, p = .000$ . Overall this shows that classifications of students in the embedded assessments into three groups was valid in that the classifications were reflected in significant differences in performance on the benchmark test.

In answer to the second research question as to whether the assessments work well for English language learners and students with disabilities, the study showed that, overall, students performed better on the benchmark assessments than on the post test, and performance gaps between both ELLs

and SWDs compared to other students were reduced on the benchmark. To determine the effect of the simulation-based assessments on ELLs and SWDs, their performances on the benchmark assessments were compared to performance on the post test of conventional items. Table 1 compares performance gaps of ELLs and SWDs to a reference group of all students who are neither English language learners nor students with disabilities. Although the average performances of ELLs and SWDs on the *SimScientists* benchmark is lower than that of the reference group, the gaps between the focal groups and the reference group is comparatively smaller than for the post test. This evidence provides some support for the claim that the multiple representations in the simulations and active manipulations may have provided alternative means, other than written text, for ELLs and SWDs to understand the assessment tasks and questions and to respond.

The differences in the performance gaps were even more marked in the

measurement of the science inquiry skills, as shown in Table 2. There were much larger performance gaps on the inquiry skills on the post tests than there were on the benchmark assessments. This evidence suggests that the benchmark assessments allowed ELLs and SWD to demonstrate their inquiry skills more clearly in the simulation-based benchmark assessments than they were in the multiple-choice item post tests. The benefits of simulations for these groups warrant further investigation.

### Conclusion

This study provides research-based evidence that systematically developed simulation-based science assessments can be used for formative and summative purposes, and that they can achieve high technical quality, be broadly implemented, and have strong instructional utility. Moreover, the findings support the role that computer-based assessments can play in differentiating learning directly with individual students as they are engaged in learning



Figure 8: Screenshots of the class summary and individual reports provided to teachers at the end of the benchmark assessment.

**Table 1** Gaps in total performance between English learners or students with disabilities and the general population

Group	Ecosystems post test	Force & Motion post test	Ecosystems benchmark	Force & Motion benchmark
English learners	24.0% (n = 123)	27.4% (n = 50)	10.6% (n = 126)	13.6% (n = 50)
Students with disabilities	20.2% (n = 183)	15.7% (n = 153)	8.4% (n = 189)	7.0% (n = 153)

**Table 2** Gaps in inquiry skills performance between English learners or students with disabilities and the general population

Group	Ecosystems post test	Force & Motion post test	Ecosystems benchmark	Force & Motion benchmark
English learners	25.6% (n = 123)	35.1% (n = 50)	6.6% (n = 126)	10.9% (n = 50)
Students with disabilities	25.5% (n = 183)	20.3% (n = 153)	5.6% (n = 189)	6.2% (n = 153)

interactions and in supporting teachers to differentiate their instruction for groups of students based on detailed diagnostic assessment of their learning progress on well-defined instructional goals. While all students benefited from the use of the *SimScientists* assessments, it proved particularly beneficial for ELL and SWD students. The study also shows that such outcomes are the result of careful design of the assessment systems so that they are founded on sound assessment and content principles.

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## References

Bangert-Downs, R. L., Kulik, C. L. C., Kulik, J. A., & Morgan, M. T. (1991). The instructional effect of feedback in test-like events. *Review of Educational Research, 61*(2), 213–238.

Black, P. (1998). *Testing: Friend or foe? Theory and practice of assessment and testing*. New York: Falmer Press.

Covington, M. V. (1999). Caring about learning: The nature and nurturing of subject-matter appreciation. *Educational Psychologist, 34*(2), 127–136.

Dassa, C., Vazquez-Abad, J., & Ajar, D. (1993). Formative assessment in a classroom setting: From practice to computer innovations. *Alberta Journal of Educational Research, 39*(1), 111–125.

Duschl, R. A., Schweingruber, H. A., & Shouse, A. W. (2007). *Taking science to school: Learning and teaching science in grades K–8*. Washington, DC: The National Academies Press.

Furtak, E. M., Ruiz-Primo, M. A., Shemwell, J. T., Ayala, C. C., Brandon, P., R., Shavelson, R. J., & Yin, Y. (2008). On the fidelity of implementing embedded formative assessments and its relation to student learning. *Applied Measurement in Education, 21*(4), 360–389.

Herman, J. L., Osmundson, E., Ayala, C., Schneider, S., & Timms, M. (2006). The nature and impact of teachers' formative assessment practices (CSE Tech Rep. No. 703). Los Angeles, CA: University of California, National

Center for Research on Evaluation, Standards, and Student Testing (CRESST).

Maehr, M. L., & Midgley, C. (1996). *Transforming school cultures*. Boulder, CO: Westview Press.

Messick, S. (1994). The interplay of evidence and consequences in the validation of performance assessments. *Educational Researcher, 23*(2), 12–23.

Mislevy, R., & Haertel, G. D. (2007). Implications of evidence-centered designs for educational testing. *Educational Measurement: Issues and Practices, 25*(4), 6–20.

Pashler, H., Bain, P., Bottge, B., Graesser, A., Koedinger, K., McDaniel, M., & Metcalfe, J. (2007). Organizing instruction and study to improve student learning (No. NCER 2007–2004). Washington, DC: National Center for Education Research, Institute of Education Sciences, U.S. Department of Education.

Tomlinson, C. A., & Allan, S. D. (2000). *Leadership for differentiating schools and classrooms*. Alexandria, VA: ASCD.



# The neighbourhood just got bigger: Schools and communities working together for change



## Michele Lonsdale

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Dr. Michele Lonsdale is a Principal Research Fellow at ACER in the Policy Analysis and Program Evaluation research team. She is a former secondary school teacher of English and humanities. Previous work has included teaching adults in a neighbourhood house and TAFE, lecturing and tutoring teacher trainees, working with unemployed young people, and working in the Victorian Government in policy and strategic planning. Dr. Lonsdale played a key role in developing the evidence base for the NAB Schools First program and has a strong interest in what makes highly effective school–community partnerships.



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Ms. Sharon Clerke is a Senior Project Director for NAB Schools First at the Australian Council for Educational Research in Melbourne.

She has worked at senior levels in the education sector for 30 years, teaching and working closely with secondary schools, parents and community members on a wide range of programs designed to improve educational outcomes for students and schools.

Ms. Clerke heads ACER's significant contribution to NAB Schools First, a national awards program that recognises excellence in school–community partnerships and seeks to provide school communities with the skills to build robust and sustainable partnerships and programs.



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## Abstract

There are many things that schools can do to improve learning opportunities and outcomes for their students. Increasingly schools are choosing to look beyond their gates to connect with other groups in their neighbourhood. Businesses, not-for-profit organisations, philanthropic organisations and others are also looking to connect with schools for mutual benefits. Whether you are the local real estate agent, someone from Rotary, a TAFE teacher, a university lecturer, a pre-school parent, a football club president, a resident in an elderly citizens' home, or from another community group and wanting to share resources and ideas with a local school, there are plenty of opportunities for collaboration to improve student outcomes. This presentation looks at the benefits of collaborating and offers research evidence and practical tips for developing strong and productive school–community relationships that ultimately support better outcomes for students.

## Introduction

Highly effective schools have high levels of parent and community engagement.<sup>1</sup> Whether you work in local business or a large corporation, volunteer with Rotary, teach in a TAFE or university, serve on the local kindergarten committee, run a youth services program, play for a football or netball club, reside in an elderly citizens' home, or offer art classes in the local neighbourhood house, there are plenty of opportunities for you to collaborate with schools to improve outcomes for students. Whether your school is in the city or a remote area, primary or secondary, government or independent, there will be a wide range of resources

<sup>1</sup> Masters, G. N. (2004). What makes a good school? ACER eNews, <http://www.acer.edu.au/enews/2004/02/what-makes-a-good-school>

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and skills in 'the neighbourhood' that you can draw on to improve your school's effectiveness.

### **Changes in school-community relationships**

In the 1950s and 1960s there was little interaction between schools and the wider community. Parents might attend parent teacher nights or visit their child's school during Education Week but schools in this era were more likely to have 'Trespassers will be prosecuted' signs on their fences than welcome mats for community groups. What went on in schools was not seen to be the business of the community.

In the past few decades, a different kind of relationship between school and community has emerged. Rather than being set apart from the rest of the community, the school is now often seen to be its hub. The community, in turn, is seen as an important source of resources and expertise for the school.

School–community engagement can take many different forms, ranging from informal arrangements that might only involve a one-off activity, service or gift to more complex partnerships with formal governance arrangements and programs that are developed over several years.

### **Outcomes and benefits**

ACER's research undertaken as part of the NAB Schools First program shows four main outcomes that schools are hoping to achieve when entering into partnerships: increased student engagement, improved academic outcomes, enhanced social wellbeing and/or broader vocational options and skills.<sup>2</sup> Within these categories, more

specific outcomes may be identified, such as improving reading as an academic outcome.

The NAB Schools First program shows that community partners have conducted training sessions across a wide range of topics, provided relevant work experience for students, offered industry experience for teachers, helped teach specific skills and knowledge related to the curriculum, organised field trips and camp activities, showed students potential career and study pathways, worked with students to improve the physical environment of the school, provided social contacts within the community and given students greater awareness of the services available for young people.<sup>3</sup> It is not only students who benefit from these connections. Staff in schools, business, philanthropic foundations and trusts, and community organisations gain from being exposed to professional learning and training opportunities. Teachers and principals can develop new knowledge and skills in project management, human resources, budgeting and marketing. Businesses can meet their corporate responsibility goals, be exposed to the innovative thinking of young people, and potentially have access to a more highly skilled future workforce in the local area. New possibilities for work and economic ventures can emerge.

Effective collaboration can lead to better interaction between agencies, greater understanding of the issues affecting young people in their communities, and greater connection between community partners and other families and groups.

Communities can also benefit from the tangible products that are associated with some partnership programs, such

as community gardens or environmental programs, and from young people who feel more connected to their communities through their participation in such programs. In turn, this can lead to greater community confidence. For example, some schools in the NAB Schools First Program report fewer street offences and substance abuse issues than previously as a result of partnering with local community groups.<sup>4</sup>

Governments, too, benefit from schools connecting more strongly with business and community groups. These kinds of relationships can help grow local economies and potentially reduce the costs of service provision through less duplication of services and shared responsibility.

### **Challenges**

These kinds of collaborations are not easy to build or sustain, however. Not all school–community partnerships run smoothly. Finding potential partners and resources, knowing who might have the professional expertise to advise and guide program development all take time and require different kinds of knowledge and skills. Gathering information about an area of identified need and knowing how to monitor and evaluate the impact of a collaboration can also be challenging.

There can be other challenges too when partners have unrealistic expectations around the relationship or what it is aiming to achieve. Sometimes one partner might be less committed to a collaboration than others. Some school leaders may be sceptical about entering into a relationship with, for example, a business. A non-school partner might not fully understand the day-to-day operations of a school and therefore under- or overestimate what's possible.

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2 Lonsdale, M. (2009). School–community partnerships in Australian schools. ACER, [http://research.acer.edu.au/cgi/viewcontent.cgi?article=1006&context=policy\\_analysis\\_misc](http://research.acer.edu.au/cgi/viewcontent.cgi?article=1006&context=policy_analysis_misc)

3 Ibid.

4 Ibid.

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## Effective engagement

ACER's project Leading Learning in Education and Philanthropy (LLEAP) has shown the importance of laying strong foundations for a school–community partnership.<sup>5</sup> From the fieldwork analyses of the LLEAP project, ten factors for highly effective engagement have been identified:

- having a 'good fit' (e.g. aligned values, objectives, priorities)
- building capacity (e.g. increasing the skills, knowledge and understanding of partners)
- making well-informed decisions (e.g. evidence-based identification of need)
- having relevant knowledge (e.g. knowledge of the community or school context)
- having appropriate levels of resourcing (e.g. having a realistic understanding of the needs of the project)
- being clear about roles (e.g. partners in the project having clearly defined roles and objectives)
- having genuine reciprocity (e.g. bringing strengths to the relationship)
- having built relationships based on trust (e.g. perceptions of competence)
- having effective communications (e.g. communicating clearly and openly)
- being impact focused (e.g. clarity around what is being sought to change).

Other evidence from NAB Schools First confirms the importance of collecting information along the way to measure this impact.

In setting up an effective partnership these are the things you could think about:

- Do you have a shared vision and common goals?
- Are your objectives clear and achievable?
- Are there clearly defined roles and responsibilities for each partner?
- Are the expectations of each partner fair and reasonable?
- Does each partner have a good understanding of the other partners' requirements?
- Have you set in place opportunities for regular communication between partners?
- Is the collaborative project adequately resourced?
- Do you know how (and how often) you will measure the impact of your collaboration?
- What will you put in place to help make the collaboration sustainable?

## Concluding comments

A consistent finding from the research in Australia and overseas is that strong school–community engagement can bring a range of benefits, not only to students but also to teachers, schools as a whole, partners and the wider community. However, for these benefits to occur, school–community partners need to have a shared vision, work in genuinely collaborative ways, and monitor the progress and effectiveness of their partnership activities. Sharing the results of this good practice means others can recognise the important role that community groups can play in supporting education and schools. Preparing 21st century learners depends on everyone in the community seeing this as their business.

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5 Anderson, M. & Curtin, E. (2011) LLEAP: Leading Learning in Education and Philanthropy, 2011 survey report. ACER, [www.acer.edu.au/lleap](http://www.acer.edu.au/lleap).

# Teachers are the key: Strategies for instructional improvement



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Ms. Lynette Virgona is a Principal Consultant with Classroom Management Strategies (CMS), a professional learning program operated by accredited classroom teachers for the Department of Education in Western Australia. Since 2003, CMS has provided interactive and reflective workshops on behaviour management and instruction to promote student engagement followed by in-class observation and coaching for teachers. CMS also offers a range of support for school-wide instructional improvement, including the development of peer coaching teams, better aligned behaviour management processes, and assistance for Principals in long-term strategic planning. The programs are highly regarded by teachers and principals with more than 7000 participants in the training with demand growing.

Ms Virgona has a background in secondary English and History, and has worked in a wide range of schools, as a classroom teacher and an administrator since 1985. She has worked with CMS since its inception in 2003.

## Abstract

Recent research is unequivocal on the importance of effective teachers in improving outcomes for schools (Jensen, 2010) and the critical role that high quality professional learning plays in increasing teacher effectiveness (McKinsey, 2007). One powerful way to do this is in real classrooms in the form of expert or peer coaching. (McKinsey, 2007) This revelation often overlooks the fact that it comes in the context of a profession that is largely unfamiliar with receiving direct feedback, is generally uncomfortable being observed, and can be wary of being evaluated unfairly (Elmore, et al., 2009). This seems especially true with our more experienced teachers. Despite this, we know that teachers want effective feedback, to have their work valued and to improve their teaching (Jensen, 2010) – and, I would add, if it can be done in a respectful and professional way.

This paper seeks add to the body of knowledge on effective professional learning through in-class coaching for teachers and its place in school improvement by sharing the research findings and the experiences of the Classroom Management Strategies (CMS) professional learning program from the Department of Education, Western Australia.

## Background

Classroom Management Strategies (CMS) was initiated by the Department of Education in Western Australia in 2002 as a key part of its Behaviour Management & Discipline (BM&D) strategy. It was conceived as a proactive and practical support for teachers with an initial focus on behaviour management in classrooms, commencing full operations in 2005. It has had strong support across all education stakeholders since its inception. CMS has been part of the

Enterprise Bargaining Agreement (2006, 2008, 2011) with the State School Teachers' Union of WA since 2006 and has bipartisan political support. CMS now works in close partnership with all the teacher-training universities in Western Australia with the exception of Notre Dame University.

Despite the behaviour management focus of the initiating strategy, it was evident from the beginning that it was not possible to impact significantly on teacher practice by attending to teacher skills in isolation. In order to achieve its aims CMS had to cover a wide range of teacher behaviour. Effective behaviour management, the original brief of the program, could only ever be one aspect of the complex instructional repertoire of an effective teacher. Managing student behaviour does not operate in isolation from other teacher skills and is only useful if it leads to the creation of a classroom environment where learning occurs. Students can be well behaved but cognitively disengaged. In addition, teachers cannot perform at their best if the school culture is dysfunctional or non-supportive of good classroom practice. Consequently, CMS should be seen as a professional learning program that aims to increase effective teaching practices within effective school cultures.

Since 2005, CMS has conducted more than 38,000 in-class observation and feedback sessions (called 'conferences') on effective classroom management and instruction with over 7000 teachers in Western Australian public schools. The program operates in K–12 classrooms (see Table 1) across all socio-economic bands and in rural, remote and metropolitan settings (see Table 2). CMS teacher consultants work alongside teachers at every stage of their careers (see Table 3), including supporting those in leadership positions to plan and implement whole school instructional improvement.

## The Model

The CMS professional development model is based on the premise that significant transfer of learning primarily occurs in teachers' classrooms. The conferencing is the most important part of the professional learning. It is

not a deficit model and is designed to make experienced teachers more consciously aware of the effective skills they already use, and to add to those skills through teacher self-reflection and peer discussion. It assumes as a starting point that teachers are already skilled

practitioners in a highly complex and demanding profession. Teachers are asked to volunteer to attend although the aim is for all teachers in Western Australian public schools to complete the programs.

Program delivery focuses on a series

**Table 1** Major teaching level: 2005–2011

Level taught	Foundation program	% of total participants numbers	Instructional strategies	% of total participants numbers
All years	118	1.6	12	0.7
ECE	396	5.6	96	6.0
Primary	3 754	52.6	760	47.5
Middle school	274	3.8	27	1.7
Secondary	2 576	36.1	700	43.7
Not specified	22	0.3	6	0.4
<b>Total</b>	<b>7 140</b>	<b>100</b>	<b>1 601</b>	<b>100</b>

Source: Internal Department of Education WA evaluation data 2012.

**Table 2** Regional information: 2005–2011

Region	Foundation program participant numbers	Number of participating schools (% of schools in region)	Instructional Strategies participant numbers	Number of participating schools (% of schools in region)	Total number of schools per region
Metropolitan	3 542	305 (65%)	874	143 (30%)	474
Goldfields	486	32 (61%)	87	17 (33%)	52
Kimberley	406	19 (86%)	18	5 (23%)	22
Mid West	452	42 (82%)	193	29 (57%)	51
Pilbara	270	18 (58%)	109	12 (39%)	31
South West	1 115	83 (85%)	104	32 (33%)	97
Wheatbelt	576	67 (93%)	116	29 (40%)	72
<b>Total</b>	<b>6 847</b>	<b>566</b>	<b>1 505</b>	<b>267</b>	<b>799</b>

Source: Internal Department of Education WA evaluation data 2012.

Additional notes:

- 389 participants' regional information from 2005 is not included in this data.
- A participant may complete more than one program.
- 2012 information is not included as not all pre-program survey data is currently available.
- Transience on staff means that many rural schools lose trained staff to the metropolitan schools over time.

of interactive workshops spread over a number of months. Expert in-class conferences occur after each workshop. In the CMS Foundation program, for instance, there are five whole-day workshops where participants are presented with opportunities to label and deconstruct effective teaching skills and practise them in a forum that encourages reflection and discussion. Following each workshop, participants have a trained consultant visit them in their classroom to provide a structured, non-evaluative feedback and reflection session.

The focus is on participants developing:

- an increased competence and confidence to engage students and manage unproductive behaviour
- an increased repertoire of responses to address attention-seeking behaviour, including low key responses, giving choices and effective consequences
- an awareness and comprehension of teaching skills to effectively deal with escalating behaviours including diffusing power struggles

- a common language to discuss student behaviour and their teaching practices
- a shared set of beliefs about student behaviour
- reflective, collegiate structures in their schools to promote professional learning communities
- an awareness and comprehension of instructional skills, with a strong emphasis on effective questioning techniques to increase student academic engagement.

CMS also offers an extension course called the Instructional Strategies program that provides a special focus on increasing student academic engagement and higher order thinking. These programs always use the workshop/conference model for delivery.

The CMS teacher consultants are all classroom teachers who have received rigorous and extensive training in the observation, deconstruction, and analysis of teacher behaviour. They are highly skilled at providing respectful and professional feedback to teachers. They do not play an evaluative role and

they work outside of the performance appraisal process used in WA public schools. That being said teachers often request CMS training as part of their professional development.

### Theoretical underpinnings

When the program was designed its structural underpinnings were heavily influenced by the work of Madeline Hunter (Hunter, 1990) in terms the coaching model and Michael Fullan (Fullan, 2001) in terms of implementation of professional learning for systemic change. Initial training of consultants was carried out in 2003 by Barrie Bennett and Peter Smilanich, Canadian educators with a strong background in these areas. The contemporary content of the course is based on current and, where possible, an Australian evidence base of effective teacher practice, although much of the more practical behaviour management skills are based on the work of established theorists like Kounin and is largely summarised in texts of Bennett and Smilanich, (Bennett & Smilanich, 1994), more recently in *Classroom Management* (McDonald, 2010).

Content is only accepted as part of the programs where research and classroom experience agree that the

**Table 3** Teaching experience 2005–2011

Years teaching	Foundation program	% of total completing the course	Instructional Strategies program	% of total completing the course
0 - 2	1821	25.5	175	10.9
3 - 10	2182	30.6	523	32.7
11 -20	1560	21.9	307	19.2
21 - 30	1108	15.5	310	19.3
31 – 36+	416	5.8	248	15.5
Not specified	53	0.7	38	2.4
<b>Total</b>	<b>7140</b>	<b>100</b>	<b>1601</b>	<b>100</b>

Source: Internal Department of Education WA evaluation data 2012

What does research tell us about effective strategies?



skills are effective in the West Australian context, and is mapped to the National Standards for Teachers. While the theory is critical to the underlying quality of the course, it only occupies a small part of the delivery of the program, however. CMS defines teaching as a set of behaviours that can be learned through practice and experiencing the results in authentic classrooms. We learn by doing.

### External evaluation

In 2008, the Department commissioned Edith Cowan University to conduct an independent review of the Behaviour Management and Discipline (BM&D) strategy, of which CMS was a key component. BM&D 'was intended to improve the behaviour of students with challenging and disruptive behaviours, improve the learning outcomes for these students, increase attendance rates, and make schools a safer and more positive learning environment for all students and their teachers. As well the strategy was intended to increase the competence and confidence of teachers to support and engage students who are alienated or who exhibit challenging behaviours' (Robson

et al., 2008, p. v).

The evaluation of the BM&D strategy drew information from a range of qualitative and quantitative data sources, including surveys, focus groups, case studies and statistical data obtained from the Department.

The review states:

All the evidence points to the Classroom Management Strategies program having provided a significant and valued benefit to schools. It was the program most often reported by principals to have contributed to an improvement in student behaviour [see Table 4] and teachers in the focus groups described how it integrated easily with other professional development programs to improve classroom management skills. The enthusiasm for the low-level responses and common language it has promoted was widely evident.

(Robson et al., p. 35)

CMS was judged by 73 per cent of respondents to the survey of principals

to have been useful, leading to improved behaviour management practices by teachers. It was the professional learning program most frequently reported by principals to have made a difference to student behaviour in their school (Robson et al., p. 62). CMS was 'the program that drew the most comments from focus group participants' (Robson et al., p. 25).

The Review also noted 'the design of the central delivery model coupled with school-level discretion was a powerful combination' (Robson et al., p. 37).

CMS use of central planning, training and delivery of the programs ... and school-level control of resources have made it possible to train teachers in a wide range of professional contexts. Given the connectedness between the training and classroom teaching practice, this achievement should be acknowledged. It would not have succeeded without effective implementation at each level of the organisation.

(Robson et al., p. 35)

Table 4 Programs identified as making a difference to student behaviour as a percentage

	Primary n = 142 %	Secondary n = 47 %	Combined n = 22 %	All n = 211 %
CMS	32	28	31	31
Class-size reductions	15	36	5	19
Rewards	18	4	46	18
Out-of-class activities	7	2	5	6
Tribes	6	2	0	5
Rock and Water	3	2	5	3
Restorative Justice	1	4	5	2

Source: Robson et al., *An Evaluation of the Behaviour Management and Discipline Strategy 2001–2007*, p. 63

BM&D strategy evaluation survey instrument. Principals were asked: 'What would be the best example of an activity funded by BM&D that made a difference to the student behaviour in your school?' 'n = 211' refers to the number of completed survey forms returned. The totals for each column do not add up to 100 per cent because not all principals identified one of the programs listed.

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Individual case studies of schools that collected local data demonstrated a strong link between CMS and reductions in bullying behaviour and suspensions (Robson et al., p. 24)

The Review also makes this assessment:

[The CMS] implementation strategy has evolved into a well-articulated and dynamic delivery model. There are several features that differentiate the approach from comparable interventions.

- 1 A direct connection has been made between the professional development program and classroom teaching practice.
- 2 Central planning and management have sat comfortably with school-level choice; even though there was no requirement that schools participate in the program it has grown and developed because of the active participation of classroom practitioners.
- 3 The BM&D resource allocations to schools have enabled the schools facing challenges to mix and match the Classroom Management Strategies program with a wide range of programs of their choosing.

(Robson et al., p. 36)

The review concluded 'CMS was recognised through the survey, focus groups and case study school visits as a highly valued program that improved teachers' behaviour management skills in the classroom and playground' (Robson et al., p. 50).

### Internal data<sup>1</sup>

The positive impact that CMS reflective coaching sessions have on instructional practice at all stages of teaching experience is confirmed by the internal

data available to the program. The evidence from pre and post survey data consistently points to an increase in skill level even in very experienced teachers. A common response from teachers after completion of the program is that they would have adjusted their pre-survey responses to a lower score; that is, they assumed before participating in the program that they had a higher level of skill and knowledge than they actually possessed.

Teachers consistently rate the workshop programs very highly. The average score for presenter skill and relevance of the material is 9/10. A common comment in the evaluations is that the CMS consultants are 'real' teachers and they understand what actually happens in 'real' classrooms.

It is also significant that many of the most positive participants are experienced teachers who, while initially anxious or sceptical about the program, typically embrace it fully. They feel that it validates their teaching, provides them with the language to share their expertise, as well as improve on their practice. The endorsement of the union is an important factor for many participants, as well as the non-threatening design of the delivery. In fact, once they experience the feedback and reflection of a CMS conference, teachers overwhelmingly endorse the process and are keen for more. This is evident from the high completion rate of the programs and the take-up of extension programs and further training in CMS. In many schools it is the first step in establishing peer-learning teams within their schools. Significantly these teams are teacher-driven, rather than administrator mandated projects.

In addition to the close work with teachers in their classrooms, CMS supports schools to plan and implement whole school instructional improvement programs in their individual contexts. Additional programs include specific

support for pre-service teachers, graduates, school support staff, and school leaders. Many schools aim to train their whole staff and then set up a sustainability program to refresh and maintain the CMS 'culture' in their schools. Significantly, this has developed in response to specific and strong demand from teachers and school leaders and continues because of its successful impact on schools. The Department recommends a whole school CMS approach in schools identified as needing additional support through the school review processes.

CMS operates a rigorous accreditation program for the training and quality assurance of its consultants that can be accessed by schools that want to develop an internal CMS capacity to provide sustainability for their staff. Trained consultants are highly valued for promotional positions within schools. All of the accreditation training is mapped to the National Standards for Teachers framework.

### Conclusion

CMS is a unique professional learning program for classroom teachers in terms of its scope, longevity and the systematic and systemic nature of its delivery and impact. In West Australian public schools a third of the workforce currently has a common language and understanding of teaching. Graduates are entering the profession already equipped with some of the same skills and understandings. Many teachers who have been through the program are now school leaders who use their knowledge and skills to set the agenda for their schools. CMS is linked into other professional learning as a vehicle for improving literacy, numeracy and other system agendas.

Its success provides some insights into how systems can support significant improvements to the current teacher workforce within a respectful professional framework. For whatever

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<sup>1</sup> Internal data to support this is currently unavailable for publication.

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reasons, teachers have had little access to high quality feedback on their classroom practice in the place where it actually counts – their classroom. Many teachers actively resist efforts by leaders to be observed and assessed because when done badly such observations do more damage than good, however well intentioned. When done well the reverse is the case.

Teachers are the key to school improvement. More precisely, it is what happens between teacher and students in each and every classroom that determines the educational outcomes of any system. Learning how to open these classrooms to professional dialogue and reflection is the first step to real change in schools. CMS can provide some insight into how this might be achieved.

## References

- Bennett, B., & Smilanich, P. (1994). *Classroom management □: Thinking and caring approach □*, Bookation. Toronto.
- Elmore, R., City, E. A., Fiarman, & Teitel, L. (2009). *Instructional rounds in education*. Harvard Education Press. Cambridge MA.
- Fullan, M., (2001). *The new meaning of educational change*. Teachers' College Press. New York.
- Hunter, M., & Russell, D. (1990). *Mastering coaching and supervision*. Corwin Press. Thousand Oaks CA.
- Jensen, B. (2010). *What teachers want: Better teacher management*, Grattan Institute. Melbourne.
- McDonald, T. (2010). *Classroom management*, Oxford University Press. Melbourne.
- McKinsey & Co, (2007). *How the world's best performing school systems come out on top*. McKinsey on Society, <http://mckinseysociety.com/how-the-worlds-best-performing-schools-come-out-on-top/> accessed June 18 2012
- Robson, G., Angus, M., & McDonald, T., (2008). *An evaluation of the behaviour management and discipline strategy, 2001–2007*, ECU. Perth. WA.
- School Education Act Employees' (Teachers and Administrators) General Agreement, 2006, 2008, 2011.

# Professional Practice Research: Ensuring teacher development through a critical approach to professional learning



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Professor Tania Aspland is currently Professor in Teacher Education at the University of Adelaide and president of the Australian Teacher Educators Association (ATEA). She has been a leader in course development in teacher education for many years and is currently engaged in a number of research projects in higher education pedagogies in teacher education undergraduate and graduate courses. Professor Aspland has developed an international reputation for community capacity building in Papua New Guinea, Singapore, Hong Kong, The Philippines and Vietnam. She has evidenced-based success with action learning as a project based learning strategy in developing countries and has been employed in offshore contexts in the field of curriculum development and curriculum evaluation and thesis supervision. Professor Aspland has also instigated new models of professional development within schools and universities, to support the process of curriculum development and leadership.

The building of a professional portfolio, the centrality of professional attributes, an investigative orientation to learning and a process of student self auditing are key innovations within teacher education that are central to the programs that Professor Aspland has developed in collaboration with her colleagues, each taking on their own characterisation within local contexts.

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## Introduction

Currently the development of a national system for the ongoing enhancement of teacher professionalism across Australia is underway. The initiative led by Australian Institute of Teaching and School Leadership (AITSL) on behalf of the Ministerial Council for Education, Early Childhood Development and Youth Affairs (now SCSEEC) is progressing rapidly with a finalised set of Professional Standards for Teachers and a set of Professional Standards for Principals approved by Ministers in 2011. It is clear that there is an inextricable link between the newly proposed professional standards and the professional education of teachers and principals across Australia. Further, it is imperative that the education sector will need to work in a unified manner through ongoing consultations to ensure the standards truly reflect what teachers and principals desire of the profession, in terms of teacher preparation, professional learning and training, and professional recognition.

It has been evident for some time that the federal government is keeping a close watch on teachers and educational leaders and that it has a preferred, if not popular view of the nature of teacher preparation, professional development and training. Federal policy linking economic growth and development to education has never been stronger and in many ways teachers and principals are in a prime position to reshape the future directions of this nation. However, within this opportunity is a deeply embedded discourse of regulation, one that could ostensibly threaten the autonomy of teachers and principals to independently regulate their profession. It is true that the consultative approach to developing the sets of standards for teachers and principals is high on the government's and AITSL's agenda and there has

been plenty of opportunity for all educators to contribute to the evolving construction of the frameworks that will regulate the shape of the profession for future graduates and practising teachers and principals. Despite this commitment to collaboration, discussions across the sector have raised four serious concerns that are outlined forthwith:

- 1 The conceptualisation of teacher and principal training and development as linear is somewhat problematic. The view that professional educators and leaders can be conceptualised from a developmental perspective is highly contestable. The standards model implies that teachers and principals improve with experience and age. For example, it is envisaged that teachers move from a stage of proficiency with time and experience to unproblematically become lead teachers. This concept of linear development is highly contestable in the profession of teaching.
- 2 While quality and accountability is essential to teacher and principal development, and the notion of professional standards is supported in principle, it is of concern to many educators that the complexity of professional growth, development and training has been reduced to a set of basic competencies that may not truly reflect the complex nature of teaching, the principalship, teacher education and the preparation of teachers and educational leaders for contemporary times and a challenging future.
- 3 Many agencies within the profession, including teachers and principals, are concerned about finding a balance between the compliance discourse that accompanies regulation and the discourse of innovation that is central to the development of rigorous and high quality teaching and educational

leadership that is evidence based and context specific. There is a concern that standards will reduce all professional learning for teachers and principals to 'the essentials' that are determined by less than flexible standards, ill-informed politicians and prescriptive or regulatory requirements. For a country striving to position itself in the international setting, such normative thinking towards the preparation and professional development of teachers and principals may be prohibitive.

- 4 What must be placed at the forefront of this debate is that teachers and principals, in preparation and throughout their professional careers, require differentiated pathways through learning. The multiplicity of pathways of teacher preparation and professional development and training currently evident around Australia must be profiled, valued and celebrated with vigour within the education profession. To become regulated nationally in the ways that are suggested, can, if done collaboratively, celebrate diversity while at the same time, can ensure quality, foster public accountability and joint working 'within' the standards discourse. If collaboration is overlooked and the professional development and training become positioned within a prescriptive ethos of re-accreditation, educators across the nation risk working within a 'check-box' mentality that will reduce teacher and principal preparation and professional development to forms of technocratic training that were rejected during the Australian political era circa 1988.

If educational reform, as central to economic reform, is to become a reality in Australia, the funding of innovative and contemporary models of professional development for teachers and principals must become a national priority. Some years ago Macpherson,

Brooker, Aspland and Elliott (1998) interrogated the field of professional learning and curriculum leadership. The principles of professional learning and training for teachers and principals that were advocated valued the centrality of dialogical conversations with educators that are collaborative, critical, action oriented, honest, meaningful, sustained and transformative in orientation (Aspland, Elliott & Macpherson, 1997). More current research (Grattan Institute, 2010; Macpherson, Aspland, & Cuskelly, 2010; OECD, 2009; Doecke et al., 2008; Reezgit & Creemers, 2005) indicates that there is no one model that best prepares and sustains the development of teachers and principals. Rather, as the professional moves forward into the 21st century and the ways of engaging with the educational community becomes reconfigured, a set of Principles of Procedure for professional training and development for principals and teachers can be identified; Principles of Procedure that may be instructive to providers of professional development and training across all sectors of education and Principles of Procedure that are congruent with the mandated frameworks of professional standards published by AITSL. The Principles of Procedure include the following:

- Professional development and training requires support and challenge from others, particular curriculum leaders.
- Professional development and training needs to recognise the stages of individuals within their careers and the contexts within which they work.
- Professional development and training generally requires guidance and intervention by educational leaders and discipline experts.
- The catalyst for professional development and training can be found in the state of perplexity that often characterises professional

educational work – it is not an unproblematic venture as some trainers suggest.

- The different types of perplexities can be recognised as dilemmas or ironies or paradoxes, all of which can be managed as a central component of professional development and training – solutions are not always the answer, rather it is working through the dilemmas that is of significance.
- The central focus of professional development and training for teachers and principals should be the educator (teacher or principal) who as a person lives and works within an educational, social and political context in differing ways and engages in curriculum decision making and leadership in unique ways that must be respected and celebrated – there is no sense in a 'one-size fits all' approach to training and development.
- Professional development and training must recognise the complex interplay of factors that are central to and impact upon the uniqueness of teachers' and principals' work – no one professional standard can capture these complexities.
- Professional development and training must actively involve teachers and principals in the ongoing generation of professional knowledge. This is best accomplished through professional practice research – the intimate involvement by the professional practitioners themselves in researching, inquiring into, and interrogating their own practice as a basis for illumination and improvement of their practice, for an informed influence on policy development in relation to their practice, and the creation and extension of theory out of their practice.



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Teachers and principals who are engaged in professional practice must advocate for professional development and training that is characterised by these Principles of Procedure if authentic and meaningful lifelong professional learning is to occur. Further, this type of professional learning and training is congruent with the Professional Standards advocated by AITSL and increasingly, by regulatory authorities around the nation. Such organisations argue that the professional standards should:

- provide a framework for professional learning
- guide self-reflection, self-improvement and development
- guide the management of self and others (AITSL, 2011: Professional Standards for Principals. <http://www.aitsl.edu.au/school-leaders/national-professional-standard-for-principals/national-professional-standard-for-principals.html>)

Professional development and training programs that capture the Principles of Procedure outlined above will be rigorous and engaging as well as meaningful and authentic. It is development and training of this type that is most successful as it is needs based, context specific and designed and implemented from a practitioner perspective. At the same time it is conceptually based and critically informed on the one hand, and systematically and sustainably undertaken on the other. To engage in professional development that is technocratic or reductionist, based on 'other people's knowledge' rather than one's own, and embedded in theory that is disconnected from the personal professional world of practice is wasteful and ill informed. As a profession undergoing constant pressure to grow, improve and reconstitute the work of teachers and principals in new times, we must, as a continuing priority, advocate strongly for modes of

professional training and development of the type that reflect these Principles of Procedure.

### **Professional Practitioner Research**

Professional development and training of the type outlined in the introduction has been referred to as Professional Practice Research (Macpherson, Brooker, Aspland & Cuskelly, 2010). The conceptual framing of Professional Practice Research is derived from earlier theorising around action research which has its origins in Stenhouse's (1975) view of the teacher as researcher – ideas spawned in the United Kingdom in the mid to late 1970s and in Australia in the late 1970s and into the 1980s (see Kemmis & McTaggart, 1988).

Action Research initiatives that have reported in various renditions over the years have sharpened the focus on professional educators as they have interrogated and investigated their professional practice as a basis for critically informed advocacy and activism as well as transformative/reconstructive action. Somekh's (1995) view of Action Research in social endeavours is still worth reading in this regard. More recent examples include Sachs's (2003) elaboration of the activist professional and Groundwater-Smith's (2010) characterisation of evidence-based practice within knowledge-building/creating schools. Groundwater-Smith (2003; 2010) in conceptualising the 'vital professional' depicts professional learning as "*draw(ing) upon diverse experiences and forms of engagement to organize a body of professional knowledge by actively interrogating what has happened, what has taken place, what has been read, what has been said (2003, p. 1)*". These works and others have been instrumental in envisioning the concept of praxis that is central to teacher development of this type.

The work of Schoen (1983; 1987) was

instrumental in bringing to the fore the notions of *reflection-on action* and *reflection-in action* as core processes integral to teacher learning and development. He highlighted for all professional developers the importance of lifting teachers out of the complex worlds of professional practice (the swamp), through reflection, to see anew (from the heights) and, to transform practice through greater clarity and understanding. A plethora of expositions about the nature of reflection and its importance in initiating and sustaining teacher learning in systematic ways was evident in the 1980s and still continues today. Many of these schemata reflect Dewey's original work on reflective thought (Dewey, 1933) and the correlation between reflection and action. Kinsella and Pittman (2012), in their critique of Schoen, remind scholars in this field that reflection is a far more complex process than what is often portrayed in much of the literature, particularly in relation to the process of professional learning. Further, Kinsella and Pittman (2012) purport that Schoen is dismissive of reflexivity and fails to 'fully acknowledge the background and social conditions that implicitly influence and contribute to ... ways of seeing' (Kinsella & Pittman, 2012, p. 43), focusing instead on individual constructions of reality that are seemingly context-free. Kemmis and Wilkinson (1998) some time ago argued that participatory action research is a collaborative social process of professional growth and development which is participatory, practical, emancipatory, critical and recursive, concerning actual (not abstract) practices. Professional Practice Research of this type does not require participants to follow a pre-determined process (see Kemmis & McTaggart 1988), but rather focus on the development of a strong and authentic sense of development and evolution in practice, and practitioners' understanding of their practice and

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the situation in which they practice. The more recent work of Kemmis (2005) consolidates the importance of the interplay of socio-cultural, socio-political and socio-historical constructs and teachers' professional thinking and repositioning of their practice through consideration of the material, social or discursive dimensions of practical knowledge. Kinsella and Pittman (2012) argue that it is only through this deeper and more comprehensive form of reflection that enables teachers to 'crack the codes' (Greene, 1995) 'to consider the invisible cloud that pervades everyday life and everyday practice, and from this location to envision new possibilities together' (Kinsella & Whitford, 2009).

### **What is good reflective practice?**

So this raises the questions of what makes good reflective practice as the core to effective professional learning. Do all types of reflective thinking guarantee the reconstruction of better professional practice or does it simply endorse the status quo?

It has been argued for some time now that current educational practices based on simplistic notions of professional learning do not develop true critical thinking (Mangan, 2002) on the part of the professional educator, nor do they ensure transformation of practice. Further, educationalists agree that simplistic reflective practice barely enables 'surface learning' (Biggs, 1987) as teachers engage in endless cycles of reflection, taking up and discarding new educational artefacts as quickly as they are promulgated by sophisticated marketing intelligentsia who based their rationale on little or no educational research. This weakness enables the maintenance of an 'ideological hegemony' by which dominant groups reinforce their legitimacy. As long as educators do not question this ideology they will in fact be reinforcing it and

playing into the hands of reductionist educational providers. Educational agents have been identified as one of the central institutions for maintaining this hegemony. This is a real threat if one is to consider the proposal most recently advocated by AITSL (2012), the Australian Teacher Performance and Development Framework.

Inherent in the original conceptualisation of a simplistic framework for reflective practice can be found Schoen's three key concepts of 'pragmatic usefulness, persuasiveness and aesthetic appeal' (Schoen, 1987). While these concepts imply the importance of teacher decision making based on individual reflective practices that value fit-for-purpose, subjective judgements and professional appreciation, such thinking is limiting if professional learning is to be deep in nature, sustainable and designed to have transformative repercussions for teachers' professional practice. Kinsella and Pittman (2012) argue that reflection that is central to a deeper form of thinking and learning requires a stronger focus on the concept of 'phronesis or practical wisdom' (Kinsella & Pittman, 2012, p. 1). This call for the reconceptualisation of professional learning based on phronesis implies a deeper deliberation of professional practice, framed by an ethical positioning, shaped by professional values and advised by practical judgements that are filtered through sustained and systematic processes of complex professional reflection. Kinsella and Pittman (2012) argue that matters of ethical concern are central to the process of professional learning and deliberative practitioner reflection. Professionals who are cognisant of the centrality of phronesis, foreground ethical matters that are commonly invisible in more technically rationalist approaches. Further, Kinsella and Pittman (2012) entice the reader to think seriously about the place of 'dialogic intersubjectivity' in order to

elevate the rigour of reflection and learning beyond reductionist individual preoccupation to a more complex level that recognises 'the negotiation of meaning within practice settings and the role of discourse in the process ... [ensuring] concern with not only his or her own interpretations in practice but also the dialogic possibilities implicit in the recognition of the interpretation of ... others' (Kinsella & Pittman, 2012, p. 49). This demands of reflective practice a desire to enable a problematising of the taken-for-granted underpinnings of practice realising the 'transformative potential' of the practitioner and his or her community.

In contrast Kemmis (2012) argues for the centrality of praxis in professional learning and purports that praxis may precede phronesis. Interestingly, he claims that phronesis is a phenomenon that cannot be acquired through instruction. Rather, 'it can only be learned, and then only by experience' (Kemmis, 2012, p. 149). Such experiential learning through phronesis opens the thinking of practitioners to viewing the world differently, from multiple perspectives. This presents opportunities for practitioners to see anew, to initiate new ways of understanding familiar or troubling situations. To do so, argues Kemmis (2012), professional learning must enable the educator to become open to new experiences in the interests of transforming practice; open to experiences in the fullest sense of the word – socially, politically, culturally and historically. 'The person who wants to develop phronesis as wisdom and prudence wants to understand the variety and richness of different ways of being in the world' (Kemmis, 2012, p. 156). In order to raise the consciousness of the practitioner through professional learning characterised by phronesis, Kemmis supports Kinsella's call for the centrality of ethics and *virtue* in professional

learning in order to 'take moral responsibility for our actions and the consequences that follow from them' (Kemmis, 2012, p. 156). Importantly, for those interested in the nature of professional learning, Kemmis argues that we should firstly value 'praxis – individual and collective', and following this, phronesis can be learned from one's own and others' practices within professional collectives that 'commit to the good through its practice as a profession' (Kemmis, 2012, p. 159). The model of Professional Practice Research advocated in this paper has been designed to reflect these principles.

### **Professional Practice Research: A model of professional learning for teachers**

Developing a culture of professional learning based on 'phronesis built on praxis' requires a critical and participatory practitioner research culture. A culture of learning such as this is essential in order to invite professional practitioners to question existing policies and practices and to provide rich data as a basis for transformation through professional learning and development – to build a culture of 'active interrogation' (Groundwater-Smith, 2003).

Professional Practice Research of this type does not require participants to become involved in a strategy design to pursue pre-determined processes or outcomes, but in the development of a strong and authentic sense of development and evolution in practice, and practitioners' understanding of their practice and the situation in which they practice. In their work with graduate students, Aspland and Brooker (1998) concluded that pursuing an approach to teaching and learning that centres on locating the subject in their everyday world of curriculum work, focusing on how everyday experiences are shaped

and how they articulate with the larger constructs that determine the everyday world of curriculum work, enables the learning community to be better placed to enter a phase of transformative action and to reshape their practice. It is increasingly being recognised that practitioner research of this type enables participants to understand and change practice; and it invites them to look at their work in new and insightful ways. Phronesis as professional learning and development can be enabled through Professional Practice Research. From the point of view of professional practitioner researchers the ontological position inherent in this model is one of democratic participation and inclusion; the epistemological stance is associated with socially critical constructions of knowledge; and the methodological approach is a 'working with' rather than a 'working on' people. For professional practitioner researchers, people are learning participants and research colleagues, and not objects of professional development. This overall view of professional learning sits within the view that the purposes are to create and extend theory, to illuminate and inform practice and to influence policy in an informed way. Ethical matters are, of course, of utmost importance in a characterisation of Professional Practice Research within what is a heavily value-laden position.

Professional Practice Research of this type is shaped by the following principles:

- It is an interrogation and investigation of professional practice by the professional practitioners themselves (in collaboration among themselves and with others).
- It is research that is critically informed, politically activist, and action oriented in a transformative sense with a view to illuminating theory, informing policy and improving practice.

- It aims for a deeper understanding of professional practice, an enriched capacity to engage in professional practice and a commitment to an ongoing quest for quality improvement in professional practice on the part of professional practitioners both individually and collectively.
- It does not deny the centrality of the practitioners' positioning in the research; rather it highlights the centrality of both practitioners and their practice. However, it does raise the importance, if not the moral/ethical responsibility, of professional practitioners to be transparent in stating the values and beliefs that motivate their thinking and practice. Such positioning is vital for documenting and disseminating research processes and research outcomes.
- It encourages democratic participation, but it may occur in hegemonic environments which militate against such involvement. An activist stance is therefore very significant in advocacy for this sort of research.
- It is conceived in these terms and seeks to avoid the possibilities of researchers and the research becoming indulgent, introspective, if not incestuous. Rather, professional practice research enables collaborative, authentic and liberating inquiry to be generated for the social good of all participants.

Professional practice research is living research *and* active learning. The form of professional learning moves away from telling or being told towards a genre of investigation. The data collection centres on conversational cycles around a number of key statements about professional practice research. Broadly, the conversation flows from key research questions that have been generated from within professional practice by

the community of learners. These become the focus of the interrogation. The questions that are considered together in the first conversational cycle are ontological (and ethical) and epistemological in orientation. Cycles of dialogical conversation continue until multiple perspectives have been achieved and the point of data saturation has been recognised.

Conversation is used as a tool to interrogate participants' ideas about professional practice research in a critically reflective way. Professional learning becomes a sustained conversation designed to interrogate ideas about professional practice research in a critically reflective way. It is through conversation that participants elicit an elaboration of what can be called a tentative construction of a territory for professional practice research. The conversations are carefully framed and structured. The statements and questions are embedded in, and emerge from, the juxtaposition of ideas, concerns and tensions that led to the working definition of professional practice research. During this phase significant points emerge from the conversation, for example:

- Time is required to establish relationships with people engaged in professional practice.
- Negotiation of research agendas within the contexts of professional practice is necessary.
- Authentic blending of theory and practice occurs in interrogations of professional practice.
- It is important to confirm and affirm emergent constructions of professional knowledge.

Networking is a significant requirement of professional practice research for sharing and validating the experiences and outcomes as well as for contributing to the local picture and the larger whole. This type of professional

learning designed to achieve *phronesis* has the potential for giving voice to professional practitioners in areas of advocacy and action at the various levels. How and where professional practitioners position themselves in this sort of research-based professional learning is very significant for considerations of validity, authenticity and worthwhileness as well as for ethical goodness. Further the rigour in this sort of professional learning must be defined differently from the way it is defined in reductionist and more traditional forms of professional learning – it should remain a contested notion with which participants continue to struggle in defining and redefining its focus, purpose, process and outcomes. It is not concerned with issues of certainty; Professional Practice Research embraces uncertainty.

Professional Practice Research of this type clearly informs professional practitioners about their ever-evolving professional knowledge to the point that is difficult to draw the boundary between theory and policy on the one hand and practice on the other. Further, this type of professional learning challenges hegemonic views about knowledge acquisition, how it is generated and who owns it; and it also raises questions about ethical principles and practices associated with this type of professional learning which, in some ways, is unpredictable and uncontrollable compared with the more traditional or positivist forms of professional development. Ongoing sharing and dialoguing about this emergent professional knowledge is necessary both within the immediate professional practice context and other professional contexts.

Those engaged in Professional Practice Research must advocate for this sort of research-based professional learning in a rigorous way – a way that emphasises that it is conceptually based and critically informed on the one hand, and

systematically and sustainably undertaken on the other. Professional Practice Research opens up new possibilities for constructing a territory for professional learning regarding who drives it, who owns it and who benefits from it?

A blending of ongoing advocacies and actions are essential for the field of professional practice research shaped by *phronesis* to gain increasing acceptance and respect. It is highly complex and demanding; and the challenges which it presents require an ever-vigilant and unrelentingly open and transparent approach to documenting and disseminating professional learning and transformative professional practices.

## References

- Aspland, T., & Brooker, R. (1998). A pathway to postgraduate teaching. In B. Atweh, S. Kemmis and P. Weeks (Eds.) *Action research in practice: Partnerships for social justice in education* (pp.280-301). London and New York: Routledge.
- Aspland, T., Elliott, B., & Macpherson, I. (1997). Empowerment through professional development. *Australian and New Zealand Councils for Educational Research*. SET, March.
- Biggs, J. (1987). *Student approaches to learning and studying*. Hawthorne, Victoria: ACER.
- Doecke, B., Parr, G., & North, S. with Gale, T., Long, M., Mitchell, J., Rennie, J. & Williams, J. (2009). *National Mapping of Teacher Professional Learning*. DEEWR, Canberra.
- Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process*. Boston: Health & Co.
- Grattan Institute. (2010). *What teachers want: Better teacher management*. Report released 24 May. ([http://www.grattan.edu.au/publications/033\\_what\\_teachers\\_want.pdf](http://www.grattan.edu.au/publications/033_what_teachers_want.pdf))

- Greene, M. (1995). *Releasing the imagination: Essays on education, the arts, and social change*. London: Routledge.
- Groundwater-Smith, S. (2000). Evidence-based practice – Towards whole school improvement. Paper presented at the *Annual Conference of the Australian Association for Research in Education*, Sydney, December.
- Groundwater-Smith, S. (2003). 'becoming the vital professional: Learning from the workplace'. Paper presented to the Faculties of Education and Health, Queensland University of Technology, Brisbane, 29 May, 2003.
- Kemmis, S. (2005). Knowing practice: Searching for salience. *Pedagogy, Culture and Society*, 13(3), 391–426.
- Kemmis, S. (2012). Phronesis, experience and the primacy of praxis. In Kinsella, E. & Pittman, A. (Eds), *Phronesis: professional knowledge: practical wisdom in the professions*. Rotterdam, The Netherlands: Sense Publishers.
- Kemmis, S., & McTaggart, R. (1988). *Introduction: The Nature of Action Research. The Action Research Planner*. Geelong: Deakin University Press.
- Kemmis, S., & Wilkinson, M. (1998). Participatory action research and the study of practice. In Atweh, B, Kemmis, S., & Weeks, P. (1998). *Action Research in Practice: Partnerships for Social Justice in Education*. London and New York: Routledge.
- Kinsella, E., & Pittman, A. (2012). Phronesis: professional knowledge: Practical wisdom in the professions. Rotterdam, The Netherlands: Sense Publishers.
- Kinsella, E., & Whitford, G. (2009). Knowledge generation and utilisation: Towards epistemic reflexivity. *Australian Occupational Therapy Journal*, 56(4), 249–258.
- Macpherson, I., Aspland, T., Brooker, R., & Elliott, B. (1999). *Places and Spaces for Teachers in Curriculum Leadership*. Canberra: Goanna Print and Australian Curriculum Studies Association.
- Macpherson, I., Brooker, R., Aspland, T., & Elliott, B. (1998). Putting professional learning up front: A perspective of professional development within the context of collaborative research about curriculum leadership. *Journal of Inservice Education*, 24(1), 73–86.
- Macpherson, I., Aspland, T., & Cuskelly, E. (2010). Constructing a territory for professional practice research: Some introductory considerations. In A. Campbell & S. Groundwater Smith, *Action Research in Education*, New Delhi: Sage Publication.
- Mangan, J. M. (2002) "Critical Teacher Education: Problems and Possibilities" Paper presented at the *Challenging Futures Conference: Changing agendas in teacher education*, University of New England, Armidale, New South Wales. February 2002
- OECD. (2009). *Creating effective teaching and learning environments: First results from TALIS*. Paris: OECD.
- Reezigt, G. J., & Creemers, B. P.M. (2005). A comprehensive framework for effective school improvement. *School Effectiveness and School Improvement*, 16(4), 407-424.
- Sachs, J. (2003). *The Activist Professional*. Milton Keynes: The Open University Press.
- Schoen, D. (1983). *The reflective practitioner*. New York: Basic Books.
- Schoen, D. (1987). *Educating the reflective practitioner*. San Francisco: Jossey Bass.
- Somekh, B. (1995). The contribution of Action Research to development in social endeavours: A position paper on action research methodology. *British Educational Research Journal*, 21(3), 339–355.
- Stenhouse, L. (1975). *An Introduction to Curriculum Research and Development*. London: Heinemann.



# Building teacher capacity and raising reading achievement



**Kath Glasswell**

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Dr. Kath Glasswell is an international expert in instructional change and collaborations with schools for innovation in literacy instruction. She has worked with schools in diverse urban communities in New Zealand, Australia and the United States of America. Her current research initiative, Smart Education Partnerships, is significantly accelerating literacy achievement in Logan City schools in Queensland. Dr Glasswell's work can be read in journals such as *Reading Research Quarterly*, *Asia Pacific Journal of Teacher Education*, *Phi Delta Kappan*, *Language Arts*, and *The Reading Teacher*.

## Abstract

Our goal in this paper is to discuss two rather unsurprising notions. The first is that teacher learning impacts schooling improvement. The second is that teachers, like all other learners, need to be scaffolded through the learning process. As part of this discussion we will present examples from a school–university partnership project aimed at raising student achievement in reading comprehension. Specifically, we will describe tools that we have used to effectively support teachers in learning to work with student data as they strive for improvements in teaching and learning.

For the past four years [2009–2012], a team of Griffith University researchers has been engaged in a literacy innovation partnership project working with two clusters of schools in a culturally diverse, low socioeconomic area south of Brisbane. The project is a research and design collaboration funded in part by an Australian Research Council Linkage grant. In the 2011 school year, we worked with 133 classroom teachers and 3149 students in 12 partner schools. This group of schools is demonstrating accelerated progress on TORCH and NAPLAN measures of reading. Our goal in this work was to close the achievement gap by helping teachers develop skills in making evidence-based decisions about what to teach, to whom and how, assisting the school community to develop a reflective practice capacity, and to support the staff of each school to develop extensive content knowledge for teaching reading so that they might create unique innovations to accelerate student learning.

Growing research evidence indicates that effective professional learning for teachers is inquiry oriented. Indeed, New Zealand colleagues working in problem-based methodologies and inquiry-focused professional learning

communities (Robinson & Lai, 2006) advocate a view of professional learning as an ongoing, iterative and contextualised process (Timperley Wilson, Barrar, & Fung, 2007). Put simply, these researchers argue that schools can accelerate student learning when reflective teachers learn what it is that they need to know to meet their students' needs, teach accordingly and re-run the reflective cycle.

Another major finding in recent years is that professional learning is enhanced when teachers in a school do not work in isolation, but when their efforts are supported by other like-minded colleagues (Earl & Katz, 2007; Earl & Timperley, 2009).

Our engagement in schools has taken these ideas seriously and we have worked to improve teacher capacity through an approach that values professional responsibility and collective focus in an ongoing cycle of reflective practice. To anchor our efforts and make the focus on professional learning meaningful, we utilise the concept of 'professional learning communities' (PLC). The term PLC was coined to denote the activity of 'a group of people sharing and critically interrogating their practice in an ongoing, reflective, collaborative, inclusive, learning-oriented, growth-promoting way' (Stoll, Bolam, McMahon, Wallace, & Thomas, 2006, p. 223). Over the last four years of the partnership, schools have established and grown professional learning communities that act as 'think-tanks' for an inquiry process centred on student achievement, teacher learning and quality instruction.

Data are central to all partnership activity and it serves two purposes. First, data are used to focus our inquiry and reflection efforts, but they are also the measure we use to evaluate the utility of the research model we are building (Glasswell, Davis, Singh & McNaughton, 2010). In all our enthusiasm for using data, we have had

some reservations. We live in a world where data-driven decision making is a phrase that has real consequences, but often little real meaning. Indeed, school systems all over the world that are engaging in change processes put great efforts and resources into examining data as a lever for change and as evidence of it. School administrators are awash with data (Hattie, 2005). They deal in scale scores, stanines, percentile rankings and test-item analyses every day. In Australia, as National Partnerships schools across the country try to work out ways to use data to drive intervention and assess effects, discussions often turn to how to collect, analyse and reflect on student data in ways that will help accelerate student learning.

Our schools are no different. Our reservations, however, lead us to concur with the assertion that data is not always dealt with in ways that have most meaning for teaching practice and maximum impact on student achievement (DuFour, DuFour, & Eaker, 2008). In aggregated reports of a population's performance, critical detail can become lost. Individual students can become lost. For us, using data in meaningful ways in schools means a commitment to 'keeping it real'. By this we mean that achievement data should be traceable to the students it concerns and related to real-world instructional problem solving in unique classroom settings. Our experience in this project is that when teachers see data as

providing critical information about individual students, they engage with it differently and are keen to learn more about what it means and how they might best use it.

In the following pages, we describe two ways in which we have helped schools build a culture of inquiry around evidence that we believe is both rigorous and 'real'. We present for discussion 'focussing activities' and smart tools that skilled facilitators use to support teacher learning and actively promote inquiry and collaboration. Like other researchers (Danielson, 2009; Little & Curry, 2009), we suggest that skilled facilitation is an important aspect of establishing and maintaining productive routines for professional engagement around student data.

The project itself has evolved through three phases of activity that are cumulative and incorporate an inquiry focus on data, observing and reflecting on teaching and building capacity for instructional innovation. During the first phase of the project School-based Researchers (SBRs) employed by the University were each assigned to coach teachers and principals about how to collect, analyse and use student achievement data to plan instruction. Data are gathered using Tests of Reading Comprehension (TORCH) (ACER, 2003) three times in each school year and the information is used as an inquiry focus for teachers, schools and SBRs. In the process of each round of data inquiry, two major focusing activities take place in the schools. These activities were designed to simultaneously serve as models of the inquiry process for schools and as professional learning experiences. Teachers engaging in the meeting processes learn the routines for interacting and become more reflective. Thus, the meetings are both a journey and destination for teacher learning.

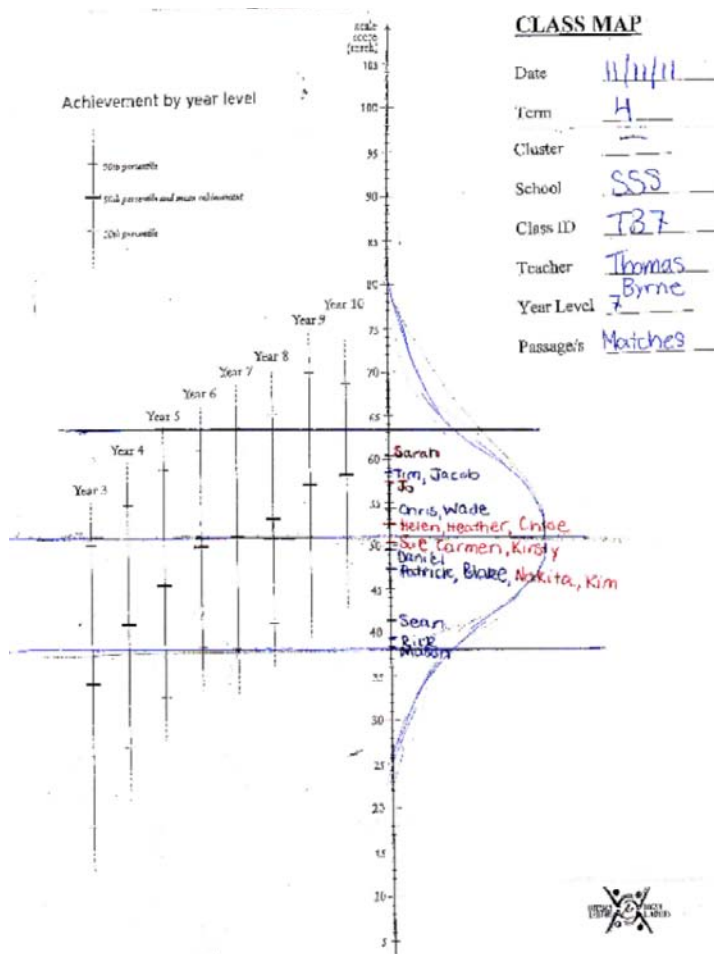


Figure 1: Class Map adapted from TORCH (ACER, 2003)

What does research tell us about effective strategies?

A common tool to focus inquiry in these meetings is data visualisation. Data visualisations are graphic representations of data that help teachers 'see' patterns, describe and explain understandings about students' strengths and needs and focus on next steps teaching. The first data visualisation tool we use is the 'class-map' (see Figure 1). It is central to inquiry about class level data and there is a set of routines that accompany it. Within a week of gathering reading comprehension data via TORCH testing, each teacher is released from class to engage in a one-on-one coaching meeting focused on student needs and teacher learning. A key activity in the meeting is to use the class map to develop a visual representation of a teacher's class data. Each student's score is plotted on the class map. The map includes a scale and a TORCH Described Regions overlay that is designed to help teachers understand student learning profiles and needs, and the complexity of reading comprehension development.

As the meeting progresses, students with similar needs are identified and possible grouping options thought through. The discussion incorporates a clear focus on current instructional practices and possible innovations that will help move students forward. The

teacher and the SBR/coach collaborate to establish professional learning needs and to problem solve issues related to the logistics of innovations to be trialled.

The second data visualisation tool we use is the school-wide 'TORCH wall' (see Figure 2). All our schools have a TORCH wall, usually displayed in an area where teachers congregate informally or come together to plan. TORCH walls are large charts (2 m x 3 m) constructed from black felt. Each is a horizontal TORCH scale divided into 13 bands of TORCH scores, which become represented as columns. Each year level in a school has a row on which student identification tiles are placed. Each child's tile is attached to the wall in the row for his/her year level, and the TORCH score band column that the score allows. National norms for the mean and the range of the distribution are marked and give teachers immediate visual information about how their student scores compare to those of national cohorts.

Three times each year, teachers attend whole-staff meetings where they map their own students onto the large TORCH wall. The resultant scatter plot allows the professional learning community to see the achievement profile of the school as a whole, of each year level overall, of each class and of each student as an individual. The data have meaning at multiple levels.

Through a collaborative process, facilitated by a School-based Researcher, teachers interrogate the evidence of student learning, identify groups of students who need additional support, raise questions, share expertise and develop innovations.

The TORCH wall serves a different purpose to the class map and the routines and interactions that surround it are particular to its purpose. The wall activity acts as an anchor for a strong and proactive professional community. Conversation is focused on student learning and professional responsibility for student progress. The TORCH wall remains on display until the next round of data collection when it is re-plotted and the reflective cycle is rebooted.

Over the course of the last four years we have seen some considerable changes in the ways teachers collect, interpret and interact with data and how they collaborate around the data visualisations. When we first began our work with mapping student achievement, we met with some resistance to our ideas. We learned early on in our project that, if misunderstood, the data displays had the potential to become walls of despair – a constant reminder of the ground still to be made up. Careful scaffolding over repeated cycles of reflection has increased teacher learning to the point that many



Figure 2: TORCH wall

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schools now value what they used to mistrust and report that they will sustain these focusing activities as the project draws to a close.

### Final thoughts

We began this paper with a promise to discuss some commonplace ideas in schooling improvement. What we hope to have shown is how those ideas have been translated into practice in ways that had meaning for the teachers involved. Our goal in this partnership was to close the achievement gap. This mission saw us focus on teacher learning as we developed an inquiry focused model for examining and using student achievement data to guide instructional decision making. The second obvious point we raised was that teacher learning occurs best when it is scaffolded through a combination of routines, resources and interactions that help teachers grow gradually into the skills and knowledge they need. Our focusing activities and smart tools used by skilled facilitators repeatedly over four years and eleven cycles of reflection have provided us with the means to engage our teachers in a rigorous habit of inquiry that had real learning outcomes for them and their students.

### References

- Australian Council for Educational Research (ACER). (2003). (2<sup>nd</sup> ed.), Tests of Reading Comprehension (TORCH). Victoria, Australia: ACER Press.
- Danielson, C. (2009). *Talk about teaching: Leading professional conversations*. Thousand Oaks, CA: Corwin Press.
- DuFour, R., DuFour, R., & Eaker, R. (2008). *Professional learning communities at work: New insights for improving schools*. Bloomington, IN: Solution Tree Press.
- Earl, L. & Katz, S. (2007). *Leadership in networked learning communities: Defining the terrain*. *School Leadership and Management*, 27, 3, 239–258.
- Earl, L. & Timperley, H. (Eds.). (2009). *Professional learning conversations: Challenges in using evidence for improvement*. USA: Springer Science and Business Media.
- Glasswell, K., Davis, K., Singh, P., & McNaughton (2010). *Literacy lessons for Logan learners: A smart education partnerships project*. *Curriculum Leadership*, 8, 31.
- Hattie, J. (2005). What is the nature of evidence that makes a difference to learning? In *Using Data to Support Learning: Conference Proceedings of Australian Council for Educational Research (ACER)* (Australia), Melbourne, Victoria (pp. 11–22). Camberwell, Victoria: ACER.
- Little, J. W., & Curry, M. W. (2009). Structuring talk about teaching and learning: The use of evidence in protocol-based conversations. In L. M. Earl & H. Timperley (Eds.), *Professional learning conversations: Challenges in using evidence for improvement* (pp. 29–42): Springer.
- Robinson, V. M., & Lai, M. (2006). *Practitioner research for educators: A guide to improving classrooms and schools*. Thousand Oaks, CA: Corwin Press.
- Stoll, L., Bolam, R., McMahon, A., Wallace, M., & Thomas, S. (2006). Professional Learning Communities: A review of the literature. *Journal of Educational Change*, 7, 221–258.
- Timperley, H., Wilson, A., Barrar, H., & Fung, I. (2007). *Best evidence synthesis iterations (BES) on professional learning and development*. Wellington, NZ: Ministry of Education.



# Targeting the things that matter



**Ben Jensen**

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In 2009, Dr Ben Jensen joined the Grattan Institute from the OECD, where he spent 5 years working in the international policy arena on issues critical to Australian education policy.

Dr Jensen took a lead in the production of two significant reports. The first was *Creating Effective Teaching and Learning Environments*. This looked at new evidence on issues such as teacher appraisal, school evaluation, teaching practices within schools, and school leadership.

The second was *Measuring Improvements in Learning Outcomes – Best practices to assess the added value of schools*. This report provided a guide to designing, implementing and utilising systems that measure the contribution of schools to lifting student performance. It details how these systems enable governments, schools, teachers and other stakeholders to develop, monitor and continually improve education policies and programs to reach stated education objectives.

He was also responsible for an international network examining the learning environment and organisation of schools, which focused on issues such as teacher salaries and working hours and conditions, instruction hours within schools and class size.

Prior to joining the OECD, Dr. Jensen was a Senior Analyst at the Department of Premier and Cabinet at the Victorian Government and a Research Fellow at the Melbourne Institute of Applied Economic and Social Research, where he led the education research program. This expanded on his previous research, which concentrated on schools in disadvantaged urban areas and the impacts of disadvantage upon students. He also greatly enjoyed his time as Assistant Professor of Economics at a liberal arts college in the United States of America.

Dr Jensen holds a PhD in Economics from the University of Melbourne.

## Abstract

Throughout Australian school education we have invested in areas that we know do not have a strong association with student learning. Education expenditure in Australia has increased substantially for more than a decade, but results have either stagnated or declined (at least on international assessments such as the OECD Programme for International Student Assessment (PISA)). This indicates that we are investing in the areas that don't have the greatest impact on student learning. Comparisons with high-performing systems and schools show that this begins with ineffective strategies that do not adequately target student learning. This impacts resource allocation decisions in schools and across education systems. Nevertheless, there is considerable evidence about what works. Stronger targeting of resources on 'what works' can have a substantial impact on student learning in schools and throughout our education systems.

## Introduction

The latest PISA results show that Australian students perform relatively well compared to their peers in other countries. In PISA 2009, when the focus was on reading, Australian students performed above the OECD average. However, Australia lags behind the leaders, many of them from our own region. In Shanghai, the average 15-year-old mathematics student is performing at a level two years, on average, above his or her counterpart in Australia.<sup>1</sup>

## Spending more but achieving less

Not only do we lag behind some of our regional neighbours, we belong to a very small group of countries where student performance is declining. PISA results show that the average Australian 15-year-old in 2009 performs at a level about 4 months below the average 15-year-old in 2000. Our students are learning less than they used to. Unfortunately, this is occurring as our spending is increasing.

Between 2000 and 2009, real expenditure on education increased by 44 per cent.<sup>2</sup> The average cost of non-government school fees rose by 25 per cent.<sup>3</sup> These mismatches between expenditure and performance in school education reflect long-term trends. Leigh and Ryan (2011) demonstrated that productivity, which is defined as real expenditure increases divided by student performance, decreased by 12–13 per cent between 1975 and 1998 and 73 per cent between 1964 and 2003. This reflects longer-term trends. Between 1964 and 2003, real per child spending in school education increased 258 per cent, while numeracy test results significantly fell by 1.1 points on the LSAY3 scale (equivalent to 11 points on the PISA scale (Leigh & Ryan, 2008)).

Australian spending on school education is comparable with other developed countries. Australia spends slightly less per primary school student than the OECD average, but more than the OECD average on pre-primary and secondary school students (OECD, 2010a). However, most spending increases in the last decades have not improved student learning.

<sup>1</sup> This should be interpreted as two to three 'OECD years' of education. PISA points are converted to education months, on average, across OECD countries on the PISA scale. Conversion rate sourced from Thomson, De Bortoli, Nicholas, Hillman & Buckley, 2010.

<sup>2</sup> Combines real schooling expenditure for State and Territory and Commonwealth governments. MCEETYA (2001) Figure 3.1; ACARA (2009) Figure 8.1.

<sup>3</sup> Ibid.



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## Our big expenditure items

Given that expenditure increases have not resulted in improved outcomes, it is important to consider where the additional expenditure is going. While this will vary across schools, the data shows that there are key drivers of expenditure that differ from resource allocations in high-performing systems and from the evidence about 'what works'.

Unfortunately, the data on education expenditure are not particularly detailed or complete in its coverage across Australian school education. The data are better for government expenditure on government schools so we must restrict some of our analysis to this particular set of expenditure on particular schools.

Increases in teacher expenditure make up the vast majority of total expenditure increases. There are three factors that explain increases in expenditure on teachers: changes in the student–teacher ratio; real changes in teacher salaries; and the natural increase in the teacher wage bill due to the ageing of the teacher cohort. Most teachers receive annual increments and, at different stages in their careers, promotions that are linked to tenure (Jensen & Reichl, 2011). Thus, over the period in question, the distribution of teachers shifts to the higher end of the pay structure. This distribution shift will occur naturally, with no change in policy; the first two of these factors are, however, policy malleable. There has been little change in teacher salaries over this period. Hence, changes in student–teacher ratios (and therefore changes in class size, given there have been minimal changes to instruction time and teachers' working time) have been the policy decisions that have driven much of the expenditure in school education (Jensen et al., 2011).

This adds to the research showing that reduced class sizes and student–teacher

ratios have a substantial impact on expenditure, but are not associated with improved student performance (Hoxby, 2000; Bohrnstedt & Stecher, 2002; Mishel & Rothstein, 2002; Hanushek, 2003; Krueger, 2003; Jepsen & Rivkin, 2009; Chingos, 2010). It is clear that increasing teacher salaries has not been a policy lever that has driven expenditure increases over the period.

The analysis of expenditure between 2000–01 and 2008–09 does not assign causality between these changes and declining performance over the period. These data do not permit analysis of causal effects of specific programs. But the magnitude of both the increase in expenditure and the decline in performance should be a large feature of the current school funding debate and the formulation of education policy.

### A greater focus on student learning

It is clear that policy decisions and resource allocations made in Australian school education have not had the desired impacts. The important question is: what can be done to increase student learning? To address this issue, it is pertinent to look at best practice in high-performing systems. Importantly, the lessons from these systems are applicable at all levels of school education.

The biggest expenditure in school education is teacher salaries. Therefore, resource allocation decisions need to focus on teachers' working time. Initially, this needs to consider the division between teaching time and non-teaching time. Instruction hours and class sizes will be the main determinants of teaching time, with, for some teachers in particular, the breadth of the curriculum also having an impact.

Teachers' activities in their non-teaching time are critical for improving learning and teaching in schools. Careful considerations have to be given to these activities with the appropriate trade-offs identified.

Building and operational expenses are other significant cost categories. At the national level, these have increased substantially over the past few years. This included expenditure on computers and IT in the *Education Revolution*, and the *Building Education Revolution* expenditure. It is important to realise that there is little evidence of a significant impact of these investments on student learning (Hattie, 2009). Like overall education expenditure levels, once a minimum standard has been reached, there is little evidence showing a significant impact of investments in buildings and IT expenditure on student learning.

If we consider the example of Shanghai, resource allocations follow the evidence about 'what works'. In Shanghai, the average teacher teaches for 10–12 hours per week, compared to an average of 20 hours in Australia. The key trade-off is class size. In Shanghai, classes range, on average, between 35 and 45. This does not mean that class sizes of 45 students are ideal, or even preferable, but that is the trade-off that has been made. But the key aspect is how teachers' non-teaching time is devoted to improving learning and teaching in schools.

Considerable resources are devoted to teachers' ongoing school-based professional learning. Classroom observation and feedback is frequent. Considerable resources are devoted to teachers' research and professional learning, such that research is a key component of teachers' job description (and promotion criteria). Active professional collaboration is not something that is done after school finishes, but is a central component of effective teaching and schools. Identifying students learning needs, often in a collaborative environment is given considerable resources, as is the modelling of good teaching practice. This can lead to improvements in the structuring of lessons, classroom

management, individualised learning, active learning, and the development of advanced thinking skills and deductive reasoning (OECD, 2009a; Jensen, Hunter, Sonnemann, & Burns, 2012).

In contrast, similar policies in Australia too regularly are administrative exercises, disconnected from improving learning and teaching. The OECD survey (2009b) of Teaching and Learning (TALIS) shows that teacher appraisal and feedback is often disconnected from the classroom and that new teachers are no more likely to receive feedback on an observation of their teaching if they work in a school with, or without, a mentoring program.

There are numerous examples of effective practices in schools (and education systems) in high-performing systems that are pertinent to discussions of how to improve schooling in Australia (Jensen et al., 2012). High-quality teacher education and professional learning programs are crucial to improving school effectiveness. But a discussion of these programs is outside the scope of this short paper (OECD, 2009b; OECD, 2012).

The challenge lies in how best to reallocate resources to improve student learning; to increase active collaboration; to improve instruction through feedback based on careful observation of teachers' work; to improve teachers' content and pedagogical knowledge through school-based research. These activities have continually been shown to increase student learning (e.g. Hattie, 2009).

Generally, in school education we have not been strong at identifying the effectiveness of how we allocate our resources (Levin, 2001; Tsang, 1997). This needs to be done at all schools and each level of education systems. Improvements will come when we concentrate resources on constantly improving student learning. Its sounds simple but it requires investing resources in areas that have been

shown to improve student learning, and cutting resources in areas that do not. Doing what matters is easy. Only doing what matters is very difficult.

## References

- Bohrnstedt, G., & Stecher, B. M. (2002). *What we have learned about class size reductions in California*. Palo Alto, CA: CSR Research Consortium.
- Chingos, M. (2010). *The impact of a universal class-size reduction policy: Evidence from Florida's Statewide Mandate*. Program on Education Policy and Governance Working Papers Series, Harvard MA.
- Hanushek, E. (2003). The failure of input-based schooling policies. *Economic Journal*, 113(485), F64–F98.
- Harris, D. N. (2009). Toward policy-relevant benchmarks for interpreting effect sizes: Combining effects with costs. *Educational Evaluation and Policy Analysis*, 31(1), 3–29.
- Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge.
- Hoxby, C. (2000). The effects of class size on student achievement: New evidence from population variation. *Quarterly Journal of Economics*, 115(3 (November)), 1239–1285.
- Jensen, B., Hunter, A., Sonnemann, J., & Burns, T. (2012). *Catching up: Learning from the best school systems in East Asia*. Grattan Institute.
- Jensen, B., & Reichl, J. (2011). *Better teacher appraisal and feedback: Improving performance*. Melbourne: Grattan Institute.
- Jepsen, C., & Rivkin, S. (2009). Class size reductions and student achievement: The potential tradeoff between teacher quality and class size. *Journal of Human Resources*, 44(1), 223–250.
- Krueger, A. B. (2003). Economic considerations and class size. *Economic Journal*, 113(485), F34–F63.
- Leigh, A., & Ryan, C. (2011). Long-run trends in school productivity: Evidence from Australia. *Education Finance and Policy*, 6(1), 105–135.
- Levin, H. (2001). Waiting for Godot: Cost-effectiveness analysis in education. *New Direction for Evaluation*, 90(Summer), 55–68.
- Meyenn, B. (2008). *Class size reduction program: 2008 Evaluation Report*, NSW Department of Education and Training.
- Mishel, L. & Rothstein, R. (2002). *The class size debate*. Economic Policy Institute.
- OECD. (2009a). Change in reading performance between 2000 and 2009. Online database, figure V.2.1.
- OECD. (2009b). *Creating effective teaching and learning environments: First results from TALIS*. Paris: France.
- OECD. (2010a). *Education at a glance 2010*. Paris: OECD.
- OECD (2010b) *PISA 2009: What students can know and do: Student performance in reading, mathematics and science*. Paris: OECD.
- OECD. (2012). *The experience of new teachers – Results from TALIS 2008*. Paris, OECD.
- Productivity Commission. (2011). *Report on Government Services 2011*. Steering Committee for the Review of Government Service Provision. Canberra: Productivity Commission.
- Tsang, M. C. (1997). Cost analysis for improved policy making in education. *Educational Evaluation and Policy Analysis*, 19(4), 18–24.
- Thomson, S., De Bortoli, L., Nicholas, M., Hillman, K., & Buckley, S. (2010). *Challenges for Australian education: Results from PISA 2009*. Melbourne: Australian Council for Education Research.



# Poster Presentations



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The University of Western Australia,*

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**“I didn’t know I could think in that way!” Thinking Science Australia: effective intervention with an effect size.**

This paper presents research on the effects of a cognitive acceleration intervention in science lessons on low socio-economic students in a government high school in regional Western Australia (WA). Thinking Science Australia is a sustained professional development program over two years for science teachers. The research was conducted over two years as a case study in one school with students as they entered high school in Year 8. Data collection involved cognitive tests at the start and completion of the program and comparisons were made with an age-matched control group. Findings show that significant cognitive gains were made (effect size of 0.81), with concomitant improvement in the state-wide testing in science when participating students were in Year 9, aged 14, compared with all other students in WA. Teachers reported changes to the ways they teach and described the challenges in implementing the intervention program.

2 **Leanne Fried**

*School of University Partnerships  
Edith Cowan University WA*

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**The Professional Learning Community Model**

In the project presented in this poster, a Professional Learning Community (PLC) was chosen as a model for conducting research in a government primary school. The model automatically places research, teaching and learning in co-operation with each other, thus potentially avoiding problems traditionally experienced with conducting educational research. This poster presents the processes involved in the early stages of development of a PLC in a low socio-economic school in Western Australia. The PLC was based on the DuFour model with an action and results orientation, Collaboration and collective inquiry was used to gain an understanding of classroom reality, develop a clear picture of expected student learning and establish goals. The important stages in PLC development are presented together with issues and achievements experienced. Evidence to date in the project points towards the value of such a model in the process of school improvement.







# Conference program



## Sunday 26th August

6.00 – 7.30 AM Cocktails with the presenters – Sydney Convention Centre Bayside Gallery

## Monday 27th August

7.30 AM Conference registration – Sydney Convention Centre Bayside

8.30 AM Welcome to Country

9.00 – 10.15 AM Keynote Address I **Continual improvement through aligned effort**  
 Professor Geoff Masters (ACER)  
 Auditorium  
 Chair: Dr Sue Thomson (ACER)

10.15 AM Morning Tea

10.45 AM – 12.00 PM **Concurrent Sessions block 1**

Session A	Session B	Session C	Session D	Session E	Session F
<b>Differentiated classroom learning, technologies and school improvement: What experience and research can tell us</b> Professor Kathryn Moyle <i>(Charles Darwin University, NT)</i> 102 Chair: Philip Arthur (ACER) <i>Differentiated classroom learning</i>	<b>Transforming education through the Arts: Creating a culture that promotes learning</b> Professor Brian Caldwell and Dr Tanya Vaughan <i>(Educational Transformations, Vic)</i> 105 Chair: Dr Michelle Anderson (ACER) <i>Creating a culture that promotes learning</i>	<b>Walking the walk: The need for school leaders to embrace teaching as a clinical practice profession</b> Professor Stephen Dinham <i>(University of Melbourne, Vic)</i> 103 Chair: Ralph Saubern (ACER) <i>Effective teaching practices</i>	<b>Building professional capability in school improvement</b> Professor Helen Timperley <i>(University of Auckland, NZ)</i> Auditorium Chair: Kerry-Anne Hoard (ACER) <i>An expert teaching team</i>	<b>Using data to drive school improvement</b> Professor Helen Wildy <i>(University of WA)</i> 104 Chair: Marion Meiers (ACER) <i>Analysis and discussion of data</i>	<b>Conversation with a Keynote</b> Professor Geoff Masters (ACER) 101

12.00 – 1.00 PM Lunch and networking

1.00 – 2.15 PM Keynote Address 2 **Endgame: a self-improving school system**  
 Professor David Hargreaves *(Cambridge University, UK)*  
 Auditorium  
 Chair: Dr Sue Thomson (ACER)

2.15- 2.45 PM Afternoon tea

2.45 – 4.00 PM **Concurrent Sessions block 2**

Session G	Session H	Session I	Session J	Session K	Session L	Session M
<b>Effective strategies for implementing differentiated instruction</b> Associate Professor John Munro <i>(University of Melbourne, Vic.)</i> Auditorium Chair: Kerry-Anne Hoard (ACER) <i>Differentiated classroom learning</i>	<b>Improving school practices for Aboriginal and Torres Strait Islander students: The voices of their parents and carers</b> Ms Gina Milgate and Mr Brian Giles-Browne (ACER and Dare to Lead) 106 Chair: Lance Deveson (ACER) <i>Creating a culture that promotes learning</i>	<b>Effective teaching: Lessons from mathematics</b> Professor Mike Askew <i>(Monash University, Vic)</i> 102 Chair: Marion Meiers (ACER) <i>Effective teaching practices</i>	<b>Lessons for improvement from international comparative studies</b> Dr John Ainley (ACER) 105 Chair: Dr Sue Thomson (ACER) <i>Targeted use of resources</i>	<b>A personal and collective commitment to a focus on school improvement</b> Mr Mark Campling, Mr Stephen Savvakis and Ms Jane Sedgman <i>(Department of Education and Training Qld)</i> 103 Chair: Lynda Rosman (ACER) <i>An explicit improvement agenda</i>	<b>The influence of teaching strategies on student achievement in higher order skills</b> Professor Patrick Griffin <i>(University of Melbourne, Vic.)</i> 104 Chair: Chris Freeman (ACER) <i>Analysis and discussion of data</i>	<b>Conversation with a Keynote</b> Professor David Hargreaves <i>(Cambridge University, UK)</i> 101

What does research tell us about effective strategies?

## Tuesday 28th August

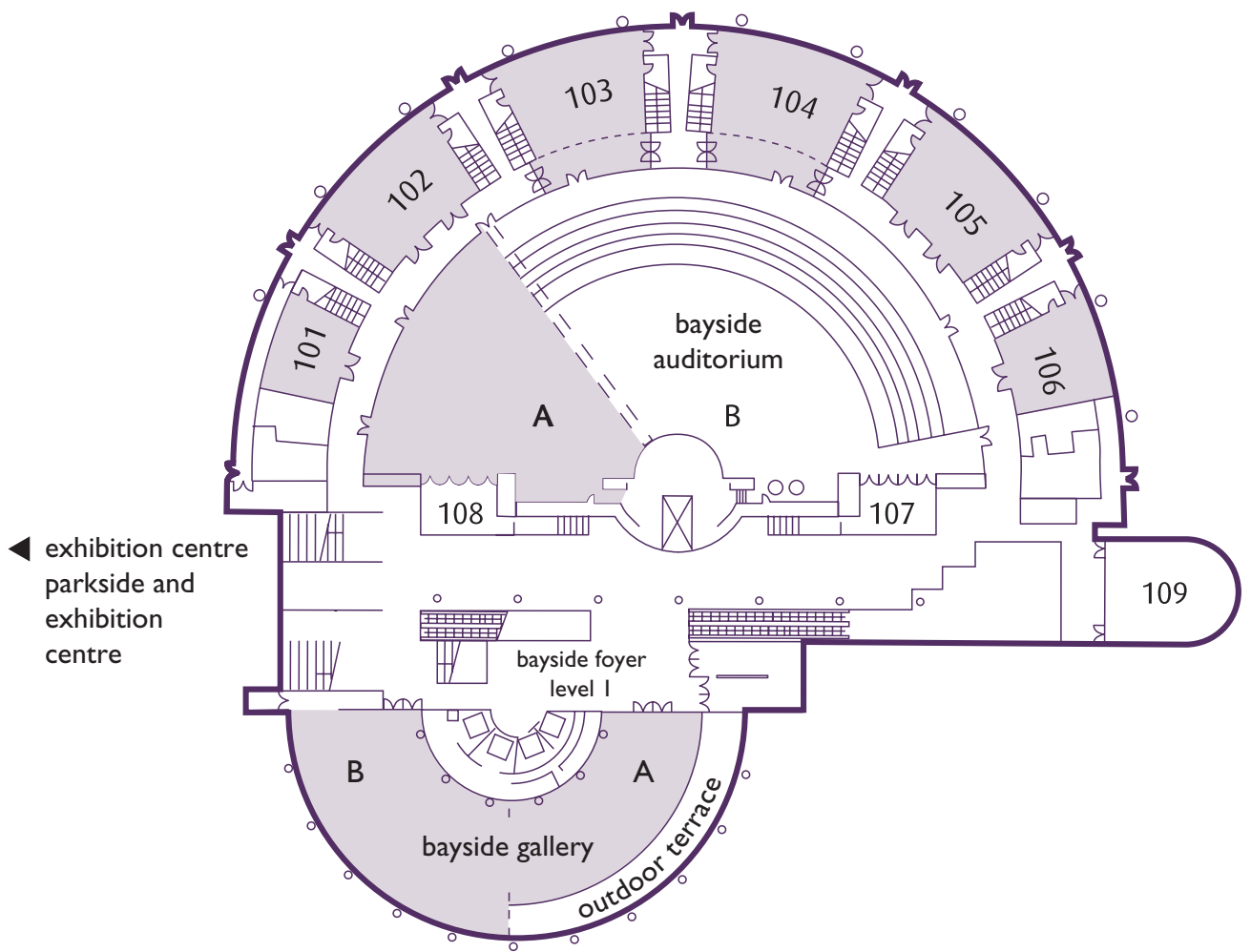
9.00 - 10.15 AM	Keynote Address 3	<b>Developing and implementing an explicit school improvement agenda</b> Dr Michele Bruniges (NSW Department of Education and Communities) Chair: Dr Sue Thomson (ACER)					
10.15 - 10.45 AM	Morning tea						
10.45 AM - 12.00 PM	<b>Concurrent Sessions block 3</b>						
	Session N	Session O	Session P	Session Q	Session R	Session S	Session T
	<b>SimScientists: An example of how technology can support differentiated instruction in the classroom</b> Dr Mike Timms (ACER) 106 Chair: Frances Eveleigh (ACER) <i>Differentiated classroom learning</i>	<b>The neighbourhood just got bigger: Schools and communities working together for change</b> Dr Michele Lonsdale, Dr Michelle Anderson and Ms Sharon Clerke (ACER) 102 Chair: Marion Meiers (ACER) <i>Creating a culture that promotes learning</i>	<b>Teachers are the Key: Strategies for instructional improvement</b> Ms Lynette Virgona (W.A. Department of Education and Training) 104 Chair: Kerry-Anne Hoad (ACER) <i>Effective teaching practices</i>	<b>Professional Practice Research: Ensuring teacher development through a critical approach to professional learning</b> Professor Tania Aspland (University of Adelaide SA) 103 Chair: Catherine Pearn (ACER) <i>An expert teaching team</i>	<b>Building teacher capacity and raising reading achievement</b> Dr Kathryn Glasswell (Griffith University, Qld) 105 Chair: Lynda Rosman (ACER) <i>Analysis and discussion of data</i>	<b>Targeting the things that matter</b> Dr Ben Jensen (Grattan Institute, Vic) Auditorium Chair: Chris Freeman (ACER) <i>An explicit improvement agenda</i>	<b>Conversation with a Keynote</b> Ms Valerie Hannon (Innovation Unit, UK) 101
12.00 - 1.00 PM	Lunch						
1.00 - 2.15 PM	Keynote Address 4	<i>Innovating a new future for learning: Finding our path</i> Ms Valerie Hannon (Innovation Unit, UK) Auditorium Chair: Dr Sue Thomson (ACER)					
2.15 - 2.30 PM	Conference Summary	Mr Anthony Mackay (Director ACER Board)					





Sydney  
Convention Centre  
Bayside Gallery  
floorplan





What does research tell us about effective strategies?





Conference  
delegates





*Dinner*

<i>Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
1	Mr Christopher Agnew	<i>Assistant Principal</i>	De La Salle College, NSW
	Ms Thalath Ahmed	<i>Student</i>	Flinders University, SA
	Dr John Ainley	<i>Principal Research Fellow</i>	ACER, VIC
	Mr Graeme Akers	<i>Education Officer Curriculum Secondary</i>	Brisbane Catholic Education, QLD
4	Mr Joseph Alexander	<i>Education Officer: Curriculum</i>	Brisbane Catholic Education, QLD
	Dr Intaj Ali	<i>Principal</i>	Malek Fahd Islamic School, NSW
	Mrs Jenny Allen	<i>Executive Director</i>	Bathurst Catholic Education Office, NSW
	Mrs Maria Anasiopoulos		Arthur Phillip High School, NSW
23	Mrs Jan Anderson	<i>Principal</i>	Beecroft Public School, NSW
	Dr Michelle Anderson	<i>Principal Research Fellow</i>	ACER, VIC
24	Mrs Paula Anderson	<i>Principal</i>	St Margaret's School, VIC
	Ms Sharon Anderson	<i>Teacher</i>	Sanctuary Point Public School, NSW
9	Ms Jill Annicchiarico	<i>Teacher</i>	Torrensville Primary School, SA
	Ms Gillian Anstee	<i>Head of Curriculum Teaching &amp; Learning</i>	SCECGS, Redlands, NSW
	Ms Deirdre Arendt	<i>Principal</i>	Collinsvale Primary School, TAS
	Mr John Armstrong	<i>Principal</i>	Cardinia Primary School, VIC
25	Miss Natalie Armstrong	<i>Principal</i>	Ajuga School, NSW
	Mr Simon Armstrong	<i>Principal</i>	The Lakes College, QLD
	Mr Terry Armstrong	<i>Creative Arts</i>	Casimir Catholic College, NSW
	Mrs Trish Armstrong	<i>Principal</i>	Lumen Christi Catholic Primary School, VIC
7	Mrs Voula Arnas	<i>Head Middle Year</i>	Aquinas College, VIC
	Mr Phillip Arthur	<i>Manager, System Testing</i>	ACER, NSW
	Ms Meredith Ash	<i>School Education Director</i>	DEC, NSW
31	Mr Mark Ashby		Mandurah Baptist College, WA
	Mr Greg Ashman	<i>Head of Mathematics</i>	Ballarat Clarendon College, VIC
2	Dr Mark Askew	<i>Head of Educational Services</i>	Catholic Schools Office, NSW
	Professor Mike Askew	<i>Prof. of Primary Education</i>	Monash University, VIC
25	Professor Tania Aspland	<i>Professor in Teacher Education</i>	The University of Adelaide, SA
	Ms Leonie Atkins	<i>Curriculum Coordinator</i>	Redlands, NSW
20	Mr Brendan Atley	<i>Principal</i>	St Mary's Primary School, VIC
	Ms Vvienne Awad	<i>Principal</i>	Domremy College, NSW
3	Mr David Axworthy	<i>Deputy Director-General, Schools</i>	DET, WA
	Mr Cameron Bacholer	<i>Director of Teaching &amp; Learning</i>	The Peninsula School, VIC
	Mr Graham Badge	<i>Head of Junior School</i>	Tranby College, WA
30	Miss Linda Baird	<i>Network Leader</i>	Office for Schools, ACT
	Mrs Christina Baker	<i>Assistant Principal</i>	Pakenham Hills Primary School, VIC
	Mr David Baker	<i>Deputy Principal</i>	Mentone Grammar School, VIC
	Mr Mark Baker	<i>Principal</i>	St Paul's College, NSW
	Ms Nicole Baker	<i>Teacher</i>	Duncraig Senior High School, WA
	Mr Stephen Baker	<i>Assistant Principal</i>	St Monica's College, VIC

<i>Dinner Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
5	Mr Daniel Balacco	<i>Manager Programs &amp; Projects</i>	DECD, SA
	Mr Damien Barker	<i>Area Supervisor</i>	Brisbane Catholic Education, QLD
	Mrs Lynette Barker	<i>Teacher-Librarian</i>	St Therese's Primary School, NSW
	Mr Michael Barra	<i>Mathematics Education Officer</i>	Brisbane Catholic Education, QLD
25	Mrs Enrika Barron	<i>5/6 Leader</i>	Lumen Christi Catholic Primary School, VIC
30	Mrs Kathryn Barry	<i>Deputy Head of Prep. - Curriculum</i>	TSS Preparatory School, QLD
	Mrs Josephine Bartlett	<i>Deputy Principal</i>	Toodyay District High School, WA
32	Mr Travis Bartlett	<i>Deputy Principal</i>	Allenby Gardens Primary School, SA
	Mr Craig Bassingthwaighte	<i>Headmaster</i>	Somerset College, QLD
13	Ms Kerri Batch	<i>Director of Teaching &amp; Learning</i>	Aitken College, VIC
	Mr Craig Battams	<i>Principal</i>	St Patrick's Special School, SA
	Mrs Jodi Bavin	<i>Maths Teacher</i>	Duncraig Senior High School, WA
	Mr Michael Bawden	<i>Principal</i>	Aldgate Primary School, SA
	Mrs Donella Beare	<i>Head of Secondary</i>	St Stephen's School, WA
	Mr David Beattie	<i>Principal</i>	Tuggerah Lakes Secondary College
	Mrs Jo Bednall	<i>Principal</i>	Tranby College, WA
19	Mr Antoon Been	<i>Support Officer</i>	John Calvin Schools, WA
	Mrs Naomi Belgrade	<i>Head of Mathematics</i>	Woodcroft College, SA
	Mr Andrew Bell	<i>Principal</i>	Snowy Mountains Grammar School, NSW
31	Dr Anne Bellert	<i>Administrative Officer</i>	Catholic Schools Office, NSW
	Mr Dan Belluz	<i>Coordinator - Teaching/Learning</i>	Brighton Grammar School, VIC
15	Mr Peter Bennet	<i>Data Management Leader</i>	Fitzroy High School, VIC
17	Mr Paul Bennett	<i>Principal</i>	St Brigid's Catholic School, SA
	Ms Christine Benson	<i>Head of Primary</i>	St Stephen's School, WA
10	Mrs Jenni Beri	<i>Deputy Principal</i>	The Willows State School, QLD
	Mrs Elizabeth Bernasconi	<i>Deputy Principal</i>	Cammeray Public School, NSW
	Ms Lyn Berryman		Nelson Cengage Learning Pty Ltd
	Miss Katrina Berwick	<i>HAT</i>	Crawford Public School, NSW
22	Mrs Christine Bessant	<i>Head of Junior School</i>	Thomas Hassall Anglican College, NSW
	Mr Matthew Best	<i>Assistant Principal</i>	Warrawong Primary School, NSW
	Mr Warren Best	<i>Head of Middle School</i>	Nambour Christian College, QLD
7	Ms Jessie Bice	<i>Policy &amp; Research Analyst</i>	Independent Schools Council, Australia
	Mrs Therese Bielinko	<i>Mathematics Teacher</i>	Queenwood School for Girls, NSW
12	Mrs Nina Bilewicz	<i>Vice Principal</i>	Penleigh & Essendon Grammar, VIC
	Mrs Cate Birch	<i>Principal</i>	St Anthony's School, SA
11	Ms Angela Bird	<i>Principal</i>	Lenah Valley Primary, TAS
21	Mr Daniel Bishop	<i>Principal</i>	DETE, QLD
	Mrs Melanie Bishop	<i>Leading Teacher</i>	Coatesville Primary School, VIC
	Mr Steve Bishop	<i>HOD Maths</i>	Matthew Flinders Anglican College, QLD
	Ms Beth Blackwood	<i>Principal</i>	Presbyterian Ladies' College, WA
11	Mr Christopher Blake	<i>Principal</i>	Penola Catholic College, VIC
	Mrs Kate Blake	<i>HSIE Coordinator</i>	Casimir Catholic College, NSW

<i>Dinner Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
	Mr John Bleckly	<i>LNNP Numeracy Manager</i>	DECD, SA
	Mr Jamie Blowes	<i>Principal</i>	St Therese School, SA
14	Mrs Kay Blundell	<i>Professional Officer</i>	Catholic Education Office, NSW
	Mr Paul Blundell	<i>Area Supervisor</i>	Brisbane Catholic Education, QLD
	Mrs Marg Blythman	<i>Deputy Principal</i>	St Francis Xavier College, VIC
32	Ms Anna Bock	<i>School Advisor Mathematics</i>	Catholic Education Office, VIC
	Miss Wendy Boggs	<i>Teacher</i>	Duncraig Senior High School, WA
	Mrs Fran Bonanno	<i>Assistant Principal</i>	St John Bosco Catholic Primary, NSW
23	Mrs Anita Bond	<i>Principal - Early Phase</i>	North Lakes State College, QLD
	Ms Rosa Bondza	<i>Strategic Program Coordinataor</i>	DECD, SA
	Mr Mark Bonnici	<i>Deputy Principal</i>	St Edward's College, NSW
	Mr Jason Borton	<i>Principal</i>	Richardson Primary School, ACT
	Mr Darrell Bottin	<i>Stage 5 Dean</i>	Kempsey Adventist School, NSW
	Mr Christopher Bounds	<i>Assistant Principal</i>	Chevalier College, NSW
	Mrs Paula Bounds	<i>Principal</i>	Bethlehem College, NSW
	Ms Elizabeth Bourke	<i>Principal</i>	Claremont College, TAS
17	Mrs Mary Bourke	<i>Director of Learning</i>	St Francis Xavier College, VIC
	Ms Melanie Boyd		AITSL, VIC
	Mr Tony Boyle	<i>Principal</i>	St Joseph's Primary School, NSW
	Mrs Grace Bradley	<i>Head of Learning Area English</i>	Como Secondary College, WA
	Mrs Lorraine Bradwell	<i>Principal</i>	Woonona Public School, NSW
	Ms Laura Brady	<i>VCE Coordinator</i>	Ballarat Clarendon College, VIC
	Mrs Natalie Bratby	<i>Teacher/Coordinator</i>	Holy Family School, NSW
	Mrs Cathy Brennan	<i>Principal Education Officer</i>	DEC, NSW
	Mr Matthew Brennan	<i>Director of Boarding</i>	St Gregory's College, NSW
30	Mrs Tania Brewer	<i>Head of Primary</i>	The Springfield Anglican College, QLD
	Mr Wade Bridgwood	<i>Deputy Principal</i>	Beecroft Public School, NSW
	Mr Farley Briggs	<i>Head of Inclusion &amp; Enrichment</i>	Westminster School, SA
	Mrs Helen Briggs	<i>Leading Teacher</i>	Chandler Park Primary School, VIC
28	Mrs Zelda Brissenden	<i>Teacher</i>	St Patrick's Primary School, VIC
	Mr Ian Broadley	<i>Head of International Programs</i>	Oxley Christian School, VIC
	Mrs Sally Broadley	<i>Principal</i>	Oxley Christian School, VIC
	Mr Mark Brockhus		Salesian College, VIC
	Mr Dan Broderick	<i>Head School Org.</i>	Aquinas College, VIC
	Mrs Michelle Brodrick	<i>Director of Curriculum</i>	St Joseph's College, VIC
27	Mr Patrick Brodrick	<i>Principal</i>	Our Holy Redeemer School, VIC
	Mr Richard Brodrick	<i>Student Management Coordinator</i>	St Joseph's College, VIC
27	Ms Lindy Brooke	<i>Principal</i>	Richmond Primary School, SA
	Mr Paul Brooks	<i>Director of Teaching &amp; Learning</i>	St Joseph's College, NSW
24	Miss Ann Brown	<i>Senior Leader 1</i>	West Lakes Shore School, SA
	Mr Garry Brown	<i>Deputy Principal</i>	Qld Academy for Health Sciences, QLD
	Mrs Julie Brown	<i>Mathematics Coordinator</i>	Catherine McAuley High School, NSW
	Ms Penny Brown	<i>Education Development Manager</i>	Social Ventures Australia, NSW

*Dinner*

*Table No.*

*Name*

*Position*

*Delegate Organisation*

	Mrs Sue Brown	<i>Principal</i>	Uralla Central School, NSW
	Mr Wayne Brown	<i>Director of Staff Development</i>	The Hutchins School, TAS
	Ms Marcia Brumpton	<i>Head of Teaching &amp; Learning</i>	St Margaret's Anglican Girls' School, QLD
1	Dr Michele Bruniges	<i>Director General</i>	DEC, NSW
18	Mrs Catherine Bryant	<i>Executive Asst. Director</i>	St Joseph's Primary School, NSW
	Mr Gavin Bryce		Coorparoo Secondary College, QLD
	Mrs Donna Bucher	<i>Senior Adviser - Curriculum &amp; Pedagogy</i>	Catholic Education Office, TAS
	Mrs Suzanne Budd	<i>Curriculum Coordinator</i>	All Saints Catholic School, SA
	Mrs Betty Burchard	<i>Regional Leadership Consultant</i>	DECD, SA
	Miss Eloise Burgess	<i>Head Teacher HSIE</i>	St Mary's Senior High, NSW
	Ms Melissa Burke	<i>Principal</i>	Qld College of Teachers, QLD
	Mr Janessa Burkhardt	<i>Curriculum Coordinator</i>	Mansfield Secondary College, VIC
	Dr Ruth Burnett	<i>Learning Enhancement</i>	Brigidine College, QLD
	Mrs Jacqui Burrage	<i>Deputy Principal - Primary School</i>	Mandurah Baptist College, WA
30	Ms Sue Burtenshaw	<i>Principal</i>	Findon High School, SA
	Mrs Deborah Buscall	<i>Regional Consultant</i>	Catholic Education Office, NSW
	Mrs Judith Butcher	<i>Head of Preparatory School</i>	Ascham School, NSW
18	Mr Warren Butler	<i>HOD Science</i>	West Moreton Anglican College, QLD
	Mrs Christine Butterworth	<i>Manager - Student Support</i>	Catholic Education, TAS
30	Miss Gail Butterworth	<i>Leading Teacher</i>	Pakenham Hills Primary School, VIC
9	Mrs Margaret Buttigieg	<i>Principal</i>	Casey Grammar School, VIC
25	Mr Anthony Butts	<i>Principal</i>	St Mary's Primary School, VIC
	Ms Angela Byron	<i>School Development Officer</i>	DEC, NSW
	Mr Paul Cahill	<i>Head of Secondary Curriculum</i>	Catholic Education Office, NSW
	Mrs Tania Cairns	<i>Head of Learning</i>	Emmaus Catholic College, NSW
	Ms Janet Cairncross	<i>Teaching &amp; Learning Coordinator</i>	Casimir Catholic College, NSW
	Professor Brian Caldwell	<i>Managing Director and Principal Consultant</i>	Educational Transformations, VIC
	Mrs Wendy Camenzuli	<i>Deputy Principal</i>	Toodyay District High School, WA
	Mrs May Camilleri	<i>Principal</i>	Marymount College, SA
	Mr Bruce Campbell	<i>Head of College</i>	Nambour Christian College, QLD
4	Mr Mark Campling	<i>Assistant-Director General, School Performance</i>	DETE, QLD
	Ms Maria Canala	<i>Principal Consultant</i>	Catholic Education, SA
23	Ms Anne Cannizzaro	<i>Principal</i>	West Lakes, SA
27	Mrs Lisa Canty	<i>Head of Teaching &amp; Learning</i>	Our Holy Redeemer School, VIC
6	Ms Keren Caple	<i>General Manager</i>	AITSL, VIC
	Ms Tracey Cappie-Wood	<i>Director UC Schools</i>	University of Canberra, ACT
8	Mr Jeff Capuano	<i>Director of Educational Research Unit</i>	Ivanhoe Grammar School, VIC
	Ms Nada Carapina	<i>Primary Curriculum Officer</i>	Board of Studies, NSW
	Mr Michael Carniato	<i>Principal</i>	John Paul College, NSW
	Ms Beverley Carr	<i>Director of Learning Support</i>	The Friends' School, TAS

<i>Dinner Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
9	Ms Leanne Carr	<i>Principal Consultant</i>	Catholic Education Office, SA
	Mr Richard Carroll	<i>Director of Studies</i>	Ballarat Grammar School, VIC
33	Ms Margo Carwardine	<i>Assistant Principal</i>	St Columba's School, QLD
	Mr Thomas Casey	<i>Teacher</i>	All Saints Anglican School, QLD
5	Ms Kate Castine	<i>Manager Programs &amp; Projects</i>	DECD, SA
	Mrs Colleen Catford	<i>Senior Coordinator</i>	AIS, NSW
	Mr John Cattoni	<i>Principal</i>	Wavell Heights State School, QLD
	Mrs Bernadette Caulfield	<i>Director of Studies: Senior Years</i>	Melbourne Girls Grammar, VIC
	Mrs Suzanne Cavanagh	<i>Senior Education Officer</i>	Catholic Education Office, QLD
4	Ms Christine Cawsey	<i>Principal</i>	Rooty Hill High School, NSW
	Mr David Chadwick	<i>Regional Director</i>	DECD, SA
	Ms Sharlene Chadwick	<i>Education Manager</i>	PEER Support Australia, NSW
26	Mr Anthony Chalkley	<i>Principal</i>	St Patrick's School, VIC
	Mr Manoj Chandra Handa	<i>School Development Officer</i>	DEC, NSW
33	Mr Peter Chapman	<i>Principal</i>	St Joseph's College, QLD
	Mr Jon Charlton	<i>Principal</i>	Kilvington Grammar School, VIC
	Dr Angela Chessman	<i>Director of Research &amp; Innov. Learning</i>	Abbotsleigh, NSW
	Mr Glenn Chippendale	<i>Deputy Principal</i>	Benowa State High School, QLD
25	Mrs Marilyn Cimera	<i>Deputy Principal</i>	Lumen Christi Catholic Primary School, VIC
	Ms Grace Cini	<i>Deputy Principal</i>	Catholic Regional College, VIC
	Mrs Genevieve Clark	<i>Principal</i>	Peace Lutheran Primary School, QLD
20	Mr Steve Clarke	<i>Head of School</i>	John Hartley School (B-7)
4	Ms Sharon Clerke	<i>Senior Project Director - Schools First</i>	ACER, VIC
32	Mrs Julie Cobbledick	<i>Education Consultant</i>	Catholic Education Office, VIC
	Mrs Rhonda Cochrane	<i>Deputy Principal</i>	Wavell Heights State School, QLD
	Mr Sean Cocoran	<i>Head of English</i>	Newington College, NSW
	Mrs Sidonie Coffey	<i>Principal</i>	St Joseph's Primary School, NSW
	Mrs Eileen Coghill	<i>Education Officer Curriculum Primary</i>	Brisbane Catholic Education, QLD
24	Mr Leon Colla	<i>Principal</i>	Queen of Peace Primary School, VIC
31	Mr David Collie	<i>Primary School Consultant</i>	Catholic Schools Office, NSW
	Dr John Collier	<i>Head of School</i>	St Andrew's Cathedral School, NSW
7	Ms Colette Colman	<i>Policy Analyst &amp; Research Manager</i>	Independent Schools Council, Australia
	Mrs Shauna Colnan	<i>Head of Curriculum</i>	Abbotsleigh, NSW
	Mr John Coman	<i>Senior Education Officer</i>	Catholic Education Office, QLD
	Mr Shaun Conlan	<i>Head Teacher</i>	Fairfield High School, NSW
	Mrs Jayne Conley	<i>Associate Principal</i>	Jolimont Primary School, WA
	Ms Megan Connors	<i>Deputy Principal</i>	James Ruse Agric. High School, NSW
	Ms Jill Conole	<i>Senior Education Adviser</i>	Catholic Education, SA
	Ms Amanda Conray	<i>Head Teacher</i>	Fairfield High School, NSW
	Ms Fiona Conroy	<i>Principal Education Officer</i>	DEC, NSW
	Ms Monica Conway	<i>Assistant Director</i>	Catholic Education, SA

<i>Dinner Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
	Mr Allan Cook	<i>Principal</i>	ISIS District State High School, QLD
13	Mr Douglas Cook	<i>Principal</i>	Yale Primary School, WA
16	Ms Tracey Cook	<i>Deputy Principal</i>	Woodridge State High School, QLD
	Mrs Bianca Cooke	<i>Assistant Director</i>	Good Shepherd School, NSW
16	Ms Jan Cooper	<i>Principal</i>	Annandale State School, QLD
	Ms Janene Cooper		Vision Education, NZ
10	Mr Steven Coote	<i>Principal</i>	Winthrop Baptist College, WA
	Ms Terri Cornish	<i>Sales Manager</i>	ACER, NSW
	Mr Terry Corrigan	<i>Principal</i>	St Patrick's School, VIC
	Mr Garry Costello	<i>Head of Schools</i>	DECD, SA
	Mrs Sandra Cottam	<i>Snr Consultant Primary Teacher Development</i>	Department of Education, WA
	Dr Michelle Cotter	<i>Principal</i>	Mercy College, VIC
	Mrs Sue Court	<i>Education Officer</i>	Catholic Education Office, NSW
	Mr John Cowan	<i>Coordinator</i>	Christ The King Primary, NSW
	Mrs Elizabeth Cox	<i>Head of Curriculum &amp; Pedagogy</i>	Norwest Christian College, NSW
11	Mr Philip Crane	<i>Head of Staff Services</i>	St Mark's Anglican Comm. School, WA
	Mrs Pamela Crawley	<i>Principal</i>	Cammeray Public School, NSW
14	Mrs Anne-Maree Creeaune	<i>Team leader, Curriculum &amp; Pedagogy</i>	Catholic Education Office, NSW
	Ms Mary Creenaune	<i>Principal</i>	Good Shepherd School, NSW
	Mr Tony Crehan	<i>Executive Director</i>	Independent Schools, TAS
9	Mrs Stephanie Cremin	<i>Principal</i>	Leaning Tree Community School, WA
	Mr Rick Cricelli	<i>Head of Science</i>	Somerville Baptist College, WA
30	Mr Steve Croft	<i>Head of College</i>	The Springfield Anglican College, QLD
	Mrs Suzanne Cronan	<i>Education Officer Curriculum Primary</i>	Brisbane Catholic Education, QLD
	Mr Simon Crook	<i>eLearning Adviser</i>	Catholic Education Office, NSW
	Mrs Jennifer Crossman	<i>Deputy Principal</i>	Kambala, NSW
	Mr David Crowe	<i>Principal</i>	Singleton Public School, NSW
	Mrs Nicole Crowe	<i>H.T. PDHPE</i>	Maitland Grossmann High School, NSW
	Ms Kimberley Crowley	<i>Humanities Head</i>	Lowther Hall AGS, VIC
4	Mr Michael Crowther	<i>Director</i>	DEEWR, ACT
	Mr Daniel Crump	<i>Curriculum Leader</i>	Mt Alvernia College, QLD
	Mr Alexander Cubis	<i>Adviser</i>	Cubis, ACT
	Mrs Kristi Culley	<i>Assistant Principal</i>	Cessnock East Public School, NSW
	Ms Ros Curtis	<i>Principal</i>	St Margaret's Anglican Girls' School, QLD
	Ms Maria D'Agostino	<i>Professional Officer</i>	Catholic Education Office, NSW
	Miss Helen Dallas	<i>Stage Coordinator</i>	Wenona School, NSW
15	Mr Tom Daly	<i>Principal</i>	Upwey High School, VIC
	Mr Derek Danby	<i>Deputy Principal</i>	Beecroft Public School, NSW
11	Mrs Lucy D'Angelo	<i>DP Teaching &amp; Learning</i>	Penola Catholic College, VIC
13	Mrs Brooke Daniels	<i>Education Officer</i>	School Service Centre North, QLD
	Mrs Sheevaun Darby	<i>Deputy Curriculum</i>	St Stephen's School, WA
	Mrs Tania Darling	<i>Deputy Head</i>	Scotch College Jnr. School, SA



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<i>Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
17	Ms Neila Darrough	<i>Deputy Principal</i>	St John's Catholic College, NT
9	Miss Jessica Dart	<i>Teacher</i>	Cardinia Primary School, VIC
	Ms Clare Das-Neves	<i>Teacher</i>	Westlawn Public School, NSW
	Mr Christopher Daunt Watney		Trinity Anglican School, QLD
	Ms Louise Davidson	<i>Head of Learning Area English</i>	Australind SHS, WA
24	Ms Tracey Davies	<i>Head of School</i>	Woodville Gardens School 3-7, SA
	Dr Alison Davis	<i>Director</i>	Vision Education, NZ
	Ms Anna Davis	<i>Science Coordinator</i>	Casimir Catholic College, NSW
	Mr Ken Davis	<i>SDO</i>	DEC - Riverina, NSW
	Mr Ray Davis	<i>Associate Director Accreditation</i>	Council of International Schools, VIC
	Ms Trish Davis	<i>HOD - Mathematics</i>	Wenona School, NSW
	Ms Fran Dawning	<i>Principal</i>	Bonner Primary School, NSW
	Mr Adam Day	<i>Head of Secondary Years</i>	Norwest Christian College, NSW
17	Mrs Anne-Marie Day	<i>Principal</i>	Ooonoonba State School, QLD
12	Mrs Tanya De Maio	<i>Consultant</i>	Catholic Education Office, WA
	Mr Rohan Deanshaw	<i>Principal</i>	Kempsey Adventist School, NSW
	Dr John DeCourcy	<i>Director, Strategy</i>	Parramatta Catholic Education Office, NSW
34	Mrs Carmel Delintsch	<i>Assistant Principal</i>	Our Lady of the Rosary, NSW
	Ms Tracey D'Elton	<i>Maths Head</i>	Lowther Hall AGS, VIC
17	Mr Chris Derwin	<i>Schools Consultant</i>	CEO Bathurst, NSW
5	Mr Lance Deveson	<i>Library and Information Manager</i>	ACER, VIC
	Ms Sandra Diafas	<i>Principal</i>	Star of the Sea College, VIC
15	Ms Sandra Dickins	<i>Team Leader</i>	Fitzroy High School, VIC
	Ms Maureen Dillon	<i>Teacher Librarian</i>	St Joseph's Primary School, NSW
	Mrs Catherine Dimmick	<i>LNIT</i>	Seton College, QLD
17	Mrs Rachel Dingle	<i>Senior Statistician</i>	NZCER, NZ
	Professor Stephen Dinham	<i>Director Learning and Teaching</i>	University of Melbourne, VIC
23	Ms Kate Dishon	<i>Principal</i>	Catholic Regional College, VIC
	Mrs Erika Dixon	<i>Sped. Consultant</i>	Catholic Education, SA
	Ms Karyn Docking	<i>Consultant</i>	GRM International, VIC
	Dr Bronwyn Donaghey	<i>Senior Policy Adviser</i>	Association of Independent Schools, SA
	Mrs Amanda Donlan	<i>Principal</i>	Northbridge Public School, NSW
	Ms Anne Donnelly	<i>Principal</i>	Emmaus Catholic School, SA
28	Mrs Mary Dorrian	<i>Head of Service</i>	Catholic Education Office, ACT
	Mr Jamie Dorrington		Saint Stephen's College, QLD
	Mr Tony Dosen	<i>Director of Teaching &amp; Learning</i>	Moreton Bay Boys' College, QLD
	Mr Peter Douglas	<i>Principal</i>	Sacred Heart School, TAS
	Mrs Toni Douglas	<i>Principal</i>	Spreyton Primary School, TAS
	Ms Leonie Dowd	<i>Assistant Principal</i>	Mary MacKillop College, NSW
	Ms Liz Dowd	<i>Director</i>	DEEWR, ACT
	Mrs Lilian Dowell	<i>CEO</i>	DEC, NSW
	Mrs Gabrielle Downie	<i>Principal</i>	St Joseph's Primary School, VIC

*Dinner*

*Table No.*

*Name*

*Position*

*Delegate Organisation*

	Mr Adrian Drane	<i>Deputy Principal</i>	Notre Dame College, VIC
	Mr Trent Driver	<i>Dean of Academic Development</i>	Brisbane Girls' Grammar School, QLD
	Mrs Maureen Duddy	<i>Deputy Principal</i>	Hampton Senior High School, WA
	Ms Annie Duggan	<i>Acting Principal</i>	Catholic Schools Office, NSW
27	Mr Francis Dullard	<i>Principal</i>	St Liborius Primary School, VIC
	Ms Karen Duncan	<i>Principal</i>	Medina Primary School, WA
	Ms Leesa Duncan	<i>Teaching and Learning Leader</i>	St Clent of Rome, VIC
	Mr Stephen Dunk	<i>Director of Studies</i>	Pymble Ladies College, NSW
	Ms Diane Dunn	<i>School Educ. Director</i>	DET, NSW
	Mr Jamie Dunnill	<i>Senior Sace Officer</i>	SACE Board of SA
	Mr Gavin Dykes	<i>Deputy Principal</i>	Notre Dame College, VIC
13	Ms Karen Dymke	<i>Director of Learning</i>	Luther College, VIC
	Mr Tim Edmonds	<i>Head of Curriculum</i>	Pembroke School, SA
	Mrs Christine Edwards	<i>Manager, Special Projects</i>	Tasmanian Catholic Education Office, TAS
	Mrs Sally Egan	<i>Head of Learning and Innovation</i>	Saint Ignatius College, NSW
	Ms Shirley Ellis	<i>Partnership Mentor</i>	Orange Schools Office, NSW
	Mr Peter Elmoreo	<i>Principal</i>	St Thomas More College, QLD
	Ms Karen Endicott	<i>Principal</i>	Sarah Redfern High School, NSW
	Ms Kathryn Entwistle	<i>Principal</i>	Riverdale R-7 School, SA
	Mrs Danielle Ervine	<i>Rel. DP</i>	St Mary's Senior High, NSW
	Mr Colin Esdale	<i>Head of Mathematics - Junior</i>	Ballarat Clarendon College, VIC
9	Mrs Trudie Esler	<i>Teacher</i>	Cardinia Primary School, VIC
	Mr Matthew Evans	<i>Religious Education Coordinator</i>	St John Bosco Catholic Primary, NSW
	Miss Sheri Evans	<i>Deputy Principal</i>	Guildford Public School, NSW
7	Ms Frances Eveleigh	<i>State Manager, Systemwide Testing</i>	ACER, NSW
	Ms Kylie Fabri	<i>HT Welfare</i>	Rutherford Technology High School, NSW
	Mr Chris Fanning	<i>Assistant Principal</i>	Catholic Schools Office, NSW
20	Ms Mary Farah	<i>Deputy Principal</i>	Catholic Ladies College, VIC
16	Mr Oronzo Farina	<i>Principal</i>	St Augustine's College, VIC
	Mr Peter Faulkner	<i>Principal</i>	St Leonards Primary School, TAS
	Ms Milly Fels	<i>Manager Equity</i>	RMIT University, VIC
	Mr Greg Feltis	<i>Assistant Principal</i>	John Paul College, NSW
	Mrs Margaret Ferguson	<i>Teacher</i>	Holy Family Primary School, NSW
	Mr Harry Fernandez	<i>Assistant Principal</i>	Bede Polding College, NSW
27	Mr David Fetterplace	<i>Assistant Principal</i>	All Saints Catholic Boys College, NSW
	Mr Westley Field	<i>Director of Learning Innovation</i>	Waverley College, NSW
31	Mrs Judith Finan	<i>Assistant Principal</i>	St Ursula's College, QLD
	Mrs Elizabeth Fitzgerald	<i>Assistant Principal</i>	St Lukes School, NSW
32	Mr Grant Fitzgerald	<i>Snr Educ. Officer</i>	Catholic Education Office, VIC
	Mr Allan Fjording	<i>Principal</i>	Snowy Mountains Christian School, NSW
	Mr Max Fletcher	<i>Deputy Director</i>	Catholic Education Office, VIC
18	Mr Neil Flottmann	<i>Director of Curriculum</i>	West Moreton Anglican College, QLD
	Ms Jennifer Foldes	<i>Adviser: Religious Education</i>	Catholic Education Office, NSW

<i>Dinner Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
	Ms Karen Forbes	<i>Principal</i>	Catholic Schools Office, NSW
	Ms Carolyn Ford		All Saints Catholic Primary School, NSW
	Mr Richard Ford	<i>Director of Teaching &amp; Learning</i>	St Andrew's Cathedral School, NSW
28	Mr Gordon Forrest	<i>Teacher</i>	St Patrick's Primary School, VIC
	Mrs Cathy Forrester	<i>Head of Primary Curriculum</i>	Catholic Education Office, NSW
	Mr Mark Fowler	<i>Head of Curriculum</i>	Urangan Point State School, QLD
	Mrs Karen Fox	<i>Deputy Principal</i>	Notre Dame College, VIC
29	Mrs Marita Fox	<i>Literacy &amp; Numeracy Improvement Teacher</i>	St Augustine's College, QLD
	Ms Josephine Foxcroft	<i>Director of Curriculum &amp; Learning</i>	Presbyterian Ladies' College, VIC
27	Mrs Denise Frantz	<i>Principal</i>	St Joseph's School, VIC
32	Ms Celia Franze	<i>School Adviser, Learning &amp; Teaching</i>	Catholic Education Office, VIC
	Mr Brendan Fraser	<i>Dean of Middle Years</i>	Xavier College, VIC
25	Mrs Cate Fraser	<i>Principal</i>	St Mary's Primary School, VIC
	Miss Tiali Fraser	<i>Director of Curriculum</i>	Arden Anglican School, NSW
7	Mr Chris Freeman	<i>Research Director of Systemwide Testing</i>	ACER, NSW
	Dr Leanne Fried	<i>Post Doctoral Fellow</i>	Edith Cowan University, WA
	Ms Deborah Frizza	<i>Head of Bayview</i>	Mentone Grammar School, VIC
	Ms Gina Galluzzo	<i>Senior Curriculum Officer</i>	CEO, ACT
	Mrs Tosca Galluzzo	<i>Teacher Educator</i>	Catholic Education Office, NSW
	Mr Paul Gavin	<i>Deputy Principal</i>	Sarah Redfern High School, NSW
	Mrs Karen Geary	<i>Assistant Principal</i>	Warrawong Primary School, NSW
	Mr Tony George	<i>Principal</i>	St Stephen's School, WA
27	Mr Jason Gerachty	<i>Principal</i>	Our Holy Redeemer School, VIC
12	Mrs Carol Geurts	<i>Principal Schools Advisor</i>	Catholic Education Office, WA
15	Mr James Giannopoulos	<i>School Adviser Mathematics</i>	CEOM, VIC
	Mr Jason Gibbs	<i>Head Senior School</i>	Merrimac S.H.S., QLD
	Mr Brenden Gifford	<i>Dean of Curriculum</i>	Carey Baptist College, WA
	Mrs Deb Gilbert	<i>HT Welfare</i>	Bulahdelah Central School, NSW
	Ms Desire Gilbert	<i>Adviser</i>	Association of Independent Schools, SA
5	Mr Brian Giles-Browne	<i>National Schools Coordinator</i>	Dare to Lead, NSW
10	Mr Chris Gill	<i>Deputy Principal</i>	Bundaberg State High School, QLD
	Mr Sean Gill	<i>Head of School Services</i>	Tasmanian Catholic Education Office, TAS
11	Mrs Sharyn Gill	<i>Principal</i>	Austins Ferry Primary School, TAS
33	Mr Mark Gillett	<i>Principal</i>	Department of Education, WA
	Ms Beth Gilligan	<i>Principal</i>	Dominic College, TAS
	Mrs Kathryn Gilmour	<i>Deputy Principal</i>	Riverdale R-7 School, SA
	Ms Jodie Gioria	<i>Assistant Principal</i>	Mary Immaculate Primary School, NSW
12	Mr Craig Glass	<i>Senior Vice Principal</i>	Haileybury, VIC
3	Dr Kathryn Glasswell	<i>Senior Lecturer</i>	Griffith University, QLD
	Mr Anthony Gleeson	<i>Principal</i>	St Leo's Catholic College, NSW
32	Ms Liz Gleeson	<i>Secondary Principal Consultant</i>	Catholic Education Office, VIC
	Mrs Trish Gleeson	<i>Education Officer</i>	Catholic Schools Office, NSW

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<i>Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
	Mrs Jo Gluckman	<i>COS - Student Leadership</i>	Moriah College, NSW
	Miss Elizabeth Godwin	<i>Principal</i>	Cabramatta High School, NSW
13	Mrs Kirstine Gonano	<i>Deputy Principal</i>	Arthur Phillip High School, NSW
	Ms Liana Gooch	<i>Academic Enhancement Coordinator</i>	Toorak College, VIC
13	Ms Lynne Goodwin	<i>Principal</i>	Arthur Phillip High School, NSW
17	Mr Adam Gordon	<i>English Leader</i>	St Francis Xavier College, VIC
10	Mrs Cherylynne Gostelow	<i>Head of Department</i>	Winthrop Baptist College, WA
	Mr Peter Gould	<i>Principal</i>	Tauhara College, NZ
	Mr Barry Graham	<i>Director of Admin.</i>	St Gregory's College, NSW
	Mrs Wendy Grant	<i>Director of Curriculum</i>	Firbank Grammar, VIC
	Miss Dianne Grantham	<i>Manager</i>	School Improvement Support, ETD, ACT
	Mr Rob Gratton	<i>Principal - Primary School</i>	Mandurah Baptist College, WA
	Mr Paul Gray	<i>Head of Maths</i>	Merrimac S.H.S., QLD
	Mrs Tracey Gray	<i>Manager, Nat. Partnerships</i>	Assoc. of Independent Schools, WA
	Mr Richard Grech	<i>Assistant Principal</i>	Delany College, NSW
	Mr David Green	<i>HOD</i>	DETE, QLD
9	Mrs Louise Green		Artamon Public School, NSW
24	Mr Patrick Green	<i>Director of Learning</i>	Marcellin College, VIC
19	Mrs Allison Greenaway	<i>Principal</i>	Stuart State School, QLD
	Mr John Greene	<i>Principal Education Officer</i>	Queensland Health, QLD
	Ms Meredith Greenwood	<i>Head Senior Years</i>	Aquinas College, VIC
	Dr Johan Griesel	<i>Principal</i>	Portside Christian College, SA
1	Professor Patrick Griffin	<i>Director, Assessment Research Centre</i>	University of Melbourne, VIC
	Mrs Josephine Griffiths	<i>Acting DP Curriculum</i>	Brigidine College, QLD
	Mr Brian Grimes	<i>Principal</i>	A.B. Paterson College, QLD
	Mrs Sue Guilfoyle	<i>Principal</i>	Holy Family School, NSW
	Ms Leanne Guillon	<i>Deputy Principal</i>	Carey Baptist Grammar School, VIC
18	Ms Jenny Hadzi-Popovic		DEEWR, ACT
	Dr Jeremy Hall	<i>Head of Department</i>	Newington College, NSW
	Mrs Julie Hall	<i>Deputy Principal</i>	Yarra Valley Grammar, VIC
	Ms Penny Halleen	<i>Principal</i>	Wanneroo Primary School, WA
	Mr Peter Halpin	<i>Professional Officer</i>	Catholic Education Office, NSW
	Mr Jason Hammond	<i>Head of Yr 9 Program</i>	The Peninsula School, VIC
	Ms Deb Hancock	<i>Principal</i>	Modbury West School, SA
	Mrs Kitty Hancock	<i>Principal</i>	St Joseph's Primary School, NSW
	Mrs Shirin Hanfi-Scott	<i>Head of Media</i>	Haileybury, VIC
	Ms Kathleen Hannigan	<i>Head Teacher</i>	Fairfield High School, NSW
	Mrs Valerie Hannon	<i>Director</i>	Innovations Unit, UK
	Ms Melody Harding	<i>Senior Curriculum Officer</i>	Board of Studies, NSW
	Mrs Jacqueline Hargan	<i>Early Years Coordinator</i>	Genazzano FCJ College, VIC
1	Professor David Hargreaves	<i>Fellow Emeritus of Wolfson College</i>	Cambridge University UK
	Mr Todd Harm	<i>Head of Middle School</i>	All Saints Anglican School, QLD
12	Mrs Joanna Harmer	<i>Head of Junior School</i>	Sepentine Jarrahdale Grammar, WA

<i>Dinner Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
	Mr Peter Harold	<i>Assistant Principal</i>	All Saints College, NSW
30	Dr Helen Harper	<i>Senior RO</i>	Menzies School of Health, NT
17	Mrs Joanne Harris	<i>Principal</i>	Greenwood College, WA
	Ms Sandra Harvey	<i>Head of School Services</i>	Tasmanian Catholic Education Office, TAS
5	Ms Jeanette Hasleby	<i>Principal Advisor Community Development</i>	Edith Cowan University, WA
3	Mr Robert Hassell	<i>Coordinator of Data</i>	Assoc. of Independent Schools, WA
	Mrs Wendy Hawking	<i>Teaching &amp; Learning Coordinator</i>	Yarra Valley Grammar, VIC
8	Mr Andrew Hay	<i>General Manager, Teaching &amp; Learning</i>	Independent Schools, VIC
	Mr Michael Hayes	<i>Director of Studies</i>	MLC School, NSW
18	Mr Ian Hayne	<i>Head of Department</i>	West Moreton Anglican College, QLD
	Ms Tracy Healy	<i>Head of Yrs 10-12</i>	Lowther Hall AGS, VIC
12	Mrs Judy Hearne	<i>Principal Schools Advisor</i>	Catholic Education Office, WA
	Ms Jayne Heath	<i>Senior Leader</i>	Australian Science & Mathematics School, SA
	Mr Michael Heenan	<i>Principal</i>	St Clent of Rome, VIC
30	Dr Janet Helmer	<i>Senior RO</i>	Menzies School of Health, NT
11	Mrs Deborah Hemming	<i>Principal</i>	Port Lincoln Junior Primary, SA
	Mrs Margaret Hendriks	<i>Assistant Director</i>	Catholic Education Office, QLD
14	Mr Noel Henry	<i>Head of School Services (Primary)</i>	Catholic Education Office, NSW
19	Mr Cameron Herbert	<i>Dean of Students (10-12)</i>	The Southport School, QLD
	Ms Maree Herrett	<i>Head of Senior School</i>	MLC School, NSW
	Mrs Sandra Hewson	<i>Assistant Principal</i>	Kildare College, SA
7	Mr Alasdair Hey	<i>Teaching/Learning/ICT Coordinator</i>	All Saints Catholic Senior School, NSW
	Mrs Robyn Hickman	<i>Principal</i>	Aurora College, NZ
	Mr David Hillhouse	<i>Principal</i>	Torbanlea State School, QLD
	Mrs Denise Hillier	<i>Dean of Learning (7-9)</i>	Loreto Normanhurst, NSW
3	Dr Patricia Hindmarsh	<i>Director</i>	Tasmanian Catholic Education Office, TAS
2	Ms Kerry-Anne Hoad	<i>Director, ACER Institute</i>	ACER, VIC
	Mr Andrew Hocking	<i>Deputy Principal</i>	Yarra Valley Grammar, VIC
	Ms Karen Hodge	<i>Principal</i>	Warrawong Primary School, NSW
	Mr David Hodge	<i>Principal</i>	Moonta Area School, SA
23	Mr Michael Hoey	<i>Principal - Middle Phase</i>	North Lakes State College, QLD
	Mr Robert Hoff	<i>Principal</i>	Immanuel Primary School, SA
	Ms Suzanne Holden	<i>Principal</i>	Canterbury Girls High School, NSW
	Mrs Robyn Holla	<i>Performance Analysis &amp; Reporting Consultant</i>	DECD, SA
13	Mrs Deborah Hollis	<i>Assistant Head of Middle School</i>	Luther College, VIC
	Mr Paul Holman	<i>Assistant Director</i>	Catholic Schools Office, NSW
	Ms Tracy Holmes	<i>Principal</i>	Somerville Baptist College, WA
2	Ms Jillian Holmes-Smith		SREAMS, VIC
2	Mr Philip Holmes-Smith		SREAMS, VIC
	Mr Rowan Holmes-Smith	<i>Business Development Manager</i>	SREAMS, VIC

<i>Dinner Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
8	Miss Josephine Holzner	<i>Assistant Director</i>	DEEWR, ACT
	Mr Geoff Hood	<i>Principal</i>	DET, WA
	Mr Bill Hooper	<i>Dean of Teaching &amp; Learning</i>	Matthew Flinders Anglican College, QLD
34	Mr Michael Hopkinson	<i>Primary School Consultant</i>	Catholic Schools Office, NSW
21	Mrs Sheila Horn	<i>Assistant Principal</i>	Carwatha College P-12, VIC
	Mr Tim Horiblow	<i>Careers Advisor</i>	Marist Regional College, TAS
10	Mr Ross Homer	<i>Assistant Director School Services</i>	Townsville Catholic Education Office, QLD
	Ms Loretta Homery	<i>Relieving Head Teacher CAPA</i>	Rutherford Technology High School, NSW
	Ms Gaye Hoskins	<i>Consultant</i>	DEC, NSW
24	Mr Peter Houlihan	<i>AP - Learning</i>	Marcellin College, VIC
	Mr Rob Houston	<i>Principal</i>	Hahndorf Primary School & Preschool, SA
	Mr Rodney Howard	<i>Assistant Principal</i>	Bede Polding College, NSW
	Ms Anne Huard	<i>Network Leader</i>	Office for Schools, ACT
	Mrs Judy Huda	<i>Coordinator National Partnership</i>	AIS, NSW
	Mr Don Hudson	<i>Principal</i>	Bulahdelah Central School, NSW
	Ms Mary Hudson	<i>Director</i>	St Paul's Educ. & Curr. Services, SA
14	Mrs Belinda Hughes	<i>Education Officer, Primary Curriculum</i>	Catholic Education Office, NSW
	Mrs Carol Hughes	<i>Director</i>	Lioncrest Education, NSW
	Ms Debbie-Lee Hughes	<i>Principal Education Officer</i>	DEC, NSW
	Mrs Simone Hughes	<i>Deputy Principal</i>	Rutherford Technology High School, NSW
	Ms Wendy Hughes	<i>Deputy Principal</i>	William Rose State High School, QLD
	Mr Ian Humphries	<i>Primary Dean</i>	Kempsey Adventist School, NSW
	Mr Anthony Hunter	<i>Education Consultant</i>	Catholic Schools Office, NSW
	Ms Janet Hunter	<i>Head of Mathematics</i>	Ascham School, NSW
	Mrs Leonie Hunter	<i>Teacher</i>	Duncraig Senior High School, WA
	Mr Noel Hurley	<i>Schools Consultant</i>	CSO Armidale, NSW
	Mrs Sue Hutchens	<i>Religious Education Coordinator</i>	St Joseph's Primary School, NSW
	Mr Allan Hutchison	<i>Psychologist</i>	Catholic Education Office, VIC
29	Ms Debra Hutton	<i>Principal</i>	Montello Primary School, TAS
26	Ms Jacqui Huxtable	<i>DOTL</i>	Wollondilly Anglican College, NSW
	Ms Susan Hyde	<i>Principal</i>	Australian Science & Mathematics School, SA
	Ms Megan Ioannou		Catholic Education Office, VIC
	Mr Gabrielle Jackson	<i>Deputy Principal</i>	St Mary's Primary School, VIC
	Mrs Samantha Jackson	<i>Senior Education Officer</i>	DEC South Western Sydney, NSW
	Ms Sylvia Jakska	<i>Executive Assistant</i>	Catholic Education, SA
6	Mr Martin James	<i>Manager, Policy &amp; Programs</i>	AITSL, VIC
	Mr Eric Jamieson	<i>A/Director</i>	DEC, NSW
32	Ms Sharon Jeloscek	<i>Deputy Principal</i>	Sacred Heart College Senior, SA
	Mr Trevor Jenkin	<i>Deputy Principal</i>	Mandurah Baptist College, WA
	Mr Ben Jenkinson	<i>Deputy Head of Senior School</i>	Scotch Oakburn College, TAS
	Ms Tracey Jenner	<i>Deputy Principal</i>	Uralla Central School, NSW



<i>Dinner Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
	Dr Ben Jensen	<i>Director of the School Education Program</i>	Grattan Institute, VIC
27	Ms Jenny Johns	<i>Assistant Principal</i>	Aberfoyle Park High School, SA
	Mr Reuben Johnson	<i>Principal</i>	Our Lady of the Sacred Heart, VIC
	Ms Lois Joll	<i>Principal</i>	Perth Modern School, WA
	Mr Allan Jones	<i>Principal</i>	Our Lady of the Way Primary, NSW
	Mrs Bridget Jones	<i>Assistant Principal</i>	St Andrew's Catholic College, QLD
20	Mr Kevin Jones	<i>Principal</i>	Bede Polding College, NSW
	Mr Leo Jones	<i>Principal</i>	St Joseph's Primary School, VIC
	Miss Renee Jones	<i>Teacher</i>	Kempsey Adventist School, NSW
20	Mrs Sonia Jones	<i>Principal</i>	St John's Primary School, VIC
	Mrs Terrie Jones	<i>Head of Teaching and Learning</i>	Ravenswood, NSW
11	Ms Linden Jones-Drzyzga	<i>Principal</i>	Catholic Schools Office, NSW
	Mrs Louise Jongejan	<i>Assistant Principal</i>	St Thomas Catholic School, NSW
	Mr David Jury		Catholic Education, SA
	Ms Susan Just	<i>Principal</i>	Lauriston Girls School, VIC
	Mrs Georgina Kadel	<i>Consultant Aboriginal &amp; Torres Strait Islander Education</i>	Brisbane Catholic Education, QLD
9	Ms Sonya Kadel		Brisbane Catholic Education, QLD
	Mr Simon Kanakis	<i>Deputy Principal</i>	Aranmore Catholic College, WA
	Ms Rebecca Kaukau		Vision Education, NZ
	Mrs Lois Kavanagh	<i>Head of Learning</i>	Clayfield College, QLD
	Mr Chris Kay	<i>Assistant Principal</i>	Donvale Christian College, VIC
	Mrs Julienne Kay	<i>School Consultant</i>	Catholic Education Office, WA
	Ms Denise Keane	<i>Literacy &amp; Numeracy Improvement Teacher</i>	Emmanuel College, QLD
25	Mrs Lucy Keath	<i>Principal</i>	St Mary's Primary School, VIC
	Mr Larry Keating	<i>Principal</i>	Catholic Schools Office, NSW
9	Ms Lisa Keeffe	<i>Teacher</i>	Leaning Tree Community School, WA
	Mrs Catherine Keegan	<i>Director of Teaching &amp; Learning</i>	St Gregory's College, NSW
	Mrs Julie Keegan	<i>Lead Teacher</i>	Boat Harbour Primary, TAS
	Mrs Wendy Keen	<i>Director of Curriculum</i>	Melbourne Girls School, VIC
	Mr Peter Kelaher	<i>Education Officer</i>	Catholic Education Office, NSW
27	Mr Michael Kelleher	<i>Assistant Principal</i>	Patrician Brothers' College, NSW
18	Mrs Claire Kelly	<i>Principal</i>	St Francis School, VIC
	Ms Gail Kelly	<i>Teacher Yr 3</i>	Ascham School, NSW
	Mrs Kate Kelly	<i>Teaching Educator</i>	Catholic Education Office, NSW
	Ms Mary Kelly	<i>Assistant Principal</i>	Holy Family Primary School, NSW
	Mr Tony Kelly	<i>Principal</i>	Catholic Schools Office, NSW
22	Mrs Katherine Kendon	<i>Stage 3 Coordinator</i>	Thomas Hassall Anglican College, NSW
	Ms Julie Kennedy	<i>Principal</i>	Girraween High School, NSW
28	Mrs Mary Kennedy	<i>Teacher</i>	St Patrick's Primary School, VIC
15	Mr Michael Kennedy	<i>Principal</i>	St Michael's Primary School, VIC
17	Miss Pam Kenyon	<i>Teacher</i>	St John's Catholic College, NT

<i>Dinner Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
26	Ms Liz Keogh	<i>Principal</i>	Christ the King School, SA
	Mrs Wardeh Khoury	<i>Coordinator</i>	St Patrick's Primary School, NSW
6	Mr Liam King	<i>Deputy Principal</i>	Kingswood College, VIC
	Mr Michael King	<i>Director</i>	Quality Learning Australia, ACT
	Mrs Kerrie Kingston-Gains	<i>Assistant Principal</i>	Pakenham Lakeside Primary, VIC
	Mrs Selina Kinne	<i>Director of Teaching &amp; Learning</i>	Dominic College, TAS
	Mr David Klahr	<i>Deputy Head</i>	Moriah College, NSW
	Mr Greg Kluske	<i>Director of Curriculum</i>	St Joseph's College, VIC
13	Mr Robert Knight	<i>Executive Officer - Education</i>	QCEC, QLD
	Mrs Suzanne Knight	<i>Principal</i>	Leda Primary School, WA
	Ms Bernardine Knorr	<i>Head Teacher English</i>	St Catherine's School, NSW
	Ms Kerry Knowles	<i>Deputy Principal</i>	Toodyay District High School, WA
	Mrs Olivija Komadina	<i>Head of VET</i>	Australian Industry Trade College, QLD
	Mr Kimon Kousparis	<i>Maths Coordinator</i>	Casimir Catholic College, NSW
	Dr Jane Kovacs	<i>Director</i>	Quality Learning Australia, VIC
31	Mrs Cathryn Kratzmann		St Ursula's College, QLD
	Mr Michael Krawec	<i>Regional Director</i>	Catholic Education Office, NSW
	Mr Andrew Kreibich	<i>Deputy Head of Senior School</i>	St Margaret's School, VIC
21	Mr John Kural	<i>Manager</i>	Dept. of Education Services, WA
26	Ms Karen Kurczak	<i>POR Australian Curriculum</i>	Christ The King School, SA
10	Ms Wilma Kurvink	<i>College Head of Library</i>	Wesley College Institute, VIC
	Mr Steve Kyburz	<i>Network Leader</i>	Office for Schools, ACT
	Ms Pauline Laing	<i>Literacy Leader</i>	St Clent of Rome, VIC
28	Mr Jamie Lamb	<i>Teacher</i>	St Patrick's Primary School, VIC
	Mrs Irene Lambrinos	<i>VET/Careers</i>	Casimir Catholic College, NSW
	Miss Jennifer Lamet	<i>Teacher</i>	Somerville Baptist College, WA
	Mr Gregory Lancaster	<i>Head of Learning Area Science</i>	Australind SHS, WA
	Mrs Adele Langdale	<i>Deputy Principal</i>	Hercules Road State School, QLD
	Mrs Rebecca Langdon	<i>Principal</i>	Muswellbrook South Public School, NSW
23	Ms Katrina Larsen	<i>Senior School Principal</i>	North Lakes State College, QLD
10	Mr Anthony Laskey	<i>Deputy Principal</i>	Bundaberg State High School, QLD
	Ms Chris Lawrence	<i>Leadership Consultant</i>	DECD, SA
	Ms Kath Lawrence	<i>Consultant</i>	AIS, WA
	Mr Chris Leadbetter	<i>Principal</i>	Chisholm Catholic College, QLD
	Mrs Amy Lee	<i>Head Teacher</i>	Arthur Phillip High School, NSW
	Mr Stephen Lee	<i>Assistant Principal</i>	St Patrick's Primary School, NSW
29	Mr Darrel LeMercier	<i>Principal</i>	Belmont City College, WA
	Mrs Chris Lemon	<i>Assistant Principal</i>	St Patrick's Special School, SA
6	Ms Elisabeth Lenders	<i>Principal</i>	Kingswood College, VIC
	Mr Gary Leonard	<i>Leading Teacher</i>	Norwood Secondary College, VIC
11	Ms Jenny Leppard	<i>Principal</i>	Windermere Primary School, TAS
	Mrs Leanne Lesic	<i>AP - Secondary</i>	Kempsey Adventist School, NSW
	Mrs Mary L'Estrange	<i>Primary Regional Consultant</i>	Catholic Education Office, NSW

<i>Dinner Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
	Mr Troy Lethlean	<i>Director of Curriculum &amp; Pedagogy</i>	Norwest Christian College, NSW
	Mrs Jeanette Little	<i>Head of Mathematics</i>	Loreto College Coorparoo, QLD
3	Ms Jenny Little	<i>Deputy Principal</i>	Korowa Anglican Girls' School, VIC
	Mrs Lisa Little	<i>Education Officer</i>	Catholic Schools Office, NSW
	Mr Richard Lobb	<i>Manager, Secondary Support</i>	Department of Education, WA
	Ms Catherine Loel	<i>Head of Learning</i>	Toorak College, VIC
13	Mr Stephen Loggie	<i>Executive Principal</i>	Palm Beach Currumbin State High, QLD
7	Mr Andrew Long	<i>Policy &amp; Research Analyst</i>	Independent Schools Council, Australia
4	Dr Michele Lonsdale	<i>Principal Research Fellow</i>	ACER, VIC
	Mrs Michelle Lovegrove	<i>Teacher</i>	DET, NSW
	Mr Jonathan Lowe	<i>Principal</i>	New Gisborne Primary School, VIC
	Mr Ben Lowrie	<i>Vice Rector Pastoral Care</i>	Padua College, QLD
28	Mrs Kathy Ludbrook	<i>Teacher</i>	St Patrick's Primary School, VIC
	Ms Therese Lunghusen	<i>Teacher</i>	Xavier College, VIC
	Miss Pamela Lynch	<i>Director of Studies</i>	Benowa State High School, QLD
	Mrs Helen Lyons	<i>Teacher</i>	St Patrick's School, VIC
	Ms Kate MacArthur	<i>Teacher</i>	Star of the Sea School, QLD
16	Mr Peter MacDonald	<i>Academic Administrator</i>	Brisbane Boys' College, QLD
	Mr Tony MacDougal	<i>Principal</i>	Casimir Catholic College, NSW
	Mrs Julie MacFarlane	<i>Principal</i>	Hallam Primary School, VIC
	Ms Myrna Machuca-Sierra	<i>Education Specialist</i>	World Bank, NSW
1	Mr Tony MacKay	<i>Executive Director</i>	Centre for Strategic Education, VIC
	Mrs Anne Maczkowiack	<i>Principal</i>	Living Faith Lutheran Primary School, QLD
	Mr Sean Maher	<i>Deputy Principal</i>	Nambour State High School, QLD
19	Mr Tony Maio	<i>Regional Leadership Consultant</i>	DECD, SA
	Dr Suzann Malaney	<i>HOD Science</i>	Ascham School, NSW
	Mr Chris Malone	<i>Assistant Principal</i>	Sale College, VIC
	Miss Danielle Manicaros	<i>Teacher</i>	Star of the Sea School, QLD
	Ms Maura Manning	<i>Director of Teaching &amp; Learning</i>	Pymble Ladies College, NSW
	Mrs Anne Marceau	<i>T&amp;L Coordinator</i>	Western DEC, NSW
	Ms Kaylene Maretich	<i>Primary Coordinator</i>	Catholic Schools Office, NSW
19	Mrs Anne-Marie Marias	<i>Research Student</i>	Charles Darwin University, NT
26	Mr Scott Marsh	<i>Deputy Head</i>	William Clarke College, NSW
12	Ms Clair Marshall		Brighton Grammar School, VIC
3	Mr Robert Marshall	<i>Director of Learning</i>	Westbourne Grammar School, VIC
	Mr Raymond Martin	<i>Principal</i>	Holy Spirit College, NSW
	Ms Susan Martin	<i>Assistant Principal</i>	Brigidine College St Ives, NSW
	Mr Tim Martin	<i>Principal</i>	Toodyay District High School, WA
	Mrs Vivienne Marwick	<i>School Consultant</i>	Catholic Education Office, WA
	Ms Jenny Mason	<i>Assistant Principal</i>	Norwood Secondary College, VIC
1	Professor Geoff Masters	<i>CEO</i>	ACER
	Mr Guy Masters	<i>Director of Boarding</i>	Saint Ignatius College, NSW
	Mrs Suzana Matic	<i>Head Teacher</i>	Cabramatta High School, NSW

*Dinner*

*Table No.*

*Name*

*Position*

*Delegate Organisation*

	Mrs Michele Maton		DEC, NSW
	Ms Frances Matthews	<i>Sales Support Officer</i>	Keepad Interactive, NSW
	Mr Simon Matthews	<i>CEO</i>	Christian Schools, TAS
	Mrs Rosslyn Mattner	<i>Head of Senior School</i>	St Francis De Sales, SA
	Mr Ian Maynard	<i>Principal</i>	Norwest Christian College, NSW
	Ms Ros McCallan-Jamieson	<i>School Development Officer</i>	DEC, NSW
14	Mrs Cynthia McCammon	<i>Team Leader, Pastoral Care &amp; Learning Support</i>	Catholic Education Office, NSW
	Mr Gerry McCloughan	<i>Assistant Director</i>	DEC, NSW
25	Ms Sharon McCormack	<i>Maths Leader</i>	Lumen Christi Catholic Primary School, VIC
	Ms Kylie McCullah	<i>Director of Studies</i>	St Clare's College, NSW
	Ms Helen McCullough	<i>Deputy Principal</i>	Bohlevale State School, QLD
29	Mrs Carole McDiarmid	<i>Regional Director</i>	DET, NSW
	Mr Michael McDonald	<i>College Deputy</i>	Mt Alvernia College, QLD
	Mr Kris McDonall	<i>Ed. Team Support</i>	World Bank, NSW
	Mrs Julie McDougall	<i>Professional Learning Teacher</i>	Our Lady's Primary School, VIC
	Mr Anthony McElhone	<i>Assistant Principal</i>	Our Lady of the Way Primary, NSW
	Mr Paul McEntee	<i>Principal</i>	Our Lady's Primary School, VIC
	Mrs Trish McEvey	<i>Head of Curriculum</i>	Kirwan State School, QLD
	Mrs Cheryl McFadzean	<i>Principal</i>	Trevallyn Primary School, TAS
	Mr Joshua McGahen	<i>Deputy Principal</i>	Girraween High School, NSW
	Ms Jennifer McGie	<i>Head of English/Literacy</i>	Ballarat Clarendon College, VIC
	Ms Sharon McGowan	<i>Professional Learning Coordinator</i>	Mount St Benedict College, NSW
	Mrs Joanne McGrath	<i>ReCI. DP</i>	Casimir Catholic College, NSW
	Mrs Kath McGuigan	<i>Principal</i>	Mary MacKillop College, SA
	Mrs Debbie McIlwain	<i>Assistant Principal</i>	Warrawong Primary School, NSW
	Mr Daniel McInerney	<i>Assistant Principal</i>	St Patrick's College, NSW
	Ms Ann McIntyre	<i>Director</i>	DEC, NSW
	Mrs Jennifer McKeown	<i>Principal</i>	St Thomas Catholic School, NSW
	Mrs Leanne McLennan	<i>Teacher Educator</i>	Lismore Catholic Schools Office, NSW
14	Mr Matthew McMahan	<i>Education Officer: Sec. Curriculum</i>	Catholic Education Office, NSW
	Mr Lee McMaster	<i>Principal</i>	St Andrew's Catholic College, QLD
	Ms Kerry McMinn	<i>Principal</i>	Albuera Street Primary School, TAS
	Dr Gai McMurtrie	<i>Manager, Leadership Learning</i>	DEC, NSW
	Mr Christopher McNamara	<i>Director of Curriculum</i>	Melbourne Girls Grammar, VIC
	Mr Paul McSweeney	<i>Director of Studies</i>	St Patrick's College, NSW
	Mr Thomas Meehan	<i>Head of Department</i>	Pimlico State High School, QLD
6	Mrs Marion Meiers	<i>Senior Research Fellow</i>	ACER, VIC
	Mrs Tania Melki	<i>REC</i>	St Andrew's College, NSW
	Mr Digby Mercer	<i>Principal</i>	Como Secondary College, WA
	Mrs Lyn Mercer	<i>HOLA</i>	John Forrest Secondary School, WA
	Mrs Kendal Merchant	<i>QT Coordinator</i>	Busby West Primary School, NSW
	Mr Andrew Messenger	<i>Principal</i>	St Paul Lutheran School, SA

*Dinner*

<i>Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
	Mr Jason Miezis	<i>School Education Director</i>	DEC, NSW
	Mrs Annette Mikulcic	<i>Head of Junior School</i>	Woodcroft College, SA
5	Ms Gina Milgate	<i>Indigenous Liaison Officer</i>	ACER, VIC
	Mr Paul Milgate	<i>KLA Coordinator</i>	Xavier College, NSW
	Mrs Trish Miller	<i>Deputy Principal</i>	Sacred Heart Primary School, VIC
	Mrs Virginia Milliken	<i>Education Officer</i>	Catholic Schools Office, NSW
30	Mrs Sally Mills	<i>Deputy Principal</i>	St Brendan's Primary School, VIC
	Mrs Jane Milross	<i>Assistant Principal</i>	St Francis de Sales, NSW
	Mrs Anna Mirasgentis	<i>Director of Curriculum</i>	Mary MacKillop College, SA
	Mrs Catherine Misson	<i>Principal</i>	Melbourne Girls Grammar, VIC
	Miss Cathy Molloy	<i>Leader of Pedagogy</i>	Mary MacKillop College, NSW
12	Ms Kathryn Moloney	<i>Senior Coordinator</i>	RMIT University, VIC
24	Mr Nicholas Moloney	<i>Assistant Principal</i>	Marcellin College, VIC
	Dr Carolyn Montgomery	<i>Dean of Students</i>	Carey Baptist College, WA
18	Mr Aaron Moon	<i>Principal</i>	St Joseph's Primary School, NSW
	Mr Craig Mooney	<i>Assistant Principal</i>	Clancy Catholic College, nsw
	Mrs Cathryn Moore	<i>Curriculum Coordinator</i>	Ascham School, NSW
	Mr Tony Moore	<i>Director of Personnel Services</i>	Waverley College, NSW
32	Mrs Gail Morgan	<i>Director of Teaching &amp; Learning</i>	Sacred Heart College Senior, SA
	Mrs Jillian Morgan	<i>Head of Mission and Education</i>	Tasmanian Catholic Education Office, TAS
	Mr Ray Moritz	<i>Senior Education Adviser</i>	Catholic Education, SA
	Ms Elizabeth Moroney	<i>Schools Officer</i>	CEO, ACT
	Mr David Morris	<i>Principal</i>	Pimlico State High School, QLD
	Ms Angela Morsch	<i>Inclusive Education Consultant</i>	Brisbane Catholic Education, QLD
	Mr David Mowbray	<i>Campus Principal</i>	Sale College, VIC
1	Professor Kathryn Moyle		Charles Darwin University, NT
7	Mr Anthony Mueller	<i>Principal</i>	Faith Lutheran College, QLD
	Mr Robert Mulas	<i>Principal</i>	Fairfield High School, NSW
	Mr Dennis Mulherin	<i>Assistant Director</i>	Lutheran Education, QLD
	Mr Michael Mullaly	<i>Education Consultant</i>	Catholic Schools Office, NSW
2	Assoc Prof John Munro	<i>Head of Studies In Exceptional Learning and Gifted</i>	University of Melbourne, VIC
	Mr Grant Murphy	<i>Curriculum Coordinator</i>	Casimir Catholic College, NSW
	Mr Paul Murphy	<i>Project Officer</i>	Catholic Education Office, QLD
	Ms Catherine Murray	<i>Education Officer</i>	Catholic Schools Office, NSW
	Mr Wayne Murrill	<i>Middle Years Coordinator</i>	Genazzano FCJ College, VIC
	Ms Fiona Murty	<i>Head Teacher</i>	Girraween High School, NSW
	Mr Greg Murty	<i>Deputy Principal</i>	Girraween High School, NSW
	Mr Robert Muscat	<i>Principal</i>	St Clare's Catholic High School, NSW
	Mr John Muskovits		Mount St Benedict College, NSW
	Mrs Barbara Myors	<i>Assistant Director</i>	Catholic Schools Office, NSW
29	Mrs Dina Nardone	<i>Literacy Numeracy Improvement Teacher</i>	St Augustine's College, QLD
	Mr Robert Nasasi	<i>Assistant Principal</i>	Aquinas Catholic College, NSW

<i>Dinner Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
	Ms Shauna Nash	<i>Assistant Principal</i>	St Andrew's College, NSW
	Dr Kristine Needham	<i>Consultant</i>	Freelance, NSW
	Mrs Elizabeth Neil	<i>Head of Junior School</i>	Ascham School, NSW
	Mr Michael Nekvapil	<i>Teacher</i>	Orana Steiner School, ACT
	Ms Tanya Nelipa	<i>Network Leader</i>	Office for Schools, ACT
18	Mr Andrew Newcombe	<i>HOD Mathematics</i>	West Moreton Anglican College, QLD
	Mr Mark Newham	<i>Director</i>	Independent Schools, QLD
18	Ms Anna Newman	<i>Teacher</i>	St Francis School, VIC
	Mr Geoff Newton	<i>Principal</i>	Hillbrook Anglican School, QLD
	Dr Bronte Nicholls	<i>Assistant Principal</i>	Australian Science & Mathematics School, SA
	Mr Mark Nikulandra	<i>Dean of Learning (10-12)</i>	Loreto Normanhurst, NSW
15	Ms Kathryn Nolan	<i>Project Officer</i>	CEOM, VIC
	Ms Kellie Noonan	<i>Classroom Teacher</i>	St Mary's Primary School, VIC
	Mr Gary Norbury	<i>Principal</i>	Pakenham Lakeside Primary, VIC
16	Mr John Norfolk	<i>Principal</i>	Woodridge State High School, QLD
	Ms Rosalie Nott	<i>Assistant Director</i>	Catholic Education Commission, NSW
	Mr Mark Nunan	<i>Assistant Principal</i>	Newman Senior Technical College, NSW
	Mrs Helen O'Brien	<i>Executive Asst. Director</i>	Catholic Education, SA
	Mr John O'Brien	<i>Education Consultant</i>	Townsville Catholic Education, QLD
	Dr Kate O'Brien	<i>Assistant Director of Teaching &amp; Learning</i>	Catholic Education Office, NSW
16	Mr Matthew O'Brien	<i>Dean of Studies</i>	Brisbane Boys' College, QLD
	Mrs Michele O'Brien	<i>Senior Curriculum Officer</i>	CEO, ACT
	Mrs Monica O'Brien	<i>Teaching and Learning Coordinator</i>	Mount St Joseph, NSW
	Dr Alec O'Connell	<i>Headmaster</i>	Scotch College, WA
	Ms Anne O'Connell	<i>Learning Support</i>	St Andrew's Catholic College, QLD
	Mrs Franceyn O'Connor	<i>Education Officer</i>	Catholic Education Office, NSW
25	Mr John O'Connor	<i>Principal</i>	St Mary's Primary School, VIC
	Mr Mark O'Connor	<i>English Coordinator</i>	Mary MacKillop College, NSW
	Mrs Cathy O'Donnell	<i>Curriculum Coordinator</i>	Busby West Primary School, NSW
	Mr Mark O'Farrell	<i>Director of Curriculum</i>	Waverley College, NSW
	Mrs Janine O'Hea	<i>Deputy Principal</i>	Dominic College, TAS
6	Dr Mary Oliver	<i>Res. Assoc. Prof.</i>	University of Western Australia, WA
26	Mrs Annette O'Neill	<i>Principal</i>	Ruse Public School, NSW
	Mr Greg O'Neill	<i>Principal</i>	Crawford Public School, NSW
	Mr Steven Orlando	<i>Head of Secondary</i>	Meadowbank Education, NSW
20	Ms Aiva Ositis	<i>Principal</i>	John Hartley School (B-7), SA
	Dr Mary Oski	<i>Assistant Director</i>	Catholic Education Office, VIC
	Mr Paul O'Sullivan	<i>Deputy Principal</i>	Pimlico State High School, QLD
	Mr Paul Ould	<i>Principal</i>	St Anthony's Catholic College, QLD
	Mrs Elizabeth Ovens	<i>Assistant Principal</i>	St Joseph's Primary School, NSW
8	Ms Clare Ozolins	<i>Research Fellow, Psychometrics &amp; Methodology</i>	ACER, VIC



*Dinner*

<i>Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
	Mrs Juliette Page	<i>Head of English</i>	Lesmurdie S.H.S., WA
	Mrs Jo Pains	<i>Consultant</i>	Catholic Education Office, WA
	Miss Juliette Pantaleo	<i>Primary Adviser (eLearning)</i>	Catholic Education Office, NSW
	Mr Louis Papadimitriou	<i>Assistant Principal</i>	Kilbreda College, VIC
	Mr David Parawa	<i>Assistant Principal</i>	St Christopher's Primary School, NSW
	Ms Panayoula Parha	<i>Principal</i>	Norwood Morialta High School, SA
31	Ms Alison Parolo		Lesmurdie Senior High School, WA
	Ms Rebecca Parsons	<i>Consultant</i>	Brisbane Catholic Education, QLD
26	Mr Gary Pascoe	<i>Deputy Principal</i>	Emmaus Catholic School, SA
26	Mrs Teresa Pascoe	<i>Assistant Principal</i>	Christ The King School, SA
	Mr Michael Pate	<i>Assistant Principal</i>	Emmaus Catholic College, NSW
7	Mr Murray Paterson	<i>Indigenous Education Coordinator</i>	St Peters Lutheran College, QLD
	Mr Scott Paterson	<i>Prof. Learning &amp; Leadership Coordinator</i>	DEC, NSW
	Ms Mary-Ellen Pattinson	<i>Education Consultant</i>	Townsville Catholic Education Office, QLD
	Mr Peter Paul	<i>Principal</i>	Chandler Park Primary School, VIC
	Mrs Geraldine Paynter	<i>Head of Primary Years</i>	Norwest Christian College, NSW
20	Mr Brian Pearce	<i>Year 9 Team Leader</i>	Catholic Ladies College, VIC
24	Mrs Joanne Pearce	<i>Leader of Learning</i>	Queen of Peace Primary School, VIC
2	Ms Cath Pearn	<i>Teaching Fellow</i>	ACER Institute, VIC
18	Mrs Anne Marie Peebles	<i>ReCl. DP</i>	St Joseph's Primary School, NSW
29	Mr Geoff Pell	<i>Principal</i>	Taylors Lakes Secondary College, VIC
	Mrs Jan Pennisi	<i>Teacher</i>	Wyong High School, NSW
	Ms Heather Penny	<i>Chief Policy Analyst</i>	Ministry of Education, NZ
	Mr John Percy	<i>Executive Officer - Education</i>	QCEC, QLD
	Mrs Grace Pergamalis	<i>TAS Coordinator</i>	Casimir Catholic College, NSW
	Mrs Tanya Perritt	<i>Curriculum Coordinator</i>	De La Salle Catholic College, NSW
	Ms Marie Perry	<i>Assistant Principal</i>	A.B. Paterson College, QLD
3	Mr Andrew Pesle	<i>Deputy Principal</i>	Rooty Hill High School, NSW
	Ms Judy Petch	<i>Director</i>	DEEWR, ACT
21	Mr Aaron Petersen	<i>Educational Leader</i>	Carwatha College P-12, VIC
	Ms Catherine Petersen	<i>Assistant Principal - Curriculum</i>	St Catherine's Catholic College, NSW
	Mrs Jenny Petersen	<i>Leading Teacher</i>	Chandler Park Primary School, VIC
	Mrs Patricia Petterson	<i>Principal</i>	Willoughby Public School, NSW
	Dr Philip Pettit	<i>Senior Officer</i>	Catholic Education Office, ACT
32	Mrs Margaret Pfitzner	<i>Director of Secondary School</i>	Ocean Forest Lutheran College, WA
	Mr Joemon Philip	<i>Deputy Principal</i>	Snowy Mountains Christian School, NSW
	Ms Gay Phillips	<i>HOD - Science, Gifted</i>	Wellington Point SHS, QLD
33	Mrs Marie Louise Phillips	<i>Maths Advisor</i>	Catholic Education Office, VIC
	Mrs Terese Phillips	<i>Manager of Education Services</i>	Independent Schools, TAS
	Mrs Julie Piesse	<i>H.T. Science</i>	Cabramatta High School, NSW
	Mrs Alexandra Piggott	<i>Head of Humanities</i>	Pembroke School, SA
	Mrs Kim Platts	<i>Grade Leader/Team Leader</i>	Good Shepherd School, NSW

*Dinner*

<i>Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
	Mr Stephen Plowright	<i>Principal</i>	Campbell Town District High, TAS
	Mrs Antonella Poncini	<i>Curriculum Consultant</i>	Catholic Education Office of WA
	Mr Mark Porter	<i>Headmaster</i>	Woodcroft College, SA
	Mrs Allison Prandolinia	<i>Deputy Principal</i>	Lowther Hall AGS, VIC
	Mr Robert Prest	<i>Director of Curriculum</i>	Woodcroft College, SA
	Mr David Prete	<i>Deputy Principal</i>	Atherton State Primary School, QLD
	Mrs Marian Prete	<i>Principal Ed. Advisor</i>	DET, QLD
	Mrs Darnelle Pretorius	<i>Head of Primary</i>	St Stephen's School, WA
	Mrs Marie Previte	<i>Senior Education Officer - Curriculum</i>	Brisbane Catholic Education, QLD
	Mrs Danielle Priday	<i>Principal</i>	Tingalpa State School, QLD
21	Mr Richard Prideaux	<i>Campus Principal</i>	Beaconhills College, VIC
	Mrs Kerri Proctor	<i>Head of English</i>	Woodcroft College, SA
7	Mr John Proeve	<i>Executive Director</i>	Lutheran Schools Association, SA/NT/WA
15	Ms Sandrine Prosser	<i>Assistant Principal</i>	Upwey High School, VIC
12	Ms Tracey Puckeridge	<i>CEO</i>	Steiner Education Australia, NSW
16	Mr Adrian Puckering	<i>Deputy Principal</i>	St Bede's College, VIC
	Mr Andrew Pullar	<i>Principal</i>	Moama Anglican Grammar School, NSW
	Mrs Jennifer Pullar	<i>Teacher</i>	Moama Anglican Grammar School, NSW
	Mrs Megan Pursche	<i>Director of Learning</i>	Loreto Normanhurst, NSW
3	Mr Brendan Pye	<i>Project Director</i>	ACER Institute, VIC
	Mrs Diane Quartermaine	<i>VET Coordinator</i>	South Fremantle Senior High School, WA
	Mr Stephen Quartermaine	<i>Deputy Principal</i>	Como Secondary College, WA
25	Ms Josephine Quinlan	<i>Deputy Principal</i>	St Mary's Primary School, VIC
33	Mrs Julie Quinn	<i>Dean of Studies</i>	St Joseph's College, QLD
33	Mrs Luci Quinn	<i>Senior Education Officer</i>	Catholic Education Office, VIC
	Mr Nello Raciti	<i>Senior Education Officer</i>	Catholic Education Office, QLD
	Mr Trevor Radloff	<i>Executive Director</i>	DECD, SA
22	Ms Nicola Ramsay	<i>Mathematics Coordinator</i>	Thomas Hassall Anglican College, NSW
	Mr Andy Rankin	<i>Prof. Learning &amp; Leadership Coordinator</i>	DEC, NSW
24	Fr Ian Ranson	<i>Parish Priest</i>	Queen of Peace Primary School, VIC
33	Mrs Elina Raso	<i>Manager</i>	Catholic Education Office, VIC
14	Mr Mark Raue	<i>Head of Religious Education &amp; Learning Services</i>	Catholic Education Office, NSW
	Mrs Karen Rayner	<i>Deputy Principal</i>	Muswellbrook South Public School, NSW
	Mr Bradley Raynor	<i>Deputy Principal</i>	Kununurra District High School, WA
	Mrs Rebecca Read	<i>Assistant Principal</i>	Modbury West School, SA
	Mr Trevor Read	<i>Principal</i>	Darwin High School, NT
	Mrs Vanessa Rebgetz	<i>Acting Principal</i>	Qld Academy for Health Sciences, QLD
15	Mr John Reddan	<i>Education Consultant</i>	CEOM, VIC
	Mrs Naomi Reed	<i>Assistant Principal</i>	Chandler Park Primary School, VIC
	Mr Wayne Reed	<i>Student Performance Manager</i>	Mentone Grammar School, VIC
6	Ms Louisa Rennie	<i>Manager, Principal Standards</i>	AITSL, VIC
22	Mr Hugh Renshaw	<i>Director of Operations</i>	Thomas Hassall Anglican College, NSW

<i>Dinner Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
23	Mrs Kelly Revelman	<i>Deputy Principal</i>	Catholic Regional College, VIC
	Mrs Frances Reynolds	<i>Schools Consultant</i>	Catholic Schools Office, NSW
	Mrs Emma Reynoldson	<i>Director of Learning</i>	Notre Dame College, VIC
	Ms Elisabeth Rhodes	<i>Deputy Principal</i>	Lowther Hall AGS, VIC
	Mrs Bernadette Ricciardiello	<i>Assistant Principal</i>	St Therese Primary School, NSW
33	Mr Frank Rice	<i>Principal Consultant</i>	Catholic Education Office, VIC
23	Mrs Andrea Richards	<i>Deputy Principal</i>	St Martin de Porres Primary School, VIC
	Ms Michelle Richards	<i>Senior Sace Officer</i>	SACE Board of SA
23	Mr Kevin Richardson	<i>Principal</i>	Immanuel College, SA
	Mr Daniel Richardson	<i>Coordinator</i>	Moonta Area School, SA
14	Mrs Helen Riekie		Cardijn College, SA
	Ms Janina Rinaldi	<i>Teacher</i>	St Patrick's School, VIC
	Ms Kristine Rintoul	<i>Senior Project Officer</i>	Catholic Education Office, VIC
	Mrs Loretta Robbins	<i>Learning &amp; Teaching Teacher</i>	Our Lady's Primary School, VIC
23	Ms Suzanne Robens	<i>Assistant Principal</i>	Sanctuary Point Public School, NSW
	Ms Alison Roberts	<i>Teacher</i>	Marian College, VC
	Mr Brett Roberts	<i>Deputy Head of Secondary School</i>	St Stephen's School, WA
	Mr Terry Roberts	<i>Principal Consultant</i>	Catholic Education, SA
8	Mr Mark Robinson	<i>Head of Curriculum</i>	Delany College, NSW
	Ms Megan Robinson	<i>Journalist/Communications Officer</i>	ACER, VIC
12	Mr Mark Robson	<i>Head of Mathematics</i>	St Peter's College, SA
	Mrs Rhonda Robson	<i>Head of Junior School</i>	St Andrew's Cathedral School, NSW
	Mr John Roche	<i>Coordinator/Teacher</i>	St Patrick's - Sutherland, NSW
	Miss Clare Roden	<i>PDHPE Coordinator</i>	Casimir Catholic College, NSW
	Mr Jaime Rodriguez	<i>Deputy Principal</i>	St Charbel's College, NSW
	Mrs Grace Romano	<i>Teacher Educator</i>	Sacred Heart Catholic Primary, NSW
	Ms Lynda Rosman	<i>Manager Programs &amp; Projects</i>	ACER Institute, VIC
27	Ms Cheryl Ross	<i>Deputy Principal</i>	Richmond Primary School, SA
	Mrs Margaret Rouggos	<i>Principal</i>	Kildare College, SA
	Mr Peter Rouse	<i>Deputy Principal</i>	Fairvale High School, NSW
	Mrs Pam Rowe	<i>Head of Student Services</i>	Mount Scopus Memorial College, VIC
	Ms Lorraine Rowles	<i>Manager, Teacher Learning</i>	DEC, NSW
16	Mrs Pam Ruddell	<i>Deputy Principal</i>	Woodridge State High School, QLD
	Mr Duilio Rufo	<i>Principal</i>	Catholic Schools Office, NSW
	Dr Brad Russell	<i>CEO</i>	DEC, NSW
	Mrs Libby Russell	<i>Head of Junior School</i>	Carey Baptist Grammar School, VIC
10	Mr Bart Rutherford	<i>Librarian</i>	Wesley College, VIC
	Mr Paul Ryan	<i>Principal</i>	Emmaus Catholic College, NSW
	Ms Kathryn Salkeld	<i>Coordinator</i>	St Patrick's Primary School, NSW
	Mr Carl Salt	<i>Head</i>	Pembroke School, SA
	Ms Robyn Salziel	<i>Deputy Principal</i>	Moonta Area School, SA
24	Mrs Anne Sammut	<i>Acting Deputy Principal</i>	William Light R-12 School, SA
	Mr Darius Samojlowicz	<i>Head of Primary</i>	Meadowbank Education, NSW

<i>Dinner Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
	Mrs Gail Sampson	<i>Principal</i>	Cooloongup Primary School, WA
	Mr Mark Sampson	<i>Regional Director</i>	Tribal Group Pty Ltd, NSW
	Ms Lynne Samson	<i>LNIT</i>	St Francis College, QLD
	Ms Rosa Santopietro	<i>Mathematics Learning Area Coordinator</i>	Our Lady of the Sacred Heart College, SA
6	Mrs Marina Santos	<i>International Projects</i>	SEP, Mexico
	Mrs Mary Sapio	<i>Literacy &amp; Individual Needs Coordinator</i>	Immaculate Heart of Mary School, SA
	Mr Mark Sargeant	<i>Deputy Principal</i>	Fairfield High School, NSW
4	Mr Ralph Saubern	<i>Director, Assessment Services</i>	ACER, VIC
	Mr Nick Saunders	<i>Head of Preparatory School</i>	Shore School, NSW
22	Mrs Alexandra Saville	<i>Stage 2 &amp; 3 Curriculum Coordinator</i>	Thomas Hassall Anglican College, NSW
4	Mr Stephen Savvakis	<i>Principal</i>	DETE, QLD
	Ms Ekbal Sayed Rich	<i>Head Teacher</i>	Fairfield High School, NSW
	Mrs Denise Scala	<i>Principal</i>	MLC School, NSW
	Mr Luke Schoff	<i>Assistant Principal</i>	Immanuel Primary School, SA
	Mr Shane Schoff	<i>SACE Officer</i>	SACE Board of SA
	Ms Cathy Schultz	<i>Manager, Moderation &amp; Standards</i>	SACE Board of SA
32	Ms Brooke Schumann	<i>Primary Coordinator/Teacher</i>	Holy Name Primary School, NSW
	Mrs Shelley Schwartz	<i>Deputy Principal</i>	Casula Public School, NSW
	Mr Derek Scott	<i>Principal</i>	Haileybury, VIC
	Mrs Janice Scott	<i>Deputy Principal</i>	Cammeray Public School, NSW
	Mrs Cheryl Screech	<i>Deputy Principal</i>	Liverpool Girls High School, NSW
	Ms Margaret Scroope	<i>Professional Officer</i>	Catholic Schools Office, NSW
	Mrs Marie Seaford	<i>Education Officer</i>	Catholic Schools Office, NSW
22	Mr Jon Seccombe	<i>English Coordinator</i>	Thomas Hassall Anglican College, NSW
	Mrs Lynda Secombe	<i>Assistant Director</i>	Association of Independent Schools, SA
4	Ms Jane Sedgman	<i>Principal</i>	DETE, QLD
	Ms Judith Selby	<i>Mathematics Consultant</i>	DEC, NSW
	Ms Jenny Self	<i>Business Manager</i>	The Hutchins School, TAS
3	Mr Brendyn Semmens	<i>Regional Director</i>	DECD Western Adelaide, SA
	Ms Linda Shardlow	<i>Head of Mathematics</i>	Methodist Ladies College, VIC
	Ms Robyn Sharpe	<i>Senior Education Officer</i>	Catholic Education Office, QLD
	Ms Aminath Shashi	<i>Student</i>	Flinders University, SA
	Mrs Christine Shaw	<i>Assistant Head</i>	Ballarat Grammar School, VIC
	Mrs Julie Shaw	<i>Deputy Principal</i>	Pymble Ladies College, NSW
	Ms Donna Shay	<i>Head of Middle School</i>	Wellington Point SHS, QLD
	Ms Julia Shea	<i>Head of Curriculum</i>	Newington College, NSW
	Mr James Sheedy	<i>Principal</i>	St Mary's Primary School, VIC
	Ms Caroline Sheehan	<i>Director of Teaching &amp; Learning</i>	Xavier College, VIC
	Mr Rob Sheehan	<i>Consultant</i>	Sharp Words, VIC
19	Mr David Sheil	<i>DOTL</i>	St Dominic's College, NSW
	Ms Chris Sheldon	<i>Asst. Regional Director</i>	DECD, SA
26	Mrs Margaret Shepherd	<i>Assistant Principal</i>	All Saints Catholic Girls School, NSW

*Dinner*

<i>Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
	Mr David Shinkfield	<i>Principal</i>	Kormilda College, NT
	Mrs Emma Shulman	<i>Director of Teaching &amp; Learning</i>	Mount Scopus Memorial College, VIC
	Miss Jodie Sibbald	<i>Teacher</i>	Holy Family Primary School, NSW
	Mrs Toni Simms	<i>Leadership Consultant</i>	Leadership Learning, NSW
	Mrs Jan Simpson	<i>Head of Primary School</i>	Nambour Christian College, QLD
	Dr Mark Simpson	<i>Principal</i>	Trinity South School, SA
	Ms Sue Sinko	<i>Education Officer</i>	Catholic Education Office, NSW
	Mr Paul Sjogren	<i>Deputy Principal</i>	St Andrew's Anglican College, QLD
	Miss Megan Skinner	<i>Leading Teacher</i>	Coatesville Primary School, VIC
	Ms Kate Slater	<i>Principal</i>	Richmond Primary School, TAS
	Mrs Jane Sleeman	<i>Principal</i>	Qld Academy for Health Sciences, QLD
10	Mrs Christina Smeed	<i>Deputy Principal</i>	Wavell Senior High School, QLD
	Ms Barbara Smith	<i>Leader of Learning</i>	Marymount College, SA
8	Ms Barbara Smith	<i>Schools Program Manager</i>	ACER, VIC
	Mrs Georgina Smith	<i>Assistant Director</i>	Catholic Education, SA
	Ms Liz Smith	<i>Deputy Principal</i>	Hampton Senior High School, WA
29	Mrs Margaret Smith	<i>Teacher (LNIT)</i>	St Lukes Catholic School, QLD
	Mrs Marie Smith	<i>Senior Regional Consultant</i>	Catholic Education Office, NSW
	Mrs Michelle Smith	<i>Teacher</i>	Holy Family Primary School, NSW
29	Mr Simon Smith	<i>Principal</i>	Taylor Primary School, ACT
8	Mr Vaughan Smith	<i>Head of Research</i>	Caulfield Grammar School, VIC
34	Mr Christopher Smyth	<i>Secondary Consultant</i>	Catholic Schools Office, NSW
	Mr Peter Snowden	<i>S.D.O.</i>	DEC, NSW
	Mrs Louise Speke	<i>Curriculum Coordinator</i>	Freeman Catholic College, NSW
	Mrs Robyn Spence	<i>HOD - Maths</i>	Wellington Point SHS, QLD
	Dr Helen Spiers	<i>Deputy Principal</i>	Kormilda College, NT
	Mrs Karen Spiller	<i>Principal</i>	St Aidan's Anglican Girls' School, QLD
9	Mrs Julie Squires	<i>Head of Teaching/Learning</i>	Casey Grammar School, VIC
	Mr Brady Stallard	<i>Head of Junior School</i>	St Francis De Sales, SA
	Ms Sallyanne Stanbridge	<i>Primary Coordinator</i>	St Therese's Primary School, NSW
	Dr Phil Standen	<i>Consultant - IE</i>	Brisbane Grammar School, QLD
14	Ms Helen Steele	<i>Head of Middle School</i>	Cardijn College, SA
	Mrs Joanna Stella	<i>Advisor: School Improvement &amp; Compliance</i>	Catholic Education Office, NSW
	Mr Greg Stevens	<i>Principal</i>	St Joseph's Primary School, NSW
30	Mrs Paula Stevenson	<i>Principal</i>	St Brendan's Primary School, VIC
8	Ms Sandy Stevenson	<i>Assistant Director</i>	DEEWR, ACT
15	Ms Bronwyn Stewart		St Michael's Primary School, VIC
	Mrs Jan Stewart	<i>Education Officer</i>	Catholic Education Office, SA
16	Mr Scott Stewart	<i>Principal</i>	William Ross High School, QLD
	Ms Jane Stock	<i>Curriculum Leader</i>	St Joseph's Primary School, VIC
	Mrs Sharon Stocker	<i>Head of School</i>	Mount Scopus Memorial College, VIC
	Mrs Annelise Stockey	<i>Principal</i>	Christ The King Primary, NSW
	Mrs Victoria Stodulka	<i>ACE Teacher</i>	Kingsford Smith, ACT

<i>Dinner Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
	Mr Peter Stokes	<i>Deputy Principal</i>	Narrabeen Sport High School, NSW
16	Mr Brayden Stone	<i>Deputy Principal</i>	St Augustine's College, VIC
31	Mr John Stone		Lesmurdie Senior High School, WA
	Miss Keryn Stone	<i>Best Start Consultant</i>	DEC, NSW
	Mr David Stonestreet	<i>Deputy Principal</i>	Sutherland Shire Christian School, NSW
	Ms Alison Stott	<i>Head of Professional Practice</i>	Aquinas College, VIC
15	Mr Ben Stott	<i>Teacher</i>	St Michael's Primary School, VIC
	Mr Simon Stower	<i>Vice Rector Administration</i>	Padua College, QLD
19	Ms Kaye Sullivan	<i>Principal</i>	Wulguru State School, QLD
	Mrs Michele Sunnucks	<i>Assistant Principal</i>	OLMC Mt Pritchard, NSW
31	Ms Nancy Surace	<i>School Advisor Mathematics</i>	Catholic Education Office, VIC
	Ms Debbie Sutton	<i>Manager, Prof. Learning Quality Assurance</i>	DEC, NSW
33	Mr Alan Swan	<i>Principal Consultant</i>	Department of Education, WA
	Mr Charles Swanepoel	<i>Deputy Head</i>	St Margaret's School, VIC
	Mr Ray Swann	<i>Teaching &amp; Learning Coordinator</i>	Yarra Valley Grammar, VIC
	Mrs Loretta Swayn	<i>Principal</i>	Bohlevale State School, QLD
	Mrs Kim Sweeny	<i>Principal</i>	Cessnock East Public School, NSW
8	Mr Andrew Syme	<i>Principal</i>	Caulfield Grammar School, VIC
19	Mr Jeff Symms	<i>Head of Preparatory School</i>	The Southport School, QLD
	Mr Alistair Symons		Mount St Joseph, NSW
28	Mrs Leeanne Szydzik	<i>Teacher</i>	St Patrick's Primary School, VIC
	Mr Declan Tanham	<i>Principal</i>	Nagle Catholic College, WA
	Mr Brett Tanner	<i>Deputy Principal</i>	Guilford Young College, TAS
	Ms Priscilla Tanner	<i>Senior Project Manager</i>	DEECD, VIC
	Ms Carmel Tapley	<i>Education Officer</i>	MIN Catholic Schools Office, NSW
	Mr Ross Tarlinton	<i>Headmaster</i>	St Joseph's College, NSW
	Mrs Christine Tasker	<i>Principal</i>	Casula Public School, NSW
	Mr Robert Tassoni	<i>Director: Teaching</i>	Genazzano FCJ College, VIC
6	Mrs Mele Taumoepeau	<i>Coordinator</i>	Tonga Sec. Schools Leadership Prog, TONGA
	Mr Adam Taylor	<i>Principal</i>	Holy Cross College, NSW
	Ms Christine Taylor	<i>Primary Inspector</i>	Board of Studies, NSW
	Mrs Gail Taylor	<i>Principal</i>	James Meehan High School, NSW
2	Ms Margaret Taylor	<i>Administrative Officer</i>	ACER Institute, VIC
	Mrs Nicola Taylor	<i>Principal</i>	Sutherland Shire Christian School, NSW
	Ms Sabreena Taylor		DEC, NSW
20	Mr Peter Teggelove	<i>Principal</i>	St Joseph's Primary School, VIC
19	Mr Alwyn Terpstra	<i>Principal</i>	John Calvin Schools, WA
	Mr Paul Teys	<i>Principal</i>	Hunter Valley Grammar School, NSW
	Ms Kath Thelning	<i>LNNP Literacy Manager</i>	DECD, SA
	Mrs Jenny Thomas	<i>Education Office, NSW</i>	Catholic Schools Office, NSW
	Mr Andrew Thompson	<i>Head of Visual Arts</i>	Newington College, NSW
	Dr Murray Thompson	<i>Director of Studies</i>	University Senior College, SA



<i>Dinner Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>
20	Ms Ali Thomson	<i>Head of School Early Years</i>	John Hartley School (B-7)
1	Dr Sue Thomson	<i>National Research Coordinator</i>	ACER, VIC
28	Ms Bernadette Thome	<i>Accelerated Literacy Consultant</i>	Effective Teaching, NSW
	Mrs Andrea Tiffin	<i>Assistant Principal</i>	Trevallyn Primary School, TAS
1	Dr Mike Timms	<i>Director, Assessment and Psychometric Research</i>	ACER, VIC
	Professor Helen Timperley	<i>Professor of Education</i>	University of Auckland, NZ
	Mr Bruce Titlesstad	<i>Head of School</i>	St Stephen's School, WA
	Mrs Susan Tolhurst	<i>Principal</i>	DEC, NSW
6	Mrs Meleane Tonga	<i>Mentor</i>	Tonga Sec. Schools Leadership Prog, TONGA
	Ms Helen Tooulou	<i>LOTE Coordinator</i>	Norwood Morialta High School, SA
5	Ms Jennifer Trevitt	<i>Librarian, Information Dissemination</i>	ACER, VIC
	Mrs Christina Trimble	<i>Principal</i>	Marist Sisters' College, NSW
	Mr Kevin Trimble	<i>Analyst</i>	Catholic Education Office, NSW
	Ms Dorothy Tselios	<i>Director of HR</i>	Carey Baptist Grammar School, VIC
	Mrs Gail Tull	<i>Literacy Coordinator</i>	St Mary's Primary School, VIC
	Mr Mark Turkington	<i>Regional Director</i>	Catholic Education Office, NSW
	Ms Bernadette Turner	<i>Deputy Principal</i>	Star of the Sea College, VIC
26	Dr David Turner	<i>Principal</i>	Bald Hill State School, QLD
	Ms Sarah Turner	<i>Assistant Director</i>	DEEWR, QLD
	Mr Kevin Tutt	<i>Headmaster</i>	Prince Alfred College, SA
	Mrs Bronwyn Underwood	<i>Assistant Principal</i>	St Joseph's Primary School, NSW
	Ms Christina Utri	<i>Principal</i>	Catholic Regional College, VIC
	Mr Geoff van der Vliet	<i>Deputy Principal</i>	Nambour Christian College, QLD
11	Dr Margaret Varady	<i>Coordinator</i>	University of New South Wales, NSW
	Mr Alfredo Vasquez	<i>Administrator</i>	Camel Adventist College, WA
7	Dr Tanya Vaughan	<i>Senior Consulting Researcher</i>	Educational Transformations, VIC
	Ms Rosemary Vellar	<i>Education Officer</i>	Catholic Schools Office, NSW
	Ms Noelene Veness	<i>Head: School Improvement &amp; Compliance</i>	Catholic Education Office, NSW
	Mr Nic Vidot	<i>Principal</i>	St Andrew's College, NSW
	Mr Steven Vincent	<i>Principal</i>	Kallangur State School, QLD
	Mrs Margaret Vingerhoets	<i>Education Officer</i>	Catholic Education Office, VIC
5	Ms Lynette Virgona	<i>Principal Consultant, Statewide Services</i>	Department of Education, WA
	Mr Anton Viser	<i>Deputy Principal</i>	Portside Christian College, SA
	Ms Heather Vogt	<i>Principal</i>	Endeavour College, SA
	Mrs Binh Vu	<i>Senior Education Specialist</i>	World Bank, NSW
	Mrs Danielle Wadland	<i>Primary Coordinator</i>	Snowy Mountains Christian School, NSW
28	Mr James Waight	<i>Principal</i>	St Patrick's Primary School, VIC
	Mrs Ashleah Walker	<i>Coordinator</i>	St Patrick's Primary School, NSW
19	Mr Barry Walsh	<i>DOA</i>	St Dominic's College, NSW
	Mrs Bernadette Walsh	<i>Assistant Principal</i>	Christ The King Primary, NSW

*Dinner*

*Table No.*

*Name*

*Position*

*Delegate Organisation*

	Mrs Joyanne Walsh	<i>Assistant Principal</i>	Kempsey Adventist School, NSW
	Mrs Suzanne Walsh	<i>Director System Learning</i>	CEO Parramatta, NSW
	Dr Michael Wan	<i>Head of Assessment</i>	University of Notre Dame, NSW
	Ms Debbie Ward	<i>Principal</i>	Wellington Point SHS, QLD
	Mr John Warren	<i>Principal</i>	Eynesbury Senior College, SA
	Ms Shannon Warren	<i>Vice Principal</i>	Seymour College, SA
	Ms Janet Wasson	<i>School Education Director</i>	DEC, NSW
	Mr David Watkins	<i>Head of Junior School</i>	Arden Anglican School, NSW
	Mr Craig Wattam	<i>Assistant Director</i>	Catholic Schools Office, NSW
	Mr Phillip Waugh		Aust. International School, Hong Kong
	Mrs Jenny Webb	<i>Principal</i>	St Patrick's Primary School, NSW
	Mr Mark Webber	<i>Head of Teaching</i>	Marist College Eastwood, NSW
	Ms Cheryl Weber	<i>Head Teacher</i>	Fairfield High School, NSW
	Ms Karen Websdale	<i>English Teacher</i>	Casimir Catholic College, NSW
31	Mrs Loretta Weedon	<i>School Advisor Mathematics</i>	Catholic Education Office, VIC
	Mr Chris Welch	<i>Assistant Principal</i>	Emmas Catholic College, NSW
	Mr Andrew Wells	<i>Manager</i>	DECD, SA
	Miss Lisa Wells	<i>Coordinator</i>	Good Shepherd Catholic Primary, NSW
28	Ms Cathy Welsford	<i>Consultant</i>	Effective Teaching, NSW
	Miss Helen West	<i>Education Officer</i>	Catholic Education Office, NSW
	Ms Kerry Weston	<i>School Development Officer</i>	DEC, NSW
18	Mrs Helen Whale	<i>Principal</i>	St Joseph's Primary School, NSW
	Mr Ben Wheatley	<i>Head Teacher</i>	Maitland Grossmann High School, NSW
22	Mr Ross Whelan	<i>Principal</i>	Thomas Hassall Anglican College, NSW
	Ms Julie White	<i>Principal</i>	Woodstock State School, QLD
	Mr Peter White	<i>Principal</i>	Notre Dame College, VIC
	Ms Abby Whitehead	<i>Classroom Teacher</i>	St Patrick's School, VIC
	Mrs Rosalee Whiteley	<i>Literacy Consultant</i>	DEC, NSW
	Mrs Amanda Whitfield	<i>Director</i>	Amanda Whitfield Educ. Consultancy, NSW
	Mrs Kim Wickham	<i>Dean of Studies</i>	St Aidan's Anglican Girls' School, QLD
14	Mr Michael Wilcock	<i>Deputy Principal</i>	Cardijn College, SA
1	Professor Helen Wildy	<i>Dean of the Faculty of Education</i>	University of Western Australia, WA
33	Mr Martin Wilkie	<i>Principal</i>	St Columba's School, QLD
	Mrs Colleen Wilkin	<i>Principal</i>	St Mary's Primary School, VIC
22	Mr Glenn Wilkins	<i>HSIE Coordinator</i>	Thomas Hassall Anglican College, NSW
20	Ms Christina Wilkinson	<i>Learning Leader</i>	Catholic Ladies College, VIC
	Ms Eleanor Wilkinson	<i>PALLIC Literacy Leadership Mentor</i>	DETE, QLD
13	Mr Paul Wilkinson	<i>Principal</i>	St Kilians School, VIC
	Mr Roger Willcocks	<i>Head of Middle School</i>	St Francis De Sales, SA
34	Mr Alan Williams	<i>School Consultant</i>	Catholic Schools Office, NSW
29	Mrs Alison Williams	<i>Deputy Principal</i>	Taylor Primary School, ACT
	Ms Emma Williams	<i>Adviser</i>	Association of Independent Schools, SA

<i>Dinner Table No.</i>	<i>Name</i>	<i>Position</i>	<i>Delegate Organisation</i>	
21	Mrs Jenny Williams	<i>Campus Principal</i>	Beaconhills College, VIC	
	Mrs Maree Williams	<i>Education Officer</i>	Catholic Education Office, ACT	
	Mrs Patricia Williams	<i>Principal</i>	Holy Spirit College, NSW	
	Mr Keiran Williamson	<i>Assistant Principal</i>	Catholic Schools Office, NSW	
	Mrs Amanda Wilson	<i>Principal</i>	Holy Spirit College, NSW	
	Mr John Wilson	<i>Principal</i>	St Finbarr's School, NSW	
	Mr Richard Wiseman	<i>Deputy Principal</i>	Griffith High School, NSW	
	Mrs Leigh Witney	<i>Program Officer</i>	AISQ Schools, Qld	
	Mr Christopher Witt	<i>Literacy Consultant</i>	AIS, WA	
21	Mrs Janet Wood	<i>Principal</i>	Eden Hill Primary School, WA	
21	Mr Peter Wood	<i>Assistant Director</i>	Dept. of Education Services, WA	
21	Mr Paul Woodham	<i>Principal</i>	Ogilvie High School, TAS	
	Mrs Samantha Woodham	<i>Assistant Principal</i>	Campbell Town District High, TAS	
	Mr Anthony Woodhouse	<i>Deputy Principal</i>	Bohlevale State School, QLD	
	Mrs Susan Woolfenden	<i>Leader of Thinking</i>	Good Shepherd School, NSW	
	Mr Mark Woolford	<i>Assistant Principal</i>	Marist College Eastwood, NSW	
	Mrs Christine Woolley	<i>Principal</i>	Northern Christian School, TAS	
	Mr Alan Wright	<i>Business Manager</i>	St Stephen's School, WA	
	Ms Sheena Wright	<i>Secondary Coordinator</i>	Catholic Schools Office, NSW	
	Mrs Karolina Yeates	<i>Director of Teaching</i>	Xavier College, SA	
	Mr Alec Young	<i>CEO</i>	Ingenious Technological Enterprises, TAS	
	Ms Cathy Young	<i>Head of Gifted Education</i>	Catholic Education Office, NSW	
	22	Mrs Jennie Young	<i>Science Coordinator</i>	Thomas Hassall Anglican College, NSW
		Dr Lorraine Young	<i>Leadership Consultant</i>	DECD, SA
22	Mr Roger Young	<i>Head of Senior School</i>	Thomas Hassall Anglican College, NSW	
29	Mr Daniel Zobel	<i>Principal</i>	Fadden Primary School, ACT	
	Mrs Aminath Zubair	<i>Student</i>	Flinders University, SA	
	Mrs Diana Zuvela	<i>Head of Department</i>	Gilmore College, WA	

*Conference Delegates 1,115 as at 27 July 2012*





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