Research Conference 2018

Teaching practices that make a difference: Insights from research

PROCEEDINGS AND PROGRAM

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Acknowledgement of Country
The Australian Council *for* Educational Research acknowledges the Gadigal clan of the Eora Nation, Traditional Owners and Custodians of Tumbalong, the land on which we gather for Research Conference 2018.

We acknowledge the Traditional Owners of the lands on which ACER's offices are located, and of the Country in which we work. We pay our respects to Elders past, present and future. We acknowledge the Aboriginal and Torres Strait Islander people who contribute to educational research and development, including work to improve Indigenous learning.

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Foreword

Teaching practices that make a difference: Insights from research

There is no shortage of opinion about more and less effective ways of teaching. Schools are continually presented with strategies, programs and approaches that claim to be 'research-based', 'evidence-based' or even 'brain-based'. Vocal advocates of particular teaching methods promote their proposed solutions in the media. But how many of these programs and methods have solid foundations in research? And how can teachers and school leaders distinguish exaggerated marketing claims from teaching strategies shown through research to be effective in improving student outcomes?

Research Conference 2018 will examine research evidence around teaching practices that make a difference. It will bring together leading international and Australian researchers to review what is known about more and less effective teaching and to discuss the criteria for evaluating the quality of claims made for particular teaching methods.

Professor Geoff Masters AO
CEO, Australian Council for Educational Research

Keynote papers

Karmel Oration: The role of educator expertise in the 'fake news' world
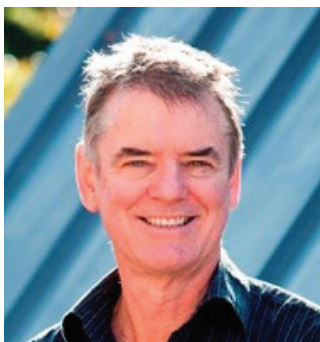
Laureate Professor John Hattie
Melbourne Education Research Institute
Melbourne Graduate School of Education
The University of Melbourne

Laureate Professor John Hattie's work is internationally acclaimed. His influential 2008 book Visible learning: A synthesis of over 800 meta-analyses relating to achievement *is believed to be the world's largest evidence-based study into the factors that improve student learning. Hailed by the* Times Education Supplement *as 'teaching's Holy Grail', this ground-breaking study involved more than 80 million students from around the world and brought together 50 000 smaller studies.* Visible Learning *found that positive teacher–student interaction is the most important factor in effective teaching.*

Since 2011, John has been Director of the Melbourne Education Research Institute at the University of Melbourne. He is also the Chair of the Australian Institute for Teaching and School Leadership (AITSL), through which he provides national leadership in promoting excellence so that teachers and school leaders have maximum impact on learning. He is also past-president of the International Test Commission and Associate Editor of the British Journal of Educational Psychology *and* American Educational Research Journal*.*

John was awarded the New Zealand Order of Merit in the 2011 Queen's Birthday Honours, is a Fellow of the Australian Council for Educational Leaders and the American Psychological Association, and has published and presented over 500 papers, and supervised 190 thesis students.

Abstract

The most powerful influence on effective student learning relates to our educators' adaptive expertise. Our educators and educational institutions are under fire from the pressure to reduce costs associated with the training and induction of teachers, and their ongoing professional learning; claims that there is a falling supply of teachers; there is ongoing backlash against evidence-based research ('fake news'); and continued debate over inputs to the system without reference to outputs. This oration will explore the notion of expertise and evidence and how expertise is anchored in evaluative thinking. It will be illustrated with methods that will help educators see the consequences of their expertise and returns to the 1973 Karmel Report's plea for enhancement of 'human resources' in all our schools.

The role of evidence in teaching and learning

Professor Geoff Masters AO
Australian Council for Educational Research

Geoff Masters is Chief Executive Officer and a member of the Board of the Australian Council for Educational Research.

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

Geoff has conducted a number of reviews for governments, including a review of examination procedures in the NSW Higher School Certificate; an investigation of options for the introduction of an Australian Certificate of Education; a national review of options for reporting and comparing school performances; reviews of strategies for improving literacy and numeracy learning in government schools in Queensland and the Northern Territory; and a review of senior secondary assessment and tertiary entrance procedures in Queensland. He is currently working with the Western Australian Department of Education to develop a Principal Performance Improvement Tool.

Geoff's contributions to education have been recognised through the award of the Australian College of Educators' Medal in 2009 and his appointment as an Officer of the Order of Australia in 2014.

Abstract

Highly-effective teaching requires evidence-informed decision making at crucial points in the teaching process. First, effective teachers use quality evidence to establish the points individual learners have reached in their learning. This enables teachers to identify starting points for further teaching and learning and to ensure that each student is given learning opportunities at an appropriate level of challenge. In contrast, much teaching instead assumes all students will be appropriately challenged by common year-level curricula. The process of establishing and understanding where students are in their learning often requires detailed diagnostic evidence of individual misunderstandings and obstacles to learning progress. Second, highly effective teachers have a repertoire of evidence-informed teaching strategies and select from these to engage individual students, set ambitious but realistic learning goals and target teaching to address individual learning needs. Third, effective teachers use evidence to monitor the progress individuals make in their learning over extended periods of time. They use evidence of progress to assess the adequacy of an individual's learning, to intervene when progress is inadequate and to evaluate the effectiveness of their own teaching strategies and interventions. In using evidence in these ways, highly effective teachers work with colleagues to build knowledge about better ways to use evidence to promote every student's growth.

Introduction

Evidence-based teaching involves the use of evidence to: (1) establish where students are in their learning; (2) decide on appropriate teaching strategies and interventions; and (3) monitor student progress and evaluate teaching effectiveness.

The term 'evidence-based' is now firmly entrenched in the education lexicon. And with good reason; improvements in student learning and educational outcomes depend on the wider use of reliable evidence in classroom practice. However, much discussion of evidence-based teaching is based on a narrow definition that would benefit from a broader recognition of the role of evidence in teaching and learning.

The concept of evidence-based practice has its origins in medicine. The essential idea is that decisions made by medical practitioners should be based on the best available evidence collected through rigorous research – ideally, through randomised controlled trials. Research studies in the form of carefully controlled experiments are seen as providing the strongest and most dependable forms of evidence to guide practice.

However, everyday medical practice uses multiple forms of evidence. In addition to evidence from external research studies, medical practitioners gather and use evidence relating to patients' presenting conditions and symptoms – for example, by taking patient histories and ordering diagnostic tests. Evidence of this kind is essential to informed decision making. So, too, is evidence about the subsequent effectiveness of a practitioner's decisions. Such evidence plays a crucial role in monitoring a patient's progress and evaluating the impact of treatments and interventions.

Most definitions of evidence-based medicine recognise the role and importance of these different forms of evidence. One of the earliest and most cited definitions (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996, pp. 70–1) describes evidence-based practice as 'integrating individual clinical expertise with the best available external evidence from systematic research'.

Evidence-based teaching similarly involves more than the implementation of practices that have been shown to be effective in controlled research studies. As in medicine, evidence-based practice depends on the integration of reliable, local, practitioner-collected evidence with evidence from systematic, external research. Policies and discussions of 'evidence-based teaching' sometimes overlook the importance of this broader, more integrated understanding of the role of evidence in teaching and learning.

Evidence to identify starting points for teaching and learning

A first, essential form of evidence for teaching is information about the points individual learners have reached in their learning. This usually means establishing what they know, understand and can do as starting points for teaching and to ensure that individuals are provided with well-targeted learning opportunities and appropriately challenging learning goals. The parallel in medical practice is diagnosing the state of a patient's health to guide appropriate treatment. Understanding where learners are in their learning is as essential to clinical teaching practice as understanding a patient's symptoms and health is to effective medical practice.

The process of establishing where students are in their learning may involve the review of available historical evidence – for example, evidence from a previous teacher or evidence from past assessments. It also may involve administering tests or other assessments to identify appropriate starting points.

One view of teaching – now largely outmoded – sees it merely as the delivery of the appropriate year-level curriculum to all students. Under this view, the role of teachers is to deliver the relevant curriculum; the job of students is to learn what teachers teach; and the role of assessment is to establish how well students have learnt what teachers have taught and to grade them accordingly. In contrast, 'evidence-based' teaching uses evidence about where students are in their learning to guide and personalise teaching. The objective is to develop a good understanding of where a student is in their learning so that they can be provided with appropriately targeted teaching and learning opportunities.

Evidence-based teaching of this kind depends on a frame of reference against which learning can be monitored – a 'roadmap' that describes and illustrates what it means to grow and become more proficient in a learning area. Learning is depicted as an ongoing process through which students develop progressively higher levels of knowledge, understanding and skill over extended periods of time.

In evidence-based teaching, assessments are undertaken to gather evidence and draw conclusions about where students are in their learning. The objective is to use observations of student performances and work to draw inferences about their current levels of attainment. A thorough understanding of where a student is in their learning may require a detailed diagnostic investigation of the errors they are making or the misunderstandings they have developed – often essential evidence for addressing obstacles to further progress and a key element of clinical teaching practice. Reports of student attainment are then expressed not

as percentages or grades, but as the points individuals have reached, interpreted by reference to what they know, understand and can do.

Evidence to inform teaching strategies and interventions

A second, powerful form of evidence for promoting student learning is evidence from research into effective teaching strategies and interventions. Knowing where students are in their learning provides a starting point; however, the crucial next question is how to promote further learning. Which interventions are likely to improve student levels of understanding and skill? What teaching strategies have been shown to work in practice? For which learners? Under what conditions? Answers to questions of this kind are derived from rigorous, systematic research and professional teaching experience.

As a general principle, effective teaching builds on and extends learners' existing knowledge, skills and understandings. Teachers need to know how to do this, which in turn depends on a deep understanding of the learning domain itself and, in particular, typical paths and sequences of student learning. How does learning build on prior learning and lay the foundations for further learning? How does prerequisite knowledge influence future learning success? What are the foundational, enabling skills that students must develop before they can progress to higher levels of attainment? Learning research has a crucial role to play in answering these questions, elucidating the nature of learning, in particular learning domains, and generating research evidence to inform teaching practice.

Research also has an important role to play in uncovering the kinds of misunderstandings and alternative conceptions that students commonly develop. Such research adds to an understanding of how learning occurs within a particular learning domain. As well as recognising typical and logical sequences of development, teachers require an appreciation of the side-tracks that some students go down and how these impede learning progress. Research that provides evidence in the form of insights into common errors and misconceptions assists teachers in diagnosing and addressing the difficulties that individuals experience.

Importantly, research evidence of these kinds is domain specific. Because teachers teach subjects, they generally benefit from research into how students learn those subjects. For example, the evidence likely to be most useful to teachers of reading is evidence about how students learn to read, including the role of pre-reading and early reading skills in establishing the foundations for subsequent reading development. The evidence likely to be most useful to teachers of science is evidence about how students progressively learn science, including evidence relating to the development

of deeper understandings of scientific concepts and principles, and the kinds of misunderstandings that students commonly develop.

'Evidence-based' educational practices sometimes take the form of general solutions such as 'individualised learning', 'early years intervention', 'metacognition', 'homework', 'peer tutoring' and 'feedback'. However, general solutions of these kinds must be interpreted and implemented in the contexts of the subjects teachers teach. What kind of homework? For whom? Feedback of what kind? When? In general, teachers require evidence about the best ways to implement effective teaching strategies and interventions in subject-specific contexts.

Evidence to evaluate student progress and teaching effectiveness

A third form of evidence for teaching is information about the progress students make in their learning over time. This is important information for evaluating learning success and for making judgements about the effectiveness of teaching strategies and interventions.

A traditional approach to evaluating learning is to compare students' performances with expectations based on their age or year level. For example, a Year 5 student's learning success is commonly assessed and graded against Year 5 performance expectations. However, this approach takes no account of where students are in their long-term learning at the beginning of a school year and so does not reflect the progress (or growth) they have made. Under this approach, two students may achieve the same grade, one having made significant progress during the year, the other having made very little.

An alternative is to define learning success in terms of the *progress* individuals make. This approach assumes that learning is reflected in, and can be evaluated in terms of, improvements in student levels of knowledge, understanding and skill – for example, over the course of a school year.

Evidence about the progress students make is crucial information for teaching. It provides a basis for establishing whether, and how effectively, individuals are learning. Low levels of progress may indicate lack of student effort and/or ineffective teaching, and so warrant closer investigation. Information about progress provides the most direct indicator of teaching effectiveness, as well as a basis for evaluating educational policies, programs and teaching methods.

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Teaching quality: Core content implemented through evidence-based methods with structure, support and challenge

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Professor Doctor Eckhard Klieme has trained as a mathematician and a psychologist. He is now Professor of Educational Research at Goethe University, Frankfurt am Main, Germany. Eckhard has been the Director of the Center for Research on Educational Quality and Evaluation at the German Institute for International Educational Research (DIPF) since 2001. His research interests focus on educational effectiveness and quality of teaching, classroom assessment, and international comparative educational research. Starting with TIMSS-Video 1995 (Trends in International Mathematics and Science Study) in Germany, Eckhard has led several video-based studies on teaching in mathematics, science and language education. He has served as a consultant for national and international agencies and has been involved in international large-scale assessment programs such as the Programme for International Student Assessment (PISA), the OECD Teaching and Learning International Survey (TALIS), and currently the TALIS video study.

Abstract

Educational research aims to replace traditional notions of 'good teaching' with evidence-based theories of 'successful teaching' and develop concepts and measures of teaching quality that can inform teacher training, professional development and evaluation. Scholars have presented various conceptualisations, including constructivist as well as direct instruction models, Western and Eastern approaches, comprehensive paradigms (e.g. 'mastery learning' or 'inquiry-based science education') as well as discrete teaching practices such as scaffolding, peer tutoring or formative assessment. Content coverage and the quality of the subject matter taught (also called 'opportunity to learn') have been identified as strong factors. This keynote presentation will attempt to integrate various approaches into a model of successful teaching that asks: What is taught? Which classroom practices and teaching methods are used? And most importantly: *How* are content and practices enacted? Based on video studies in primary school science, secondary school mathematics and language education, I will argue that there are three generic dimensions of quality: (1) structure (classroom organisation, well-structured content), (2) support (socio-emotional, individualised teaching) and (3) challenge (demanding tasks, involving students in discourse). Finally, I will look at international comparative findings from ACER's PISA 2012 study to position Australian teaching within a broader cross-cultural context.

Conference papers:
Sunday 12 August

Evidence-based approaches to school improvement: The Kimberley Schools Project

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Bill Louden is Emeritus Professor of Education at The University of Western Australia where he was Senior Deputy Vice-Chancellor and Dean of Education. He has served as chair and board member of state and national statutory authorities responsible for curriculum, assessment and professional standards. He has led many government reviews and inquiries. The most recent of these include reviews of sex and gender education for the Australian and NSW governments, a review of the Board of Studies, Teaching and Educational Standards for the NSW government and an investigation of high-performing primary schools for the Western Australian Government. Bill is a Fellow of the Australian College of Educators. He was appointed as a Member of the Order of Australia for services to education.

Abstract

Despite a great deal of goodwill, effort and funding, student achievement in the Kimberley region of Western Australia has shown little improvement in the last decade.

Governments have intervened in a range of ways: tying funding to evidence that schools are closing the gap; improving conditions for teachers and principals working with remote communities; funding a bewildering range of attendance and engagement strategies; and supporting cultural relevance though a range of short-term skill and enrichment programs.

This paper describes the Kimberley Schools Project, which is an alternative approach funded by the Western Australian Government through the Royalties for Regions program. It is a 'low variation' approach that asks volunteer schools to sign on to four common strands of activity: targeted teaching; early years learning and care; attendance and engagement; and connecting community, school and learning.

The Project offers coaching and support to teachers and school principals in implementing these four strands.

It's too soon to tell whether this program will succeed where others have failed, but this paper documents the evidence behind the approach that has been taken and share some early insights about implementation.

Introduction

School improvement in the Kimberley region of Western Australia is what social planners call a 'wicked problem': multiple dependencies between education and health, housing and employment; conflicting views about solutions; and a history of inconclusive attempts at improvement.

The Kimberley region includes some of the most disadvantaged communities in Australia. Compared with the rest of Western Australia, Kimberley children are more than twice as likely to have a low birth weight, three times as likely to be born to teenage mothers, four times as likely to be hospitalised for potentially preventable conditions, and hundreds of times more likely to be affected by Fetal Alcohol Spectrum Disorder (Serafino & Anderson, 2015). More than 45 per cent of young Kimberley children are classified as developmentally vulnerable on at least one indicator and about 30 per cent as vulnerable on two indicators (Western Australia, Department of Education, 2018, p. 10).

Attendance rates and achievement lag well behind the rest of the country and are either static or deteriorating. The attendance rate of Aboriginal children in the Kimberley region was 71 per cent in 2010 and 67 per cent in 2016 (Kimberley Regional Education Office, 2017). The proportion of Aboriginal children in the region who achieved the National Minimum Standard (NMS) in Year 3 NAPLAN reading fell from 62 per cent in 2010 to 60 per cent 2016. In that time, the proportion of WA students who achieved the NMS rose from 91.7 per cent to 93.8 per cent (ACARA, 2010, 2016). For the children in very remote schools – and about half of the 41 schools in the region are classified as very remote – outcomes were much worse. Fewer than 22 per cent of children in very remote Western Australian schools reached the NMS in Year 3 reading in 2017 (ACARA, 2017).

Problems and solutions

Many initiatives have attempted to unpick this 'wicked problem'. Some have seen the locus of the problem in language and dialect, leading to projects focused on two-way learning that is more respectful and makes more use of children's home languages and dialects (Western Australia, Department of Education, 2012). Others, such as the Stronger Smarter Institute, have focused on building safer, more respectful school environments and replacing a culture of low expectations (Stronger Smarter Institute, 2017). Many improvement efforts have focused on curriculum issues, ranging from play based and personalised learning (Association of Independent Schools of Western Australia, 2017) to direct instruction (Australian Government, Department of Education and Training, 2017). There have been significant attempts to reduce principal and teacher

transiency, through substantial improvements in salaries and conditions in remote schools (Western Australia, Department of Education, 2018). And beyond traditional school subjects, there have been all sorts of cultural offerings focused on improving the engagement of school-aged children, such as week-long hip hop video-making programs (Indigenous Hip Hop Projects, 2014).

This range of well-meaning (and expensive) activity has no doubt had some positive local impact but has not touched the attendance and achievement norms of the region. It may be that this reflects the context of schooling in the Kimberley, rather than the quality of the initiatives. The climate is harsh, communities are small and there are great distances between schools. The Kimberley's schools serve a land area twice the size of Victoria and a total population of fewer than 35 000 people. High levels of intergenerational disadvantage and disengagement from schooling mean that student transience and low levels of attendance are likely to persist. Many schools will continue to be very small and very remote, with fewer than five teachers. Many teachers and school leaders are likely to be inexperienced in their roles and unfamiliar with life in remote communities and – notwithstanding significant improvements in teacher salaries and conditions – many teachers and school leaders are likely to move on after a few years in remote communities.

If it is these contextual constraints, rather than the quality of individual improvement initiatives, that have limited improvement in the Kimberley then it makes sense to design school improvements that can persist within these constraints – in small and remote places with high transience and turnover among students, teachers and school leaders. That is what we have set out to do in the Kimberley Schools Project.

The Kimberley Schools Project

The Kimberley Schools Project (KSP) was established on the initiative of the Kimberley Development Commission, the statutory authority responsible for the social and economic development of the region. It has access to funds not directly available to schools or school systems and has made an additional investment of $25 million over three years (Western Australia, Regional Services Reform Unit, 2018). The KSP is cross-sectoral activity, available to all Kimberley schools and sectors on an opt-in basis.

Four fundamental principles underpin thinking about the project: impact, evidence, local leadership and persistence.

- Impact: preferring initiatives likely to have a direct and measureable effect on academic achievement, especially in literacy and numeracy.

- Evidence: preferring initiatives for which there is substantial external evidence of the likelihood of success.
- Local leadership: preferring staff with long-term local experience and cultural competence.
- Persistence: preferring initiatives likely to persist in small and remote communities when transient staff have moved on.

With these principles in mind, four strands of activity have been identified: targeted teaching; early years learning and care; attendance and engagement; and connecting community, school and learning. In each case, an evidence review was commissioned to guide project planning.

Targeted teaching

The first strand of activity is underpinned by an evidence review prepared by a team from Edith Cowan University. This review included advice on teaching strategies, target-setting and assessment, and coaching for teachers and school leaders (Konza et al., 2016). Responding to the high levels of student and teacher transiency and high levels of student absence that characterise many Kimberley schools, a common pedagogical framework was proposed for all schools opting in to the KSP. This lower-variation approach to teaching reflects the kind of thinking summarised in Rosenshine's (2012) research-based principles of instruction (see Table 1).

What we are calling 'targeted teaching' includes several strands:

- *Let's decode*, a systematic synthetics phonic program (Formentin, 1993; Scarparolo & Hammond, 2017)
- explicit whole-class initial teaching

- direct instruction through programs such as *Junior elementary math mastery* (Farkota, 2010) for students who require additional support.

Schools who join the program receive training in these approaches, as well as school-based coaching and feedback provided by experienced coaches who are located in the Kimberley and able to visit each far-flung school twice a term. Student achievement is closely tracked using a range of summative and formative assessments. All assessment data are entered by teachers or coaches into a common digital database designed to track student growth over time. The database also includes a range of student demographic and attendance data drawn down from school system databases, and is available as an iPad app for easy classroom use.

School leaders are directly involved in the teacher professional development and coaching program and are supported by a leadership program that helps them target activities and monitor achievement, attendance and implementation fidelity data across each school year.

Early years learning and care

The second strand of activity, early years learning and care, builds on an evidence review prepared by a team at the Telethon Kids Institute (Morton & Ansell, 2018). This report analysed targeted government funding for pre-kindergarten services, concluding that 29 of the 41 Kimberley schools do not have access to pre-kindergarten programs and that almost all of these are in very remote Aboriginal communities. In many of these communities, the school is the only organisation with adequate infrastructure to respond to 0–3 year-old health, development and education needs. Based on a literature review and consultation with schools, the report identifies ten critical success factors

Table 1 Rosenshine's principles of instruction

Begin lessons with a short review
Present new material in small steps with student practice after each step
Ask many questions and check responses of all students
Provide models
Guide student practice
Check for student understanding
Obtain a high success rate
Provide scaffolds for difficult tasks
Require and monitor independent practice
Engage student in weekly and monthly review

Table 2 Early years key success factors, Kimberley 2018

The parent/carer being present and involved throughout the program
Adaptation of the program and activities for the local Aboriginal community, culture and language, as well as Aboriginal community control, involvement or management
Tailoring the program and activities to each child's needs, focusing on each child's development as well as balancing activities that are fun with being developmentally focused and meeting parent/carer needs
Staffing attributes such as Aboriginality, cultural safety and relationship building
Linking with schools, focusing on school readiness and providing a gateway to school entry
Linking to health services and access to other early years/family services through the program
The ability of the program to facilitate out-of-class or in-home activities and work
A focus on planning, monitoring and review of the program and activities
A focus on infrastructure enhancement and resources
Adequate access and transport

for pre-kindergarten programs in Kimberley schools and two currently available programs that meet all of the success factors: Families as First Educators[1] and the Abecedarian Approach Australia[2] (see Table 2, p. 11).

Considering these success factors and the current funding streams through state and Commonwealth health and education portfolios, the KSP project team will work individually with schools to develop and augment existing place-based services in each community. In many cases, the simplest strategy will be to implement the Abecedarian or Families as First Educators approaches.

Attendance and engagement

The third strand of activity is underpinned by another evidence review commissioned from a different Telethon Kids Institute team (Wyndow, Hancock, & Zubrick, 2017).The report reviewed attendance data in Kimberley schools for 2008–2016, identified barriers to school attendance, conducted an audit of existing programs in schools and explored the evidence base supporting attendance and engagement strategies.

Although the research showed that there was a modest positive relationship between school socio-educational status, size and and attendance, there were many instances of the contrary: very disadvantaged schools with good attendance, small schools with good attendance and schools with considerable fluctuation in attendance over time. Figure 1 shows the relationship between the Index of Socio-Educational Advantage (ICSEA) and average school attendance, with school

size represented by the size of the marker and school sector represented by the colour of the mark.

Eighty-five *different* attendance programs or strategies were identified in Kimberley schools. On average, each school was implementing strategies in six or seven domains at the time of the study. Table 3 (p. 12) identifies the key domains, the number of programs in each domain and some examples of individual programs.

Given the range of activity identified in this review, the project team will be working with schools with a place-based strategy, to identify the most effective of the attendance programs they currently use and to explore opportunities to learn from other similar schools and communities.

Connecting community, school and learning

The evidence review on the fourth strand of the project was undertaken within the project, with key project staff consulting with Kimberley-based colleagues about success factors in connecting communities and schools. Six key success factors were identified (see Table 4, p. 13).

In small and remote communities in the Kimberley, it is evident to all that educational success depends on strong relationships between communities and schools. Most schools put a lot of effort into these relationships. Success varies, among communities and over time, and depends less on strategies and more on relationships. In this strand of the KSP, project staff will work with school leaders and community members on place-based strategies to strengthen these relationships.

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[1] https://apps.aifs.gov.au/ipppregister/projects/families-as-first-teachers-nt-faft-indigenous-parenting-support-services-program
[2] https://3a.education.unimelb.edu.au/

Figure 1 Attendance and engagement in Kimberley schools, average school attendance, by average ICSEA of school

Table 3 Attendance and engagement programs and strategies identified in the review, 2017

Domains	Programs (no.)	Examples
Whole of school approach	7	Remote School Attendance Program, Formal attendance policy
Attendance monitoring	9	Daily phone calls/runs, School Based Attendance Officers
External engagement	16	Bush Rangers, Clontarf Academy, Deadly Sista Girlz
Prizes and Incentives	8	Prizes, end of year awards, family awards
Food and nutrition	6	Foodbank, Eon Food and Nutrition
Numeracy and literacy	27	Aboriginal Literacy Strategy, Books in Homes, First Steps, Principals as Literacy Leaders
Sports and culture	12	Art, sports (e.g. football, netball), dance, music
Early childhood programs	5	Kindilink, Aboriginal Families as First Educators

Table 4 Connecting schools and communities key success factors, Kimberley 2017

A clear and agreed strategic purpose based on high expectations for Aboriginal students.
Whole-school approaches to building a positive school culture – all staff modelling agreed values, standards and behaviours.
Identifying and using cultural leaders and including them in school decision making.
Establishing clear statements of roles and responsibilities.
Authentic two-way dialogue and conversations supported through well designed processes.
Positive relationships among school, principals, parents, community, teachers and students that are fostered by celebrations, extra-curricular activities and opportunities for parental and community involvement.

Conclusion

The KSP has been three years in the planning, involving intricate negotiations between government agencies responsible for schooling and for regional development, between public and independent school systems and with individual schools and communities. The first group of 10 schools have satisfied the readiness requirements to participate in the project, have participated in several rounds of targeted teaching professional learning, have visited schools using similar methods, have had several rounds of in-school coaching, and have developed local plans to improve early years education and care, attendance and school-community collaboration.

So far, the project has been characterised by a great deal of energy and enthusiasm, and it is too soon for the first stories of disappointment or failure to emerge. There is a long way to go before the evidence-based approaches advocated in the project are institutionalised in these schools, and before we see whether these approaches persist when teachers and school leaders move on. Given the complexity of the context, it will be some years before we know whether the KSP has made a material difference to the outcomes for the vulnerable communities these schools serve, or whether the KSP will be one more exhibit in the museum of failed educational innovation. But that is a story for another day.

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Making a difference in learning through arts-rich pedagogy

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Professor Robyn Ewing AM is Professor of Teacher Education and the Arts at The University of Sydney. She teaches in the areas of curriculum, English and drama, language and early literacy development and works with undergraduate and postgraduate pre-service and practising teachers. Robyn is passionate about the role the Arts can and should play in creative pedagogy and transforming the curriculum at all levels of education.

In the areas of English, literacy and the arts, Robyn's research and writing has particularly focused on the use of educational or process drama with literature to develop students' imaginations and critical literacies. Since 2009, she has worked in partnership with the Sydney Theatre Company on School Drama™, which is a professional teacher learning program. Her other research interests include innovative teacher education, the experiences of early career teachers and the role of mentoring; sustaining curriculum innovation; and reflection in professional practice.

Abstract

There is unequivocal evidence that arts-rich pedagogies enhance student social and emotional wellbeing and, consequently, academic learning outcomes across the curriculum. Yet many primary teachers report they lack the expertise and/or confidence to embed quality arts processes and experiences in what is increasingly described as an overcrowded curriculum. This presentation reviews the research findings about the impact and sustainability of School Drama™, an initiative developed through a partnership between the Sydney Theatre Company and The University of Sydney. An innovative co-mentoring (Ewing, 2002, 2006; Le Cornu, 2005) teacher professional learning program and drama-based intervention, the program aims to develop primary teachers' professional knowledge of and expertise in using drama with contemporary children's literature to enhance student English and literacy outcomes.

Introduction

Given the regulatory contexts of a number of Western education systems, overcrowded syllabus documents and an increasing emphasis on high stakes testing, many early childhood and primary teachers report feeling an overwhelming pressure to compromise their pedagogical expertise and understandings to concentrate on technical and reductive approaches to curriculum and assessment. Despite the rhetoric in policy documents that 21st-century learners must develop their creative potential to cope with accelerating change, teachers frequently comment that they do not feel empowered to focus on imaginative and creative teaching and learning.

Yet a growing body of national and international research and scholarship documents the transformative potential of embedding quality arts processes and learning experiences across the curriculum (e.g., Bamford, 2006; Biesta, 2014; Catterall, 2009; Deasy, 2002; Ewing & Saunders, 2017; Martin et al., 2013; Winner, Goldstein, & Vincent-Lancrin, 2013). Aprill, Burnaford, and Weiss (2001, p.2) assert that 'an arts-rich curriculum can help transform a school into a dynamic learning community in which educators and students are more likely to think critically, express themselves creatively, and respect diverse opinions'. All art forms are disciplines with distinctive knowledges, skills and understandings and therefore are different kinds of literacies, different ways of making and representing meaning. Given that each art form involves processes that include play, design, experimentation, exploration, communication, provocation, use of metaphor, expression or representation, and the artistic or aesthetic shaping of the body or other media (Ewing, 2010a), they can play an important role in fostering our imaginations and creativities.

This paper reports ongoing research that focuses on the potential that two arts disciplines; educational or process drama and literature; can play as critical, quality pedagogy to foster literacy learning. It builds on a rich literature that documents the relationship between drama, literature and literacy (e.g., Baldwin & Fleming, 2003; Ewing, 2010b; Ewing, Simons, Hertzberg, & Campbell, 2016; Miller & Saxton, 2004, 2016; O'Mara, 2004; O'Toole & Dunn, 2015). The following sections explore the concept of drama as critical, quality pedagogy as it has been developed in the School Drama™ program since it commenced in 2009. The program's methodology and research findings are then briefly discussed.

The School Drama program

School Drama is a co-mentoring teacher professional learning program for primary teachers developed by the Sydney Theatre Company (STC) and The University of Sydney's Faculty of Education and Social Work (Ewing & Saunders, 2016). It initially aimed to enhance primary teacher knowledge, confidence and expertise in using drama-rich pedagogy with quality literature to improve student English and literacy outcomes. The program began in 2009 and over the last nine years has grown to reach more than 22 000 teachers, pre-service teachers and students. It is now one of the largest arts-based professional learning programs in Australia. More recently the program and pedagogy have been adapted for work with secondary English as an Additional Language or Dialect (EALD) students, history students, adult migrants and refugees and students in juvenile justice centres.

A co-mentoring professional learning model

Instead of using the traditional concept of a mentoring relationship as *the expert* providing guidance for the novice, the program reframes the mentoring process as one of co-learning that positions the participants in a non-hierarchical or reciprocal relationship (Ewing, 2002, 2006; Le Cornu, 2005). STC pairs each participating classroom teacher with a teaching artist and together the pair co-plan, co-mentor and co-teach the seven-week program. Initially all participating teachers are involved in professional learning workshops. A professional actor or teaching artist then works alongside the class teacher throughout a school term, to plan, model and explore quality literature using drama to focus on English and literacy skills (the key focus areas are oracy, description, imaginative writing and inferential comprehension). The teacher chooses the English or literacy focus and benchmarks six to eight students as case studies both before the program begins and after it concludes.

The teaching artists initially model the use of educational or process drama strategies with authentic literary texts but over the time frame the teacher assumes more responsibility for this pedagogy. The model works most effectively when the teacher is able to consolidate their learning through working with another class on the drama devices introduced. It is also useful when the students' complete follow up activities in preparation for the next session.

The School Drama program is thus dependent on the development of a respectful partnership between each educator and teaching artist as they team-teach using drama and literature to work towards improving student achievement in English and literacy in a particular classroom. Both must work to ensure this trusting relationship develops: one that appreciates the expertise of the other and can weather rigorous discussion about differences. The School Drama partnership is thus a significant departure from conventional artist-in-residence programs. The different participants have different knowledges and understandings to share and

each respects the expertise of the other. The teachers learn about the use of drama in enhancing English and literacy while the teaching artists learn about adapting their professional theatre skills to a particular literacy focus in specific classroom and school contexts.

In addition, the students benefit from the teachers' learning and ongoing use of drama strategies with literary texts to deepen their understanding and improve the identified literacy outcome. Building on Vygotsky's (2004) work on drama, language and the imagination, Ewing (2015) argues that dramatic play with literary texts can help students co-construct knowledge with peers as well as teachers and teaching artists. She asserts that a collective zone of proximal development (Moll & Whitmore, 1993) is established where students, teachers and teaching artists alike use the fictional spaces of quality children's literature to build on what they already know while exploring more about their worlds.

Our research over the eight years of the program suggests that teachers, teaching artists and students all benefit from the program.

Research findings

As part of the partnership, STC and the Faculty of Education and Social Work (FESW) designed and implemented annual evaluations of the School Drama program. Along with these evaluations of the pilot phase of the program (Campbell, Ewing, & Gibson, 2010; Gibson, 2011, 2012, 2013) a meta-analysis was completed (Gibson & Smith, 2013). Gibson and Smith's report analysed information gathered from participants, including: teacher pre- and post-program surveys, teacher and teaching artist post-engagement interviews, student pre- and post-program benchmarked work samples, and some student evaluations and focus groups.

In addition five case studies in participant schools have been undertaken to investigate various aspects of the program including the sustainability of the creative pedagogy and the impact of the program on student outcomes, both academic and non-academic (Hankus, 2016; Robertson, 2010; Saunders, 2015; Smith, 2014; Sze, 2013). Multiple data collection methods have been employed including artefacts (for pre- and post-program student benchmarking as well as sample student work), focus groups with students, reflective interviews with the class teachers, and observations from the teaching artists and researchers. A further five case studies are currently underway and will add to this portfolio later in 2018.

In summary, analysis of the data includes the following findings:

- Very strong evidence from teacher pre- and post-surveys and interviews of powerful teacher professional learning that has resulted in significant shifts in teachers' reported knowledge and understanding of process drama strategies, their confidence in using these, and to positive changes in classroom practice during their engagement with the teaching artist.

- Unequivocal evidence from teachers and teaching artists confirming the efficacy, effectiveness and impact of the co-mentoring model between teacher and teaching artist (actor) that is unique to the School Drama program's artist-in-residence approach. Smith's (2014) case study demonstrated the sustainability of the innovation in a school where those teachers who had undertaken the program mentored other teachers in the school. In addition 15–20 per cent of teachers choose to undertake further professional development in their own time with additional School Drama Hub twilight seminars.

- Schools frequently choose to sign up for School Drama over a number of years. Several schools have stayed with the program since it began, with different teachers participating each year to build a community of learners. Fifty-six per cent of schools have participated in the program for at least two years and 11 per cent for five years or more.

- There is strong evidence from benchmarked student work samples of increased student learning in relation to teacher-identified literacy outcomes. Despite the short time frame, teachers report almost without exception that student literacy outcomes in the focus literacy area are enhanced. Saunders' (2015) case study with a Year 6 class found that this improvement was most marked for students who were 'less able'.

- In addition, teachers consistently highlight the increased confidence of their students both in being prepared to actively engage in drama strategies and across the primary key learning areas (Gibson & Smith, 2013, p.1). For example one teacher commented: 'Drama allows students to take risks, express themselves orally, use their bodies and emotionally connect to the text. These are all important to deep learning …' Importantly, the case study data also suggest a range of non-academic gains for students through the intervention, including increased motivation and engagement in learning, and shifts in empathy and *a lot more confidence to express an opinion, to have a go at something that's outside their comfort zone*. Saunders' (2015) case study, has also explored student development of empathy.

- Participant teachers report that using one art form (drama) to delve more deeply into another art form (literature) has contributed to their students' development as confident, creative, engaged literacy learners. They also assert that the program develops their own confidence to use drama strategies as creative pedagogy across the curriculum.

- The teaching artists who work with the class teachers report that the program is just as valuable for them, citing both an understanding of the educative process and a heightening of their own skills in a different context as outcomes.
- The 'student voice' also confirms the impact of the program. In focus group discussions (Saunders, 2015; Robertson, 2010) they have demonstrated their understanding of the intervention as well as articulated the value of the drama pedagogy for their learning. As one student comments: *'And putting yourself in the character's shoes, its like, when you are in character you feel a better prediction of what could happen next … because you've been through what they have been through … kind of …'* (Saunders, 2015).

Conclusion

The role drama can play in enhancing student social and emotional wellbeing as well as English and literacy outcomes has been highlighted in this paper. Making art through drama and literature enables students to move into transformative spaces in which they can play with possibilities that take them beyond their own perspectives to encourage openness and mindfulness towards the others who share their worlds. Creative arts-rich pedagogies enable students to develop communicative, collaborative and critical literacies (NEA, 2013) that go beyond surface and literal interpretations of literature. Students' worldviews can be broadened to embrace an understanding of the vast diversity of cultures and approaches to living (Neelands, 2010). If we truly want to develop children's creativities and help them become resilient and flexible thinkers we must embed arts-rich pedagogies at the heart of the classroom experience.

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Transforming learning with information and communication technologies: Insights from three decades of research

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Romina's teaching and research interests and endeavours focus on the use of information and communication technologies (ICT) to enhance and transform teaching and learning to meet the needs of 21st-century learners. Romina's work in this field is recognised nationally and internationally: she has won several awards at Australian Council for Computers in Education conferences; received more than $1.9m in external competitive grants and consultancies; and been endowed with a Schooling 2001 Queensland Award for contribution to the integration of learning technology in Queensland schools as well as a QUT Postdoctoral Fellowship to further her doctoral findings related to the impact of ICT on higher order thinking, problem solving and creativity. Romina has extensive experience in the leadership and management of large scale pure and applied research projects, specifically investigating the impact of ICT on teaching and learning across state and national education systems and was integral in the adoption of the Technological Pedagogical Content Knowledge (TPACK) framework in the National Teaching Teachers for the Future project and the creation of the survey instrument used to measure pre-service teachers' TPACK confidence and capability (2011–2012). Romina has expertise in quantitative methods, especially the design and development of theoretically and statistically valid and reliable measurement instruments to gauge student attitude to computers, student creative dispositions, teacher confidence and capability to integrate ICT, and teacher TPACK.

Abstract

Since computers first appeared in classrooms, educators have sought to integrate information communication technologies (ICT) into teaching and learning. In Australia, as elsewhere, ICT are widely regarded as critical facilitators of student learning. The ability to use ICT effectively is specified in Australia's national curriculum as a required general capability. However, despite the educational environment being replete with ICT related programs, our understanding of how students use ICT for learning is still limited. This paper presents insights from the past 30 years of research, which suggest that even though the current 'climate' in Australian schools is favourable, teacher confidence and capability to transform their pedagogy with ICT requires robust, evidence-based frameworks and tools that will support teachers to critically analyse the affordances of ICT, and plan transformative learning experiences for their students. A framework to guide teacher development and practice, the Technological Pedagogical and Content Knowledge (TPACK) model is described, as well as the Teaching Teachers for the Future (TTF) TPACK Survey, which assesses teacher beliefs about how their students use ICT to achieve learning outcomes. Attention is then focused on the potential for creative thinking that is enabled when ICT is integrated as a 'mindtool' for learning. The paper concludes by proposing an explanatory framework that describes a systems perspective for student creativity in classrooms, Distributed Creativity (DC), which accounts for variables that impact student creativity and provides teachers with a scaffold from which to plan and assess student use of digital technologies for learning and creative thinking.

Introduction

Since the introduction of computers into Australian classrooms in the early 1980s, educators have sought to integrate information communication technologies (ICT) into teaching and learning, while researchers have examined the affordances and impact of these technologies, which are widely regarded as critical facilitators of student learning. A review of research suggests that the transformation of education as a result of the integration of ICT can be envisaged as occurring across three 'waves' (e.g., Finger, Russell, Jamieson-Proctor, & Russell, 2007). In the first wave (circa 1980–1990), computers were introduced as a new educational tool in a similar manner to previous technologies such as the overhead projector, and were principally viewed as an object of study. In the second wave (circa 1990–2000), the value of ICT as an educational resource began to be recognised and teachers, beyond those responsible for computing subjects, saw the potential for ICT to be integrated across a range of learning areas. In the third wave (post 2000), the value of ICT is being recognised as a means to fulfil emerging needs and accomplish new goals (Norton & Wiburg, 2003).

Recent research confirms that students and their teachers are increasingly becoming third-wave users of ICT (Jamieson-Proctor, Redmond, Zagami, Albion, & Twining, 2014). With the increasing availability of digital devices within schools and the community, students are able to choose how, when, where and with whom they engage in learning. At the same time teachers are able (indeed encouraged) to redefine their pedagogy. Nonetheless, the literature indicates that some educators ignore the information-rich world shaping

students' non-school experiences (Yelland, 2007). As a result, many students find learning in school irrelevant to their real (digital) lives.

The challenge for educators and systems is to learn about and capitalise on the affordances of 21st-century technologies for teaching and learning so that students are being 'primed' for the demands of living and working in a rapidly changing information environment (Chubb, 2015). In this paper, I argue that it is not only time for all educators to embrace the third-wave potential of digital technologies, it is also time to engage with the affordances of a fourth-wave approach; utilising digital technologies as 'mindtools' that can transform curriculum and pedagogy and enable students to be and become more innovative and creative (Beghetto & Kaufman, 2007).

Policy trends for using information and communication technologies in the curriculum

In response to the challenge posed by rapid and increasing world-wide digitisation, education systems nationally and internationally have reviewed their curriculum. In Australia, *The Melbourne Declaration on Educational Goals for Young Australians* (MCEETYA, 2008a) led to the development of Australia's first national curriculum, the *Foundation to Year 12 Australian Curriculum* (ACARA, 2016), which sets the expectation that all young Australians, regardless of their circumstances, should become highly skilled in using ICT.

ICT is specified as a general capability in the national curriculum and students are required to communicate, investigate and create with ICT; apply social and ethical

protocols and practices with ICT; as well as manage and operate ICT across all learning areas (ACARA, n.d.). Such expectations go far beyond simply using ICT to access content, to requiring that students attain 21st century learning outcomes: communication, collaboration, critical thinking and creativity (Partnership for 21st-Century Learning, 2007). Given the pervasive presence of ICT in the Australian Curriculum, the integration of ICT should have transformed objectives and content, learning outcomes, and pedagogy. But has it?

Governments and some educators recognise that new forms of teaching and learning are needed but 'many school systems continue to value and promote old learning and the associated outcomes related to the possession of specific and privileged knowledge' (Yelland, 2007, pp. 121–122). For teachers who trained before the development of digital technologies, preparing themselves and others to utilise rapidly developing digital technologies effectively is a challenge (Luke, 2001). Accordingly, many teachers tend to focus on integrating new technologies rather than transforming established curriculum and pedagogical approaches in order to realise the potential of ICT to facilitate creative and innovative thinking

Good practice and leadership in the use of ICT in schools (DETYA, 2000) emphasised the complexity that educators find themselves in by identifying four different but overlapping dimensions of ICT use in classrooms:

- a tool for use across the curriculum where the emphasis is on the development of ICT-related skills, knowledge, processes and attitudes
- a tool for enhancing students' learning outcomes within the existing curriculum and using existing learning processes
- an integral component of broader curriculum reforms, which will change not only how students learn but what they learn
- an integral component of the reforms, which will alter the organisation and structure of schooling itself.

The last two dimensions of ICT use clearly transcend earlier conceptualisations and portray ICT as part of a broader movement toward curriculum and school reform (Fluck, 2003; Nichol & Watson, 2003).

In order for Australian schools to meet the demands of the 21st century, the federal government funded the Digital Education Revolution (DER, 2008). The DER, which was guided by the *Joint ministerial statement on information communication technologies in Australian education and training: 2008–2011* (MCEETYA, 2008b), provided a national framework for cross-sector sharing of resources and expertise. When DER funding ended, Australian school communities had come to expect

1:1 computing. Thus, state and territory governments had to consider options such as *bring your own* (BYO) technology (Bita & Chilcott, 2013).

Given ICT enablement of technology-rich learning environments in Australian schools (and society more generally), as well as the pedagogical transformations described in the MCEETYA, demanded by the Australian Curriculum, and reinforced by Australian education policy statements, are fourth- or even third-wave approaches to integrating ICT in teaching and learning evident?

Teacher confidence in utilising information and communication technologies in the curriculum

In order to answer this question, researchers have examined teacher confidence to utilise ICT across the curriculum. The results of two large-scale studies to evaluate teacher confidence to use ICT in teaching and learning indicated that teacher gender and teacher confidence had a direct positive relationship with the quantity and quality of student use of ICT (Jamieson-Proctor, Burnett, Finger, & Watson, 2006; Jamieson-Proctor & Finger, 2008a, 2008b). Specifically, male, and more confident teachers were using ICT to enhance and transform the curriculum to a greater extent than female, and less confident teachers. Given that more than 70 per cent of Australian teachers are female, it could be inferred that many students are not experiencing equitable access to teaching and learning in which ICT use is integral to learning. In turn, this suggests that a one-size-fits-all model of teacher professional development for integrating ICT effectively in teaching and learning has not been effective. In order for desired student outcomes to be achieved, ongoing research examining barriers to teacher confidence to integrate ICT is needed (Jamieson-Proctor et al., 2006; Prestridge, 2008), as is evidence-based, pedagogically focused professional development to build teacher capacity to transform teaching and learning through technology (Ertmer & Ottenbreit-Leftwich, 2010; Jamieson-Proctor et al., 2014; Prestridge, 2014). Only then will greater evidence of third- and fourth-wave approaches be seen in Australian classrooms.

The Teaching Teachers for the Future project and initial teacher education in Australia: A framework guiding teacher development and practice

The necessity for teachers to develop pedagogically focused ICT capabilities is also recognised in the Australian Professional Standards for Teachers (AITSL, 2017), which prescribe rigorous expectations for initial teacher education (ITE) programs as well as for practising teachers. The Teaching Teachers for the

Future (TTF) project was an initiative funded by the ICT Innovation Fund (ICTIF) to guide early career teachers to better utilise ICT in teaching and learning. This project, which involved all 39 Australian higher education ITE providers, as well as state and federal governments and education agencies, aimed to enhance pre-service teachers' Technological Pedagogical Content Knowledge (TPACK); based on the conceptual framework developed by Mishra and Koehler (2006). As shown in Figure 1, TPACK provides teachers and teacher-educators with a valuable explanatory model that accounts for teachers' technological knowledge (TK), content knowledge (CK), and pedagogical knowledge (PK) and the intersections of these knowledge domains.

In addition, to the provision of a strong explanatory framework to guide teacher development and practice, the TTF project also resulted in the development of a robust measure, the TTF TPACK Survey (Jamieson-Proctor et al., 2013), designed to examine pre-service teachers' TPACK. The development of this measure was built upon the foundation of three earlier instruments: the ICT Curriculum Integration Performance Measurement Instrument (Jamieson-Proctor, Watson, & Finger, 2004); the Learning with ICTs: Measuring ICT Use in the Curriculum instrument (Jamieson-Proctor et al., 2004; Jamieson-Proctor, Watson, Finger, Grimbeek, & Burnett, 2007) and the TPACK Confidence Survey (TCS) (Albion, Jamieson-Proctor, & Finger, 2010).
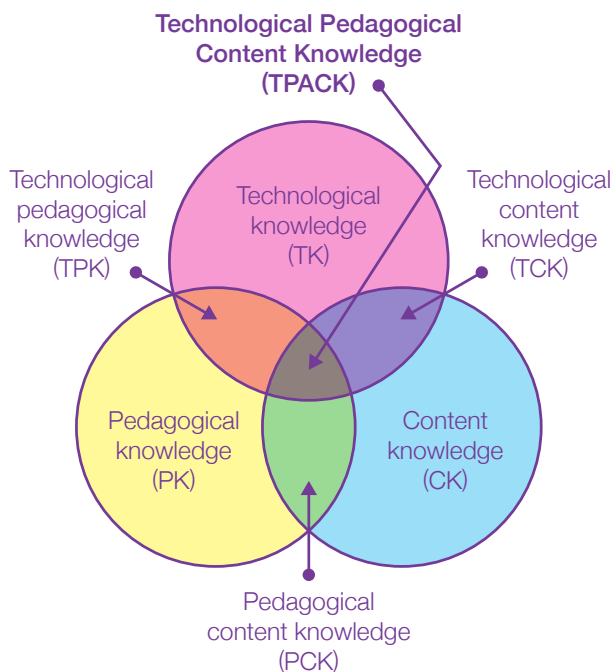
Figure 1 Technological Pedagogical Content Knowledge (TPACK)

Source: http://tpack.org.
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Tools for assessing the impact of information and communication technologies on student learning

The developmental trajectory of the three measures informing the construction of the TTF TPACK Survey (Jamieson-Proctor et al., 2013) is noteworthy for several reasons. First, the researchers developed and applied a consistent definition of ICT integration, thus addressing a shortcoming observed in the literature (Jamieson-Proctor & Finger, 2008b). Second, the studies were large scale, involving thousands of teachers across schools and systems; for example, the study conducted by Jamieson-Proctor et al. (2007) involved 10 433 and 4473 pre-service teachers, pre- and post-intervention respectively. In contrast, previous studies were generally small-scale case studies of 'lighthouse' projects (Jamieson-Proctor & Finger, 2008b). Third, the researchers moved beyond accounting for input measures (e.g. numbers of computers, funding for teacher professional development) to determining output measures such as the quantity and quality of student experiences of integrated ICT and the resultant impact on their learning outcomes (Jamieson-Proctor, Watson, & Finger, 2004).

The TTF TPACK Survey, which emerged from an extensive review of the literature on ICT curriculum integration (e.g., Fitzallan, 2004; Jamieson-Proctor, Watson, & Finger, 2004; Trinidad, Clarkson, & Newhouse, 2005), as well as the development of the three earlier measures (Albion et al., 2010; Jamieson-Proctor et al., 2004; Jamieson-Proctor et al., 2007), was administered pre and post the year long TTF intervention. Findings demonstrated measurable growth in pre-service teachers' self-perceptions of their confidence to use ICT, within a range of pedagogical strategies, to support their future students' learning (Finger et al., 2013; Jamieson-Proctor et al., 2013).

In summary, teachers and teacher-educators at this time can confidently rely on this valuable explanatory model (TPACK) to guide them in integrating ICT in teaching and learning. In addition, a robust measure (TPACK Survey) is available to assess teachers' TPACK across core learning areas (Jamieson-Proctor et al., 2013). While the model and survey tool are sufficient to support educators in third-wave integration of ICT to facilitate teaching and learning, they are insufficient for teachers seeking to take advantage of the potential power of ICT digital technologies to become cognitive tools or 'mindtools' that facilitate student creative thinking. In order to support teachers in engaging with fourth-wave approaches to teaching and learning with ICT, an expanded explanatory model such as the 'Distributed Creativity: A systems perspective for student creativity in classrooms' (Figure 2, p. 24) is proposed.

Utilising information and communication technologies to enhance students' creativity: The fourth wave?

In parallel with my work examining the integration of ICT, I have also investigated the development of creativity, higher-order thinking and problem solving as a result of this integration (Jamieson-Proctor, 1999; Jamieson-Proctor & Burnett, 2004). Since my earliest experiences with computers in classrooms, I have been fascinated by the power of these digital mindtools to transform the curriculum, and teaching and learning, affording students the classroom contexts, content and dispositions to be and become creative (Beghetto & Kaufman, 2007). Further, evidence from the large-scale studies, many cited in this paper, has convinced me that students' creative thinking can be enhanced when they work collaboratively with access to appropriate digital technologies as 'mindtools' (Jamieson-Proctor & Larkin, 2012; Jamieson-Proctor, 1999; Jamieson-Proctor & Burnett, 2002). As a consequence, I have developed a systems perspective on student creativity in classrooms (Jamieson-Proctor & Albion, 2016).

The uses of ICT to support and promote creativity have been described, reviewed and theorised in a number of research studies and a conceptual framework for creativity and ICT in primary classrooms has been proposed (Loveless, Burton, & Turvey, 2006). Nonetheless, educators' understanding and practical implementation of enhancing creativity with ICT need further explication. Thus, a theoretical framework for creativity in 21st century technology-rich classrooms (Figure 2) is proposed, which accounts for current theories and previous research with respect to creativity, particularly 'mini-c' creativity (Beghetto & Kaufman, 2007), as well as for essential interactions among individuals, domains and contexts. The framework can support critical analysis of the ways in which ICT supports creativity and assists teachers to organise learning with and through ICT by encouraging learners to collaborate, create meaning, make curriculum connections, and develop personal creative abilities and dispositions.

Distributive Creativity: A systems perspective for student creativity in classrooms

The Distributive Creativity (DC) framework (Figure 2) assumes that creativity arises from the interactions among person, domain and sociocultural context. This implies a study of creativity as a system, asking not what is creativity, but more importantly, where is creativity? The DC framework identifies the dependent variables that are predicted to impact student creativity across learning areas (domain), learning contexts (context) and learning qualities (individual). These variables, derived from creativity research, are specific to learning contexts where students can operate in and manipulate the symbol system of a particular domain within a learning context that can be observed or described. The model recognises that students bring their individual learner qualities to bear on each learning task in order to create an innovative response that is validated by others (teachers, peers, parents/caregivers) who are also part of the learning context.

While educators could use the framework for instructional planning (e.g., designing learning activities in which students are required to use their devices and connectivity to create novel products in a specific learning area, or across learning areas both within and beyond the physical classroom); researchers could use the framework to develop observation tools and measurement instruments within and across the three elements of learning area, learning context and learning qualities.
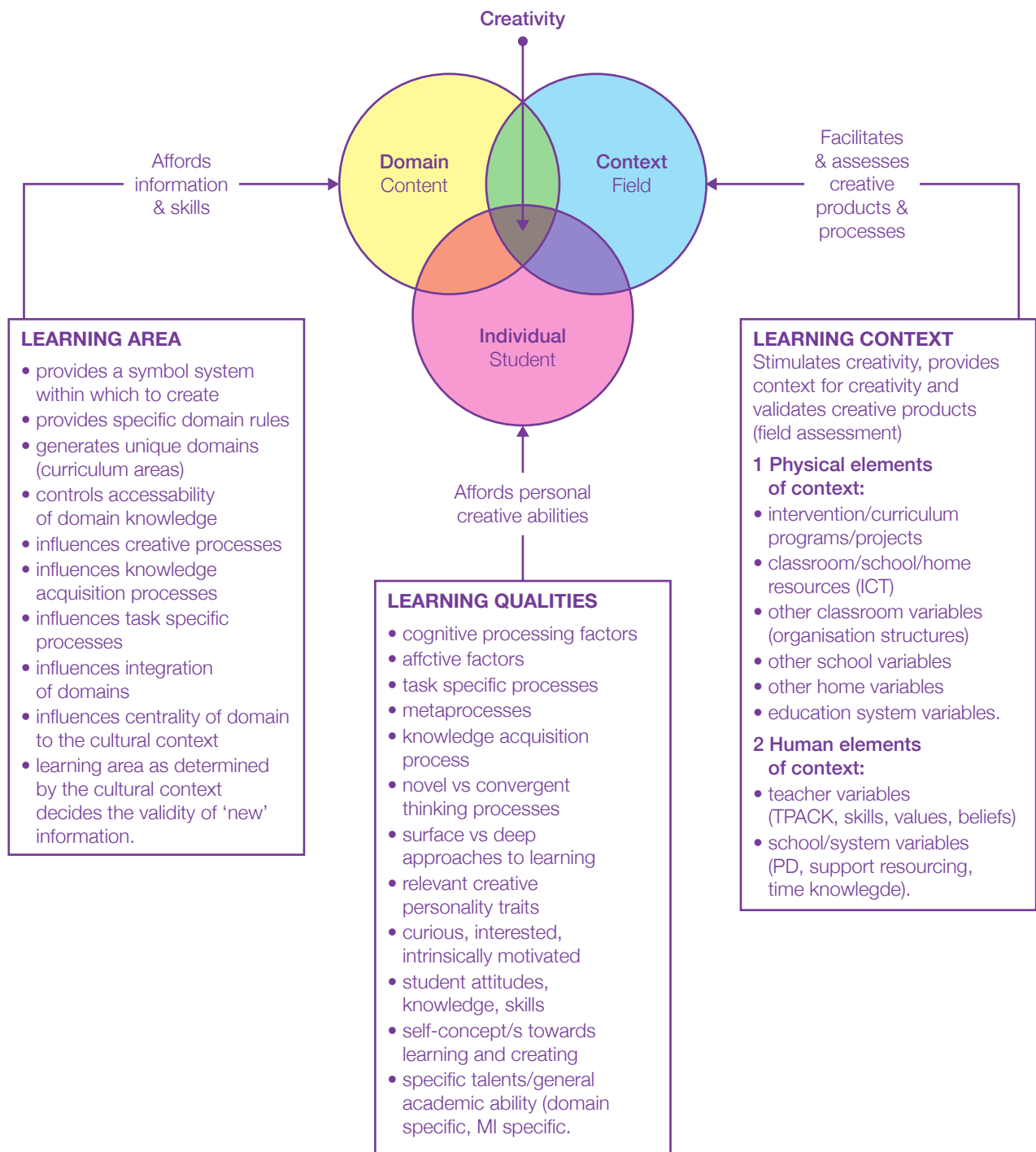
Figure 2 Distributed Creativity: A systems perspective for student creativity in classrooms

Conclusion

So, what have I learnt from three decades of research into ICT use in classrooms? First, educational change is difficult and complex. Although ICT has brought new possibilities and urgencies (Norton & Wilburg, 2003), 'digital expectancy' and national initiatives such as the DER and TTF have not been enough to transform teaching and learning. Second, we need to ask the right questions. While many studies have examined the impact of the computer as a tutor or tool, very few have explored the potential of digital technologies to become 'mindtools' that allow individuals to engage in multiple forms of thinking (Jonassen, 2000). Third, we have learnt that there are significant challenges for educators seeking to frame and develop creativity in schools. Despite 'critical and creative thinking' being specified as a general capability in the national curriculum,

there is little agreement on how creativity should be envisioned, defined and enacted in schools (Jamieson-Proctor & Burnett, 2002). Fourth, teachers have not had a dependable workable framework to guide them in providing students with opportunities to develop the 4Cs (communication, collaboration, creativity and critical thinking) and their potential for creative thinking (Mishra, Koehler, & Henriksen, 2011). Finally, teachers face challenges in negotiating a path between standards and accountability and creative learning, where there is a commitment to nurturing ingenuity, flexibility and generative capability (Craft, 2005; DEST, 2002).

Although the power of ICT to transform education has yet to be fully realised, insights from the last 30 years of research suggest that the current 'climate' in Australian schools is favourable for curriculum and pedagogical transformation. We know that teacher confidence and capability (2Cs) to transform their pedagogy with ICT is dependent on their knowledge base (TPACK), as well as upon the development of robust theoretical frameworks and tools with which to critically analyse the affordances of ICT and promote transformative learning experiences for students (4Cs). The proposed DC framework delineates potential links between curriculum and classroom that can assist educators to better understand and enhance the creative thinking of students with the range of digital technologies at their disposal. Thus, in seeking to answer the *big* question, 'What if education departments, schools and individual teachers had the confidence, capabilities and resources to optimise student creative potential and transform the curriculum, teaching and learning with ICT?'. Findings indicate that teacher preparation and ongoing professional learning opportunities are critical, as is understanding the role ICT can play in transforming the curriculum and pedagogy to engage students in the 4Cs.

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Early literacy skills: Finding the right pathway for each child

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Danielle Anzai is a research fellow in the Assessment and Reporting division at the Australian Council for Educational Research. She commenced in 2010 to contribute to the development of ACER's early and primary years' capability. Over the last five years she has conducted considerable research and work into creating the design and content for early years' literacy and numeracy diagnostic assessments. The data from these assessments have been used to inform many levels of education, from national policymaking to school-based pedagogy, across a number of regions including Afghanistan, Lesotho, Scotland and remote areas of the Northern Territory.

Danielle has a Master of Education specialising in Early Childhood and has worked as a primary school teacher both in Australia and overseas.

Abstract

The first two years of schooling are often regarded as 'make or break' for students to develop competent literacy skills that can last into adulthood. These are skills that also often define students' overall learning experiences for the rest of their time at school. Implementing a consistent, whole-school practice of applying reading assessment data to inform pedagogy during the first two years of education can significantly contribute to the ongoing improvement of students' literacy and their school experience.

This paper introduces a simple and efficient model for educators in the early years to facilitate this practice in two keys areas of early reading – decoding and comprehension. Drawing on case studies from schools using the ACER PAT Early Years online assessment suite, various conclusions and methods are reviewed and presented for consideration. Although educators from schools using PAT assessments will find the information highly applicable, the model can be effectively implemented at any school and the outcomes are relevant to all early childhood educators.

Conference papers:
Monday 13 August

Driving one's own learning – full speed ahead! Motivationally anchored instruction

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Dr Alison Davis is the Director of Vision Education, a New Zealand organisation that specialises in the delivery of professional development to schools and leaders in literacy, student agency, assessment, school self-review and school change. Alison has a wide range of experience and expertise in the development of school and organisational based professional learning development (PLD) and teaching as inquiry. She is a well-known and highly respected leading researcher, writer, speaker and staff trainer working in Asia, Australia, the Middle East, New Zealand and the United States. She is particularly known for her research on reading comprehension and writing instruction and for leading initiatives focused on accelerating and sustaining improved levels of literacy achievement. Her PhD thesis investigated the characteristics associated with raising the reading comprehension achievement of underachieving students' in Years 3–9. Alison has subsequently authored nine professional texts for teachers to use in classrooms.

Alison has also been active in leading a range of inquiry initiatives through the PLD projects she mentors. These include a project in Queensland between three secondary schools seeking to raise literacy achievement in cross curricula contexts and a wide range of inquiries on raising achievement for priority students within primary educational settings. Alison has also published a range of professional papers on this work and has been a keynote and workshop presenter for a large number of conferences.

Abstract

This paper explores the concept of motivationally anchored instruction, how it is practised in classrooms and the structure for teacher professional learning that supports its implementation.

Participants will examine how teachers enact pedagogical practices that deliberately develop and grow students' inner desire to *want* to learn. Content will draw on the analogy of learners driving their own learning by describing and examining deliberate acts of teaching that grow and develop the intrinsic motivation dispositions of our students. Research and practices that support a learning environment where intrinsic motivation creates internal drive and desire to do well are examined, and such instructional practices ultimately lead to improved student achievement. In order to raise achievement and accelerate rates of learning, motivationally anchored instruction is critical.

The examples presented primarily draw on three projects lead by Alison: a cluster collaboration in Far North Queensland between three large urban secondary schools to improve writing across the curriculum; a schooling improvement project focused on acceleration of literacy outcomes for Māori and Pasifika students in New Zealand; and an Acceleration Literacy Learning inquiry project of which the author is a national leader.

Introduction

Raising achievement is a goal of much educational endeavour as leaders and teachers strive to improve educational outcomes for students. Frequently this work is driven by a model of teaching as inquiry (e.g. Fowler, 2012; Timperly, Halbert, & Kaser, 2014), supporting an approach to professional learning and development that uses multiple forms of student assessment data to inquire into, and develop responsive and reflective improvement practices. The concept of acceleration, where students who are underachieving progress at a faster rate than that of their peers in order to reach expected outcomes, is integral to this. Consequently, practices that strengthen partnerships and relationships between teachers and students have come to the fore of the core work of leaders and teachers. These include a heightened focus on understanding intrinsic motivational factors, and deliberately embedding these in everyday teaching and learning approaches to develop student motivation and agency.

A motivational perspective on teaching and learning

Motivation, put simply, is a person's desire and reason for doing something and doing something well. There are two forms of motivation – extrinsic motivation and intrinsic motivation. Extrinsic motivation is when desire and reason are based on external influences such as the expectation of receiving praise or receiving a reward. By comparison, intrinsic motivation is led by the person's internal drive, belief and desire to do something. Intrinsic motivation can be encapsulated by the well-known saying 'They who think they can, can'.

Both extrinsic and intrinsic motivation can heavily influence a student's performance at school. In the context of literacy instruction, reader and writer motivation are an often underestimated but integral component of acceleration and achievement. While both extrinsic and intrinsic motivation have the potential to influence student outcomes, this paper positions intrinsic motivation and the subsequent development of inner belief in oneself, as an essential element in strengthening and accelerating a student's learning trajectory.

It is widely understood that intrinsic motivation is fundamental to learning and therefore, motivation is a critical understanding within today's educational contexts of improving and accelerating achievement. The Latin word 'intrinsic' is a combination of two words meaning 'within' and 'alongside'. As such, intrinsic motivation drives students to put effort themselves into their own learning, to have power and control over their own learning (agency) rather than completing a set task/series of tasks for the purposes of compliance, accountability or external reward. In the context of academic achievement, intrinsic motivation is bound and influenced by a set of beliefs and self-perceptions individual students develop in the classroom (Jang, Conradi, McKenna, & Jones, 2015). These include:

- attitude and awareness
- interest, relevance and curiosity
- value
- self-concept
- self-efficacy
- goal setting and goal reaching.

Enabling, creating and sustaining intrinsic motivation relies on teacher understandings of how to engage with these beliefs and self-perceptions as an integral part of everyday instruction. While the relationship between each of these is multi-directional, they all influence each other and are all inter-related.

When used in combination, they create an optimal learning environment for students. Each belief and self-perception is a predictor of motivation. Further, most students are motivated to learn when they feel included and respected, find learning relevant, interesting, engaging and challenging and become effective in learning what they value (Ginsberg, 2011). Subsequently, motivation affects both new learning and the performance of previously learned skills, strategies and behaviours (Schunk, Meece, & Pintrich, 2008).

The purpose of this paper is to present, summarise and exemplify each perception, and to encourage the reader to critique their own knowledge practice of how each is interrelated and their impact on instructional practices, relationships, achievement and acceleration.

Learning environments that influence student motivation

Attitude and awareness

For the purposes of this discussion, attitude and awareness are viewed as tricomponent, drawing on attitudes and awareness of both the learning climate and the classroom task (Mathewson, 2004; Marzano, 2003, 2007, 2011), through the lens of the students as follows:

- *Evaluation* – having a positive or negative evaluation of the classroom climate and the learning task.
- *Feeling* – having a positive or negative feeling towards the classroom climate and the learning task.
- *Action readiness* – being inclined to learn and be enthusiastic towards learning and the learning task.

Developing a positive attitude and awareness towards learning means developing a climate where students feel included and in control of their learning, are clear about their tasks, have a strong sense of presence, feel favourable towards learning and have the deliberate and conscious intention to learn.

Instructional approaches

This paper outlines four instructional approaches designed to develop student attitudes and awareness and develop their personal expectations for success.

Joint critique of instructional practice through the lens of students and teachers

Through this practice, teachers seek and respond to the voice and feedback of their students when reviewing the effectiveness of their instruction, the appropriateness of teaching approaches and the design of academic tasks. Joint critique provides a means of gathering and responding to student voice (see p. 33) in order to understand learning from the perspective of the student on the understanding that motivation is strengthened when teachers learn from students about what is working, what is not working and jointly explore opportunities for improvement. Through identifying what needs to be focused on to improve motivation and learning, the information gleaned provides new possibilities for learning for both teachers and students.

Deconstruction of learning tasks

Deconstruction of learning tasks helps to build confidence and knowledge within students of the skills and abilities necessary to complete a given task. Even though the task might look difficult at the onset, deconstruction through explicitly planned discussion, exemplification, teacher and student think aloud and demonstration breaks down elements of the task to specific achievable steps. Engagement in the process of deconstruction encourages students to be predisposed to 'give it a go' and builds confidence and preparedness for risk taking. It moves the locus of control of learning towards the students, often supported by the use of learning goals and success criteria written in student friendly language and by investigation and analysis of exemplars related to the task.

Co-construction of learning tasks through joint planning of topic and tasks

Co-construction involves deliberately planning time for students to have input into the topic they will be studying. It means involving students in what they would like the teacher to do to help them learn best, jointly designing tasks that will support their learning, and offering suggestions for how the learning goals can be achieved and the mix of activities that will best help them to achieve this. Through this practice, a teacher shares future learning goals with their students and students provide feedback on potential difficulties, activities they expect would assist their learning, and together teacher and students jointly plan topics, tasks and outcomes. These deliberate acts strengthen student motivation, agency and control over their own learning.

Implementing new and different teaching approaches

To vary teaching approaches recognises that students learn in different ways through guided learning, scaffolded instruction, cooperative learning, peer engagement, independent learning and maintenance and mastery of content, skills, strategies and processes.

Additionally, there are strong links between attitude, intention and interest, explaining how attitude often serves as the dynamic that fosters intention and piques student interest towards learning. The next section describes and discusses how teachers pique their students' interest and curiosity in order to motivationally anchor their instruction.

Interest, relevance and curiosity

Interest, relevance and curiosity can be both situational and personal. Therefore, making learning contextual to real-world experiences is a key factor in developing motivation and agency amongst students. When learning is made relevant to students' own lives, teachers build both student interest and meaning towards tasks (Guthrie et al., 2007). Further, interest is commonly associated with effort, leading us to understand that it is likely that we will try harder when we are interested and see the relevance of something we are asked to learn.

Similarly, a basic source of student lack of motivation is lack of interest (also known as boredom) and this ensues when the topic, task or purpose for learning is not seen as interesting, relevant or challenging by the student. High interest tasks include those that provide a challenging problem-solving dimension, pique curiosity, offer choice, require reflection and involve student collaboration in order to improve their desire to take part and become involved in learning.

Practices that stimulate student interest and curiosity

Gather strong knowledge on student interests

Knowing and understanding student interests and then using these to inform and plan instruction deliberately builds on student interest. Teachers show they value student interests as they gather information through a range of approaches that may include student surveys, small group interviews, focus group discussions, questionnaires, blogs and explicit feedback on learning from students to their teachers.

Provide choices based on student interests

Choice leads to ownership and responsibility and helps students believe they have autonomy and control over their learning (Patall, Cooper, & Wynn, 2010). Planning to deliberately include some elements of choice within a unit of work purposefully invites student control over learning. For example, students may have the choice of two different tasks concerning the same science concepts, choice from a selection of writing frameworks to meet task demands, choice to select text and purpose for reading or choice of number and order of tasks to be completed within an assignment.

Plan high challenge tasks, provide a problem-solving dimension and involve students

Problem-solving approaches create interest by offering active opportunities to engage with learning. Problem-solving tasks may involve students being asked to consider how they might rewrite the same main arguments/message using another text structure, how they might improve the grade and feedback on an example of work that did not meet expectation or how

they might present the same information from a different point of view. Seek ways to involve students in planning how they might solve learning problems, sharing and comparing their approaches and suggestions to those of their peers and using their experiences to decide a pathway to move forward.

Provide opportunities for students to work collaboratively

As with both attitude and interest, motivation can diminish if student expectations are not fulfilled. Instructional approaches must provide commitment and consistency of approach rather than isolated opportunities that do not serve the best interests of learning.

Value

Value relates to worth, significance and importance. Two types of value are important in relation to motivation: attainment value and utility value (Schunk et al., 2014). Attainment value is the value of being able to achieve something, of completing a task well and reaching the desired goal/outcome. Utility value is the perceived usefulness of this for the future, how useful something will be when we have learned it, and how useful this is in reaching future goals (Schunk et al., 2014). Both are influenced by a range of factors including how the task meets ones needs, the 'cost' of completing the task in relation to time and effort and what a student will have to give up or delay in order to complete a task. Because we direct energy towards goals and learning that we value and see as useful or important, value is also strongly reliant on respect for cultural, linguistic and social diversity and equity (Ginsberg, 2011).

Practices that that embed and develop the concept of value

Make explicit the purpose and learning benefits of the lesson

Deliberately planning lesson delivery to help students to understand the purpose of what they are learning and of the learning task is pivotal to developing a sense of value towards a task. This supports students to understand, articulate and demonstrate the learning benefits of the task (Davis, 2011, 2013, 2016; Pressley, 2006) and the relevance and relatedness of learning to 'real life'. Seeking feedback from students, finding out how learning a specific skill or strategy helped a student achieve their task provides insight between teacher and student on the attainment and utility value of what students have been asked to do.

Seek and respond to student voice

Student voice provides valuable and helpful insight into the utility value of learning. Ask students to give feedback on the usefulness of the activity, and explain

and demonstrate how useful what they have learned has been, compare this to other activities and provide opportunities for them to share the impact of learning on themselves.

Involve students in decision making

If teachers are able to share the 'next' learning topics and tasks with their students and seek their feedback, they will actively involve students in instructional decision making. Students may offer valuable insights and suggestions into how the teaching could be developed in order to best help them to learn. Teachers could also discuss and share why it this important for to students to know these things, and how this knowledge will help future learning and achievement.

Each of these approaches also support students to feel that they themselves are being valued in the learning partnership and in developing motivationally anchored instruction.

Self-concept

This section discusses the importance of self-concept in developing motivation and agency (power and control of learning) within students.

Self-concept is a person's view or idea of themselves, how they appraise themselves and what they think of themselves. Self-concept informs the cognitive images of what you are, or what you might become (Dweck, 2006; Mathewson, 2004), are associated with a sense of competence and confidence (Guthrie, 2008; Guthrie & Humenick, 2004; Guthrie, Wigfield, & Perencevich, 2004). Research suggests a reciprocal relationship between a student's academic self-concept and their achievement (Seaton et al., 2014) and that this is strongly linked to the kind of feedback students receive about their learning and themselves as learners. When students view themselves as progressing and being competent at something, this positively affects achievement. This is evidenced in the context of reading through the research of Becker, McElvany and Kortenbruck (2010) reporting that students often fail because they do not experience the progress and competence that leads to strong self-concept.

The next section describes some actions designed to enable student motivation towards achievement by addressing and developing student self-concept. Each approach supports and develops students' personal views of themselves and their expectations for success.

Explicit feedback to students about learning

Generally speaking, feedback focuses on the learning intention of the task, occurs as the students are doing the learning, provides information on how and why the student understands and misunderstands, provides strategies to help the student to improve and assists

the student to understand the goals of the learning (Hattie, 2012; Wiliam, 2018a, 2018b). When focused on student understanding, feedback on learning processes also improves a student's metacognitive knowledge and awareness of how they learn.

Explicit feedback from students about learning

Using a range of teaching approaches will provide opportunities to receive and reflect on explicit feedback from students. These approaches include:

- the 'think aloud' – students explain their thinking as they complete a task
- peer demonstration – supported by explicit description and annotation by the student
- self-marking – students provide reasons and evidence for marking and assigning a grade
- use of scaffolds for younger learners (e.g. 'I think I am good at writing because I am able to do the following…').

Selecting and combining each of these approaches will provide a range of deliberately planned instructional opportunities for students to share feedback on their own learning throughout instruction. Additionally, feedback from students leads to review of task clarity and, as needed, re-teaching opportunities.

Provide praise

Along with feedback, it is important to praise effort for a successfully accomplished task. While praise is different to feedback it is also important in developing positive self-concept. When used effectively, praise serves to encourage the idea that effort and hard work has led to learning, thus it is focused on effort rather than intelligence (Dweck, 2008)

Creating opportunities for students to show their progress

Instructional routines that involve students in monitoring their own progress effectively build self-concept (Dweck, 2006). Examples within regular classroom practice include the use of formative assessment practices, in particular those of self-assessment and self-regulation. Where formative practices have ensured that students clearly understand learning goals, success criteria and task design, self-assessment provides opportunities for students to develop strong insights into their own learning and self-regulation enables learners to take control of their own learning and actions towards reaching goals (Wiliam, 2011). Davis (2013, p. 23) explains 'self-assessment of writing is effective when students can explain the criteria against which they are self-assessing and have viewed, discussed and analysed written exemplars of what the criteria 'looks' like in practice'.

Developing classroom expectations and routines that are strongly focused on enhancing student self-concept is instrumental in rethinking instruction so that students feel in control of their own learning. The next section examines the importance of student self-efficacy within a learning environment that positively influences student motivation.

Self-efficacy

A student's belief in their ability to carry out a task to successful completion represents their self-efficacy. When a student views themselves as capable or has belief and confidence about their future ability to complete a future task they have strong self-efficacy. This also links to feeling positive and encourages behaviours such as perseverance and conscientiousness. Self-efficacy goes a long way in determining a student's likelihood of academic success; research indicates that the stronger the self-efficacy the more likely one is to persist even when challenged (Guthrie, 2008). In summary, self-efficacy encompasses the notion that what we believe ourselves capable of doing/achieving will most often lead to increased effort and expectations of how well we will complete a task. The following section provides example of practices that embed and develop the concept of self-efficacy.

Encourage students to investigate different strategies rather than giving up

Across the curriculum there are a number of strategies that students can employ to improve learning. When students are able to demonstrate and explain specific strategies, and then select, combine and use them appropriate to task and learning goal, their confidence in their ability to successfully achieve their goal increases. Researchers including Pressley (2006), Duke and Roberts (2010) and Fisher, Frey, and Lapp (2009) have each extolled the importance of strategic knowledge held by students through the development of explicit strategy instruction. Additionally, within the context of reading instruction, teachers may also use approaches such as reciprocal reading (Palinscar & Brown, 1984) and literature circles (Daniels, 1994), and adaptations of these, whereby students actively interact with a range of comprehension strategies (Davis, 2016).

Co-construct assessment rubrics and marking guides

Co-construction provides clarity of understanding about tasks and expectations and assists students in developing the skills and strategies required to improve learning and monitor their own progress. Together teachers and students and/or students and students examine the task and outcomes, seek and examine examples, discuss features of successful end products and develop rubrics and marking guides to accompany

a task. This practice can be extended whereby students set the grade they wish to achieve and then make a commitment to get there, identifying what they will need to do and the support they will require along the way.

Self-assessment leads students to take a proactive stance towards learning

Self-efficacy is further strengthened through practices that embed self-assessment, with self-assessment criteria that is strongly learning orientated rather than performance orientated. A range of self-assessment activities, as discussed in the previous section, impact strongly on developing student self-efficacy.

Develop shared understandings of feedback logs and learning journals

Both feedback logs and learning journals enable students to record their learning over time. There are a number of options available for classroom use, including those that are co-constructed between the teacher and students. Feedback logs provide a forum for students to discuss and interpret feedback received from teachers and peers while learning logs provide opportunities to record and reflect on the learning task(s), what was achieved, how well this was achieved and the next goals for subsequent instruction.

In addition, each of the examples above actively engage students in self-regulatory activities that link also to their ability to set and reach goals. The final section of this paper discusses the final belief and self-perception to develop motivationally anchored instruction – that of goal setting and goal reaching

Goal setting and goal reaching

Goal setting and goal reaching of meaningful goals that focus on learning, progress and effort over performance, support meaningful and motivationally rich learning. When supported by feedback towards these goals, this practice also develops what Dweck (2006, 2015) refers to as growth mindset, the self-belief in one's ability to learn.

Setting goals and the ways in which to achieve them is an important component of motivationally anchored classroom instruction. It is important that goals have high relevance to students and make connections between what students are learning/reading/writing and their own lives and contribute to their own understanding of themselves as learners.

Goals that students own and understand will strengthen overall ownership and understanding of learning. Within the classroom context, large goals are frequently broken into a series of smaller goals. This practice fosters goals that are both attainable and enables students to enjoy the satisfaction of reaching a goal, and celebrating this,

building self confidence and self-belief to reach the next goal. Instruction will frequently incorporate a range of routines and approaches to establish how students track progress towards goals, enabling students to see and discuss their progress with teachers and peers, and, as appropriate, update personal records, learning log and/or charts created to assist them to self-monitor and evaluate their progress towards achieving their goal(s). Marzano (2007) further suggests that teachers and students regularly review the targets and use these as the basis for instruction, having students choosing goals most useful to themselves and translating goals in to student friendly language. Additionally, self-report goals rank highly on effect size (Hattie, 2012) and generate intrinsic motivation towards learning.

Conclusion

This paper has examined student motivation through a set of beliefs and self-perceptions that individual students develop in relation to learning and how these impact on their progress and achievement. In addition, this paper has strongly emphasised and exemplified how motivation is entrenched in ownership and self-knowledge.

There are many actions that educators can take to help our students develop intrinsic motivation, to develop belief in themselves and feel that they have power over their own learning. Teachers who have both a deep knowledge of their subject matter/core curriculum areas combined with intentional practices to teach in ways that keep students focused and interested in learning are highly important. Additionally, viewing motivation as not 'one thing' but rather a set of inter-related components that have strong influence on achievement and understanding and building on these through choices of instructional practices. This paper has explored how teachers who are knowledgeable about motivation, and creating motivational environments within teaching and learning, are more likely to create conditions under which students 'go all out' as they strive to succeed. It is by taking care to address and combine these and other like approaches through rich, focused and needs-based learning that teachers and students together affect change.

Reflective questions

- To what extent is classroom instruction designed so that students view learning as a useful and enjoyable activity?
- What does motivationally anchored instruction look like within different teaching contexts?
- How might classroom practices be adapted to deliberately strengthen student motivation?

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Making a difference through Quality Teaching Rounds: Evidence from a sustained program of research

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Abstract

Through rigorous forms of research, including a randomised controlled trial, Quality Teaching Rounds (QTR) has been shown to make a positive difference to the quality of teaching, teacher morale and school culture.

This presentation will draw on both quantitative and qualitative evidence to demonstrate the impact of QTR, outlining its effects across a range of NSW primary and secondary schools and for teachers at very different stages of their careers.

The essential components of QTR will be elaborated with analysis of the underlying mechanisms that contribute to the effectiveness of this form of professional development in improving teaching practice. As a relatively low-cost, short-term intervention with applicability across all subjects, stages of learning and schooling sectors, the multi-faceted evidence provided has significant implications for teacher development policy and practice. Importantly, the approach is founded in respect for the capacities of the teaching workforce in Australia, which is in stark contrast to some initiatives, here and around the world, that emphasise accountability at the expense of teacher growth and wellbeing.

Introduction

Around the world, educators are looking for powerful ways to improve teaching practice and produce better outcomes from schooling. Despite vast investment in teacher professional development (PD), few studies have shown rigorous evidence of impact on the performance of either teachers or students (Kennedy, 2016). Arguably, progress has been slow while impact remains piecemeal and difficult to measure. By contrast, Quality Teaching Rounds (QTR) stands out as an approach to PD with evidence of impact on the quality of teaching of a kind that is rare among research studies, globally.

What is Quality Teaching Rounds?

QTR, developed by Jenny Gore and Julie Bowe, involves teachers working in professional learning communities (PLCs) of four or more to observe and analyse each other's teaching (Bowe & Gore, 2017). There is a growing body of research that uses the term 'rounds' in relation to teacher development (Elmore, 2007; Goodwin, Del Prete, Reagan, & Roegman, 2015), but no other approach is founded on a rigorously developed pedagogical model, or attends so carefully to the power relations inherent in collaboration. The Quality Teaching (QT) model, developed by Gore and Ladwig (NSW Department of Education and Training, 2003), guides teachers to ask three major questions about their practice:

- To what extent is there evidence of intellectual quality?
- In what ways is the environment supportive of student learning?
- How can learning be made more significant or meaningful for students?

The QT model depicted in Table 1 has a strong intellectual lineage (Newmann, 1996). While most other attempts to improve teaching lack a mechanism for developing a shared understanding of good teaching, the QT model provides teachers with a tested conceptual framework for articulating, sharing, assessing, and refining their practice. It is derived from a comprehensive review of empirical studies providing evidence on aspects of classroom practice that make a difference for students (Ladwig & King, 2003). Subsequently, it was refined through hours of classroom observational data and sophisticated statistical analysis involving multi-level modelling and factor analysis (Ladwig, 2007).

Teachers who participate in QTR work together in PLCs over a period of weeks, with each teacher taking a turn to host a 'round' involving observation in their classrooms. The host teacher's lesson (typically 30–80 minutes) is observed by the small group of peers in the PLCs. Coding and discussion follow immediately after. First, all the teachers (including the host) code the lesson, using one to five descriptors of quality associated with the 18 elements of the QT model. Then they engage in extended discussion (typically one to two hours) with each teacher sharing and justifying their codes, drawing on evidence gathered during the lesson. The goal is to reach consensus, a process that generates lively interaction and goes well beyond providing feedback to the host teacher. Teachers share targeted and critical insights in constructive ways, knowing that soon it will be their turn to host a lesson.

Currently, teachers begin QTR by attending a two-day workshop. The workshops develop teachers' understanding of 'quality' in tangible, accessible, and measurable ways; they extend teacher repertoire, not in terms of skills but of the conception of what it is to teach well. Unusually, while so many forms of PD rely on continued external support, teachers who attend these workshops (at least two per school) are empowered to

Table 1 Dimensions and elements of the Quality Teaching model

Intellectual quality	Quality learning environment	Significance
Deep knowledge	Explicit quality criteria	Background knowledge
Deep understanding	Engagement	Cultural knowledge
Problematic knowledge	High expectations	Knowledge integration
Higher-order thinking	Social support	Inclusivity
Metalanguage	Students' self-regulation	Connectedness
Substantive communication	Student direction	Narrative

implement QTR at their schools with no further external input. The initial investment produces ripple effects as participants form new professional learning communities over time. Teachers can also lead QTR with colleagues new to their schools or with colleagues in new schools if they move. They become a rich PD resource for themselves and others.

Conceptual and methodological framing

Figure 1 shows how the work is underpinned by rigorous research including systematic attention to processes of development, proof of concept, efficacy testing, real-world trials, and dissemination – processes that are relatively rare in educational research.

Importantly, QTR emphasises the quality of teaching, rather than the quality of teachers. This reframing of the 'problem' of teacher quality is manifest in QTR's resolute focus on pedagogy, recognising that what matters most is what teachers actually do in their interactions with students. Unlike approaches to PD that start with content or the use of instructional material or techniques, QTR starts with the principles of intellectual quality, quality learning environment, and significance (see Table 1). These principles distil the knowledge base for teaching and help teachers reconceptualise what good teaching is. As a result, teachers are empowered to undertake more critical and deeper analytical work on their practice, always with the aim of improving student learning.

Recognition of the importance of power relations and profound respect for teachers also pervade the QTR approach. QTR explicitly builds on what teachers already know and do, extending their professional knowledge and capacity to refine their own teaching. Misguidedly, many government agencies and PD providers seek to improve teaching through accountability regimes.

Teachers are subjected to new forms of scrutiny and onerous systems of performance to prove they are making a difference. Not only do these approaches lack strong evidence of positive impact, they also convey a lack of faith in teachers. Our mission is to build teachers' confidence by helping them to identify and fortify quality in their own and others' practice.

Relatedly, QTR flattens power hierarchies in schools. The process of undertaking rounds builds collaboration and professionalism. It deliberately brings together teachers with diverse experiences to encourage multiple perspectives on their diagnostic work. Our most recent analysis (Gore, Rosser, & Bowe, manuscript in preparation) found that the teachers and principals who participated in QTR reported:

- enhanced capacity to reflect on their own and each other's practice
- an increase in quantity and quality of dialogue about teaching
- new confidence and insights about themselves, other teachers, and their students
- greater professionalism in school culture
- strengthened relationships among staff, based on heightened trust and respect.

These wide-ranging effects suggest that QTR succeeds in overriding obstacles based on power and hierarchy and generates new ways of interacting about pedagogy. Subject and grade level boundaries in schools often obstruct dialogue, exchange, and sharing. Early career teachers often have no way to challenge their more experienced colleagues or ask for help because they don't want to be seen as lacking. QTR gives them tools to articulate what is happening in classrooms, regardless of their experience and status in the school. As a result of a shared lens on good teaching and a non-judgemental mode of critique, collaborative relationships thrive. One experienced teacher captures

Timeline	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Evidence/ Scientific purpose	Preliminary studies of pedagogy and power relations		Development of the QT model		Proof of concept testing the QT model in real-world settings			Effectiveness in new settings and development of the QTR approach		Proof of concept and pilot testing of QTR			Design experiments to refine QTR for wider implementation			RCT efficacy trial to examine impact of QTR on teaching quality and teacher morale			Mixed methods including RCTs to test QTR: • impact on student outcomes • sustainability of effects two years post-intervention • efficacy of trainer delivery and digital delivery • translation to new jurisdictions, nationally and globally.				

Figure 1 Timeline of research program

the transformative effect in a nutshell: 'They did not like me, and I did not like them, which was only on hearsay and reputation alone … But when I was in the room with them and working with them, I respected them and I learned to trust them and I learned who they really were' (secondary teacher).

Research on Quality Teaching Rounds

One of the most exciting findings of our research to date is that QTR improves the quality of teaching while impacting positively on teachers' morale. Following protocols of the Consolidated Standards of Reporting Trials (CONSORT) including the requirement for observers to be blinded to group allocation (Moher et al., 2010), our randomised controlled trial (RCT) (2015–2016) produced effect sizes of .4 to .5 – effects that were consistent across representative school sectors (primary/secondary), school-level socio-educational advantage, and teachers' years of experience (Gore et al., 2017). These results were obtained with teachers participating in as few as four half-days of QTR. Furthermore, the effects were sustained six months after the intervention and in a new school year with new students. Our next study will examine sustainability of effects 12 and 24 months after participation in QTR, providing even more robust data on the long-term benefits for teachers.

The transformative effects of QTR were also demonstrated in qualitative evidence from teacher interviews and focus groups. The word most frequently used by teachers was 'changed'. Teachers reported change not only in their teaching practice, but also in their perceptions and expectations of their students, how they see their colleagues, and how they understand good teaching. QTR produced changes in their goals, relationships with colleagues, and commitment to the profession. The research documented growing confidence and skill among early career teachers, while re-energising and re-engaging those with more experience. The transformative effect on one school leader was described unequivocally: 'This is the first time in my career I feel I'm actually teaching students. Until now, I've just been giving them work to do' (primary deputy principal).

Other outcomes for teachers include:

- gains in professional knowledge about what constitutes good teaching
- greater skill and efficacy (both individual and collective) as a result of using the shared concepts and language of the QT model
- stronger professional identities as a result of both the affirmation and challenge from scrutinising practice in constructive ways

- improved wellbeing, morale, and engagement in the profession
- enhanced capacity to lead colleagues, including the next generation of teachers, in ongoing refinement of teaching.

We will soon commence a mixed methods investigation of the efficacy, complexity, and sustainability of teacher change (2018–2021), a project that promises new evidence of the impact of QTR on student outcomes. In this study, we will examine academic performance using progressive achievement tests to demonstrate literacy, numeracy, and science achievement. Anticipated outcomes for students also include increased engagement in school and improved social outcomes. These will be measured by constructs such as student self-concept, student attitudes toward learning, and student aspirations.

Implications for making a difference

QTR build capacity across schools and systems, not just one subject, one lesson or one small group of teachers at a time. A defining characteristic of QTR is its focus on pedagogy. It can be applied broadly to any teaching and learning context. Any combination of teachers can work together to analyse pedagogy, regardless of subject or grade level. Science teachers can work with art, English, physical education, history, or maths teachers. Elementary can work with secondary. QTR can focus on specific issues like the use of technology, problem-based learning, or literacy across the curriculum. These varying uses add to the scalability of the approach, especially given that the costs to schools are limited to releasing teachers to engage in a set of rounds and sending a couple of colleagues to a QTR workshop.

QTR also has clear capacity to address teacher attrition, a worrying challenge in many developed nations. Even when systematic induction into the workforce is provided, the support is usually administrative, personal, and social. Rarely do early career teachers receive comprehensive pedagogical guidance. They are urged to improve their teaching without conceptual clarity about what it is to teach well, contributing to their frustration and disillusionment. What QTR does is scaffold improvement outside the usual hierarchical mentoring or coaching relationship. It provides collegial support and collaborative critique, encouraging teachers at all career stages to learn from one another. This reciprocity is key to interrupting attrition (Gore & Bowe, 2015), raising quality, and ensuring the health of the profession.

The ultimate beneficiaries of PD are school students, now and well into the future. To date, evidence of the impact on student learning comes mainly from correlations between teacher participation in QTR and student

performance on national standardised tests. Participating schools that were previously ranked as low performing in their districts report significant turnaround within a short period of time. Powerful narratives from teachers and school leaders also indicate strong improvements in student engagement and outcomes. One principal reported a significant dip in results for students whose teachers had *not* participated in QTR: 'The rest of the school was on a momentum shift … there's been an identifiable link to our NAPLAN results in terms of student improvement' (primary principal). Our next RCT will test these claims under experimental conditions.

Conclusion

With pervasive calls to improve the quality of teaching, QTR is achieving this goal. As a way of diagnosing and improving teaching, QTR transcends new fads and innovations. It can usefully apply to whatever technological or curriculum innovation is being introduced. QTR is not a framework attached to any specific style of teaching, discipline area or technology. It can be used in traditional settings and more experimental '21st century' problem-based, inquiry-oriented learning spaces. Because QTR is about principles of pedagogy, it is durable and future-oriented. Arguably, QTR might just be a key piece of the jigsaw of educational improvement that has been missing in many contexts around the world.

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Communicating student learning progress: What does that mean and can it make a difference?

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Abstract

Traditionally in schools, the main method of communicating students' academic performance has been the summative end-of-semester report, and the focus of much of this communication has centred on reporting achievement against year-level standards. While semester reporting largely remains established practice, the advent of new school management systems has seen schools embrace a practice known as 'continuous reporting'. Though well-intended, early analysis would suggest that the potential benefits of this relatively new process are inconsistently understood, and reveal a confusion between progressive instalments of feedback versus feedback on student progress. Such confusion may be indicative of other gaps in the organisational knowledge in schools. For example: How is progress defined? How is progress measured? What is meant by continuous reporting of progress? Who is the audience of continuous reporting? And, importantly, what is the impact of continuous reporting?

This paper will present initial findings of a research project that is examining current policies and practices related to communicating student learning progress in Australia, including semester-based and continuous reporting. The project seeks to understand the form, function, and impact of current policies and practices, and provide an evidence-base for identifying processes for communicating student learning progress that will make a difference.

Introduction

Each year, across Australia, school communities engage in various activities that are focused on communicating information about student learning. These include student school reports (end-of-semester, cycle-based); interviews (parent-teacher, three-way student-parent-teacher); portfolios (hard copy, digital); exhibitions and performances, and so on. Given the effort and time devoted to such activities in all schools each year, questions of interest are: how effective are these practices and do they make a difference to student learning?

These questions prompted the research project reported here. We are investigating alternatives to the traditional 'school report' as a way of communicating the progress students make in their learning. Traditionally, school reports have functioned as the cornerstone of communication to parents – providing a final reckoning of a child's achievement across a range of subjects each semester. However, they have a chequered history with respect to how stakeholders regard them. Dissatisfaction with school reports has been expressed by parents and educators alike, with criticisms focused on the kinds of measures used, the level of detail provided, the accessibility of language used, and how meaningful the information presented actually is (Hollingsworth & Heard, 2018). Research developments in recent years have provided increased understanding about the nature of learning and individual student learning growth, challenging assumptions about age-based lock-step curriculum (Masters, 2017a). This has prompted new thinking about curriculum and what it means to assess learning progress, together with ways to improve reporting and communication processes. A particular focus of

this project is to explore alternatives to judging and grading student learning only in terms of age/year level expectations, and of ways to capture and communicate the progress – or growth – that students make in their learning over time.

Alongside this new thinking about student learning and progress has been the advent of electronic school management systems and data tools, and these have encouraged some schools to embrace new reporting practices. A further area of research interest involves investigating and understanding how these electronic systems and tools are influencing the ways that schools report and communicate information about student learning.

The Communicating Student Learning Progress Project comprises six areas of investigation:

1. an environmental scan of existing system policies on reporting and communicating student learning progress

2. an examination of current school practices related to reporting and communicating student learning progress

3. an examination of how electronic systems and tools influence the ways schools report and communicate student learning progress

4. a review of the alignment between reporting and communication practices and current learning and assessment theory and practice

5. a collection of stakeholder views about what works well and what doesn't with respect to current practices for reporting and communicating student learning progress

6. a collection of stakeholder views about what they want and what they need with respect to reporting and communicating student learning progress.

In the sections that follow, findings from early analyses in two of these areas are presented: current school practices related to reporting and communicating student learning progress and influences of electronic systems and tools on the ways schools report and communicate student learning progress. Further details about these and each of the other areas of investigation will be published in a final project report.

Early observations and questions about reporting and communicating

Our examination of current practices related to reporting and communicating student learning progress has involved the collection and analysis of school reports and other related documents (e.g. reporting policy documents, documents explaining reporting practice, etc.) from primary and secondary schools. Reports have been collected from different jurisdictions and systems and include examples from Foundation to Year 12.

We have made two observations from the early analysis of these reports and documents, which have given rise to the questions that follow.

Observation 1: The contents and formats of school reports vary considerably

School reports vary with respect to such things as:

- elements reported (academic achievement, social and emotional development, work habits, etc.)
- learning domains reported (all subjects, English and mathematics only, domain-level only, sub-domain level, etc.
- learning context descriptions
- assessment task descriptions
- measures (performance indicator rubrics; scales; grades; level indicators, etc.)
- reference to evidence of performance (explicit reference; no reference)
- comments (included, type, excluded)
- individual and comparative assessment information (individual results, cohort results)
- indication of next steps in learning (explicit, specific, generic, not included)
- the contributors (learning domain teachers; homeroom teachers, pastoral teachers, school leaders, students, parents etc.)
- additional artefacts (photos, etc.)
- links to other information types (interviews, portfolios etc.).

Questions provoked by Observation 1

- What are the consequences of this variability? For students? For parents? For teachers? For schools? For systems?
- How does the 'grain-size' of what is reported impact the interpretation of information for different stakeholders?
- What are essential inclusions for a meaningful report?
- What is the purpose of school reports?

Observation 2: The term 'progress' is used often but rarely describes learning gain

Learning progress has been defined as the gain, growth or increasing proficiency along a continuum of learning (or learning progression), as measured over time (Masters, 2016, 2017b). This definition aligns with the perspective presented in the Department of Education and Training's *Through growth to achievement: Report of the review to achieve educational excellence in Australian schools* (2018, p. 30), which states:

> *Assessment and reporting arrangements must be updated to accurately describe the progress a student has made in the acquisition of knowledge, skill and understanding over time, and the level of attainment that has been reached, regardless of how other students are performing or what the standards may be for a certain age or year level. A prerequisite for such arrangements is a sound understanding of what long-term progress across the curriculum looks like, informed by student performance data.*

Early analysis of the school reports and other documents collected indicates that the term 'progress' is used in a variety of ways and some of these are inconsistent with the government's perspective.

Many of the school reports (and associated documents) analysed thus far profess to communicate student learning progress. In the explanatory preamble of these reports, claims that the student report is a means 'by which [parents] can learn about student progress', or are part of the school's efforts to 'provide a coherent picture of each child's academic progress' were common. Teachers commented on the 'steady', 'significant' or 'solid' progress a child had made in their learning. Progress was sometimes applied to a five-point scale tied to performance in assessments where, for example, a student who received a grade of 'outstanding' due to 'performing well above the expected level of *[the school's]* students at this year level' was thus also said to have made 'Outstanding progress'. In one report, colour-coded 'progress indicators' were applied to denote whether a student had 'shown improvement', was 'holding steady' or – worryingly – 'has gone backwards'. There appears to be

a misconception that progress over time is synonymous with a student's performance over time.

Examples of the ways that the term 'progress' is used in the reports examined to date are displayed in Table 1.

Despite the relative frequency of the word 'progress' within reports, few seemed to convey a meaningful impression of how a student had progressed. A report that communicated a student's learning progress over a term or semester would, in metaphoric terms, produce a 'time lapse' impression of that child's growth within a learning domain over that period, explaining the gains that child has made.

Early analysis has uncovered very few school reports that communicate progress in any recognisable 'time lapse' manner. The most salient attempts at revealing progress were presented as simple, graphical representations. Many reports from Victorian schools made use of a 'sliding dot' graphic. This indicates teacher judgements of a student's progress within the Victorian Curriculum over a six-month period. One report presented a line graph at six-weekly intervals to indicate the rise and fall in student achievement in undefined percentage terms, providing some sense of change over time (albeit score fluctuation rather than learning gain). Others presented term-by-term column graphs to similar effect. One school report contained the student's results

on a sequence of formative assessment tasks (labelling them as 'progress tasks') as well as their result in the end-of-unit summative task. However, here too, the impression was more of performance fluctuation rather than learning gain, as the formative tasks sometimes appeared to assess discrete, rather than consistent, knowledge and skills. Most reports still appear to either communicate a child's performance in summative assessment tasks (in secondary schools) or provide a summative listing of a student's attainment of various learning outcomes (in primary schools).

Questions provoked by Observation 2

- How might schools move towards a shared understanding of what progress means?
- Do teachers understand the difference between reporting attainment and reporting gain (progress/growth)?
- Do teachers have a sound understanding of what long-term progress across the curriculum looks like, and ways to collect student performance data to enable them to accurately map student learning progress?

These early observations prompt important questions about the purpose and form of school reporting and communicating student learning progress.

Table 1 Use of the term 'progress' in school reports

Ways the term 'progress' is used	Examples from school reports
To map student learning against age-based curriculum standards	Students, teachers and parents are provided with a clear and concise picture of a student's achievement and progress at a point in time. Teachers map the student's learning against the achievement standards, and place the student on the learning continuum that best reflects the student's level of performance and progress. The report card's A to E rating will tell you how your child is progressing against the expected standard. Teacher judgements about your child's progress against AusVELS. Your child's progress (Legend).
To indicate a student's performance on tasks relative to one another over time	At a minimum there must be at least two items per term, spaced to give a sense of the student's progress.
To describe attainment of specific outcomes in a learning area	A checklist is provided to show your child's progress in each area.
To comment positively about a student	She has made steady progress this semester. He is progressing extremely well. Has shown progression in his science understanding this semester. She is making very pleasing progress.
To indicate ways to support student learning	Regular practice will support his progress. Things you can do at home to help her progress.
To link to other forms of communication about student learning progress	Teachers will give you a clear indication of progress at the upcoming parent-teacher meeting.

It is anticipated that further analyses of the reports and artefacts together with analyses undertaken in the different components of the research project will provide more insights into what might constitute effective practices related to communicating student learning progress.

Influences of electronic systems and tools: Challenges and possibilities

Given the current prominence of electronic school management systems and data tools in schools, it is important to investigate how schools use these to prepare student reports. Such tools enable 'continuous reporting', which is becoming an increasingly preferred part of a school's communication around student learning. Continuous reporting refers to the practice of reporting in regular instalments. Typically, at key moments throughout the semester, teachers provide updated assessment information to the system, which is then made visible to parents and students. These updates can include various indications of a child's performance on assessment tasks, for example scores and grades, students' work with annotated feedback, curriculum content descriptors or achievement standards attained, task rubrics, and teacher comments to the student on their achievements and areas for improvement.

The recent uptake of continuous reporting appears to have had a significant impact on end-of-semester reports, particularly in secondary schools, where several of the semester reports examined appeared as much 'leaner' grade summary documents than others. Some of these reports explicitly refer the presumed parent-reader to the school's parent portal for more detailed assessment and teacher feedback to the student. In these schools, the end-of-semester reports appear to be a somewhat perfunctory approach to meet the mandated requirement of two written reports per year.

The extent to which electronic tools and systems have improved the communication of student progress, however, remains a question for further investigation. Schools often extol the benefit of providing timely, regular information to parents about how their child is performing on assessment tasks 'in real time', as they are completed, rather than all at once at the end of the semester or year, when it is often felt to be too late for parents to seek intervention. However, to provide progressive reporting instalments is not the same as reporting on learning progress. More analysis is needed, therefore, into how schools typically use continuous reporting, and to what extent it is being used to communicate a student's growth in learning, as well as their performance on assessment tasks.

Discussions with providers of school management software have revealed promising opportunities related to school reporting. For example, several systems have integrated data analytics functionality, meaning the capacity exists for schools who undertake regular standardised testing to seamlessly access this data and communicate gains in student results. Some providers offer a curriculum tracking function, wherein teachers can indicate what key content knowledge and skills a student has mastered, represented along a curriculum continuum, and make this visible to parents at regular intervals. Tools already being used by teachers to justify student performance on individual assessment tasks can be repurposed to provide explicit evidence of learning progress or gains made. For example, many systems have the capacity to upload samples of student work, or rubrics, annotated to indicate gains in skill, knowledge or conceptual understanding. These provide opportunities for teachers to concretely demonstrate the progress a child is making in their learning over time.

Conclusion

Interestingly, and perhaps surprisingly, to date there has been little research done into reporting on student learning (Hollingsworth & Heard, 2018). The Communicating Student Learning Progress Project has the potential to contribute important information about current understandings and current practices related to communicating student learning progress in Australian schools, and to set the stage for further research in this area. The project will culminate in a report that details a set of design principles and implementation recommendations for effectively communicating the progress students make in their learning.

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Making online group-work work: Scripts, group awareness and facilitation

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Abstract

Even though group work for learning is a well-established and extensively researched pedagogy, teachers find it still challenging to engage students in productive collaborative learning that extends over time (e.g. weeks – in the context of project-based learning) and is computer-mediated in addition to being classroom-based. I introduce three practices that have been shown to foster collaborative knowledge production and learning: first, group scripts; second, knowledge building and knowledge awareness; and third, group facilitation. I discuss how teachers can integrate these into their teaching practices to address three challenges to productive group learning: unequal participation, lack of awareness, and stratified learning zones.

Introduction

The teaching 'practice' in the case of this paper is a paradoxical one: the teacher ought to get out of the way and hand epistemic agency over to the students. Think of a student-led classroom discussion, where the teacher should perhaps moderate the discussion, but not dominate it – and perhaps not even 'steer' it – or student work in small teams. I want to distinguish two roles the teacher has in such contexts: the role of a collaboration designer and of a collaboration facilitator. Teachers' work as designers takes place in the preparation of students' work, while as facilitators, teachers observe and intervene as students' work unfolds.

Because there are so many forms of collaborative learning, this short paper focuses on the kind of group work that is typically part of project-based pedagogy: small teams of students working over a period of weeks on a research challenge. This pedagogy combines opportunities for subject matter learning with the development of 21st-century skills and contemporary literacies, what the Australian Curriculum calls General Capabilities (ACARA, n.d.). In this kind of project pedagogy, students are co-dependent for the success of the project – they cannot complete the project individually.

'Online' is used in the general sense that technology plays an important role as the tool for doing the project work: for planning, information search, data analysis, and report writing even when students are co-located (e.g. sitting around a table). I will not say much on the particular challenges of virtual team work – or tele-collaboration – as this is still rather atypical for today's schools.

The rest of this paper provides a short overview of how three pedagogical strategies can be used to address three typical challenges of student team collaboration that occur in the context of project-based learning. The strategies are scripting, group awareness tools, and facilitation. The challenges are unequal participation, lack of awareness, and stratified learning zones.

Strategy 1: Scripting to reduce unequal participation

The problem of unequal participation in group work is well documented. It can, for instance, take the form of free-riding (Albanese & van Fleet, 1985). Unequal participation is challenging to address because it is rational to not invest effort into a group task when others are already taking care of that task. In the context of education and learning, this rationale is problematic because task engagement is required in order to provide opportunities for learning.

Participation can be regulated by external or by internal means. Scripting is a form of external regulation: students are assigned different roles by which roles,

tasks, and sequences of task execution are externally structured and regulated by specific scripts (Fischer, Kollar, Stegmann, & Wecker, 2013). In order to support a group to internally regulate – or self-regulate – awareness tools can be deployed. They induce and support student and group coordination and regulation by offering information on different aspects of the group situation (Hesse, 2007). Group awareness tools (GATs, see Janssen & Bodemer, 2013) can provide social information or cognitive information. *Social group awareness tools* present information on participation rates and other behavioural measures. *Cognitive group awareness tools* offer information about one's own knowledge, skills and opinions about a topic as well as knowledge, skills, and opinions from the other collaborators, information that is not directly observable. Both kinds of group awareness tools aim to improve group sharing, elaborating and acquiring knowledge.

Social awareness tools are particularly well suited to address the issues of unequal participation. They typically visualise the degree of active participation (when, what, how and why) gathered from different sources (chat, email, task area). For example, in a line of research at The University of Sydney, awareness tools have been developed that support students who learn to develop software in teams (Reimann & Kay, 2010). Information on team performance was gathered from various places – a ticket system for task planning, a wiki, a software versioning system – and visualised in a variety of forms, such as social network diagrams and a new visualisation called Wattle Tree. It combines information across all the three activity areas into one comprehensive visualisation. It was found that this kind of visualisation was particularly valued by student team members who were in the role of team leader, as it helped them to communicate individual team members' contributions and effort without having to use a normative language.

Raising awareness as well as scripting are design tasks: teachers need to think ahead about whether and what kinds of role and task distributions they want to bring to a collaboration activity and decide on the tools to capture student contributions. Raising awareness can also be accomplished by teacher observation of student teams and feeding information back to them.

Strategy 2: Creating knowledge awareness

In the context of collaborative work and learning it is not trivial to know what the others know. For instance, studies by a group of German researchers (e.g., Engelmann & Hesse, 2011) show that the efficiency of groups – for both work and learning – depends on knowing what the others know (knowledge awareness) and what information the others have access to (information awareness). These and other studies have

shown that group performance on problem solving and decision making is negatively affected by group members' reluctance to share relevant information – the information that only an individual member may have. Engelmann and others demonstrated that using distributed concept maps as a knowledge-sharing device increases knowledge sharing and that this leads to better collaboration and problem-solving performance. Concept maps in these instances functioned as cognitive awareness tools.

In addition to concept maps, externalising knowledge, opinions, and understanding are usually conducted by obtaining learners' subjective ratings and by using tests such as multiple-choice knowledge tests (e.g., Sangin, Molinari, Nüssli, & Dillenbourg, 2011). The positive effects of cognitive group awareness tools can be explained by the fact that comparisons of participating collaborators' knowledge, understanding, and opinions are directly available and easily derivable, thus triggering discussion and reflection of shared information and knowledge that, in turn, positively affects group regulation (Kirschner, Kreijns, Phielix, & Fransen, 2015).

To raise knowledge and information awareness, teachers need to think of strategies when designing for collaborative project-based learning. When using forms such as quizzes and tests to this purpose, it is important to communicate to students that this is done for the purpose of creating awareness, not meant as an assessment.

Strategy 3: Facilitating productive zones of learning

While unequal participation and lack of awareness can affect just about any form of collaborative learning, the third challenge is more specific to collaboration in the context of project-based pedagogy. It results from the tension between *performing* team work and *learning* in the context of team work, from the difference between completing a project on the group (or classroom) level and individual learning.

In general terms, it takes the following form: as students self-select roles and tasks, or self-organise these allocations based on each other's judgements of capacity and proficiency, stratified learning zones emerge. A stratified learning zone is a 'design-engendered hierarchy of student learning trajectories, each delimited in its conceptual scope, and all simultaneously occurring within a classroom' (Abrahamson & Wilensky, 2005, p. 1). Learning zones limit what can be learned from functioning in a role. For instance, a goal keeper in a soccer team will not have much opportunity to develop the skills for dribbling. The same logic is at work in other kinds of teams, but then it is typically much less obvious. For instance, in the math class in Abrahamson, Bliksten, and Wilensky's study (2007), the task was for students to

construct together a physical artefact made from paper. While the underlying math is basic probability theory, only a few students in this task engaged in mathematics. The others found themselves busy with the mechanics of building the paper artefact. Crucially, those students who were comparatively poor in math allocated themselves to tasks that required little if any mathematical knowledge. While this was completely rational from the perspective of organising team work, it reinforced existing inequalities regarding pre-instructional (in this case mathematical) knowledge. Further worrying was the fact that only a few students in the classroom had an overview of the relation between the mathematical and the physical aspects of the activity; even so the group performed the task quite well, only a few students gained an understanding of the overall task and the mathematical ideas behind it.

This is a serious challenge to collaborative learning as the logic of distribution of labour is partially at odds with the requirements for learning from the activities performed in a team. Addressing this problem requires careful teacher planning. The scripting of roles and activities, such as in variants of the 'jigsaw' design (Aronson, Blaney, Srephan, Sikes, & Snapp, 1978) may seem a solution, but such arbitrary regimes for role switching are liable to undermine students' sense of ownership of process and the artefact produced. What is called for here are deeper solutions that combine group knowledge awareness with a sense of shared responsibility for the artefact and the ideas that it is imbued with (Scardamalia & Bereiter, 2014).

One way to accomplish this is group facilitation. A facilitator is 'one who contributes structure and process to interactions so groups are able to function effectively and make high-quality decisions' (Bens, 2012, p. viii). A key task for a facilitator is to ensure equal and open participation—and equal opportunities for learning when the group work has a pedagogical function. Since this is a demanding task and requires careful observation of each team in a classroom, teachers may want to assign facilitation functions to students – what I call peer facilitation (Reimann, Bull, & Vatrapu, 2013). This is not only practical for the teacher, but also a great opportunity for students to practice basic process leadership skills.

Conclusion

Even though group work for learning is a well-established and extensively researched pedagogy, teachers find it still challenging to engage students in productive collaborative learning that extends over time (weeks in the context of project-based learning) and is technology-rich. This paper introduced three practices that have been shown to foster collaborative knowledge production and learning: group scripts, knowledge awareness, and group facilitation. I showed

how these strategies can be deployed to address three key challenges for collaborative learning: unequal participation, lack of knowledge awareness, and stratified learning zones. To identify the main tasks for teachers, we distinguished between teachers in a design role and in a facilitator role.

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Teaching practices that improve performance, attainment and engagement: Results from a longitudinal study of high school students in NSW

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Abstract

This report builds on a body of evidence showing the positive effect of teaching and classroom practices on engagement, wellbeing and academic outcomes. Using two student cohorts in NSW government schools, Years 7 to 9 and Years 10 to 12, we have quantified the effects of quality instruction and other effective classroom practices as drivers of student outcomes (see Figure 1, p. 54). A common theme across both cohorts was the positive impact on key academic outcomes of teachers having high expectations and appropriately challenging all their students (as measured through the NAPLAN tests and Year 12 completion). Modelling also shows that the effects that teaching practices have on NAPLAN, specifically, are mediated by improved attendance, behaviour and intrinsic motivation to learn.
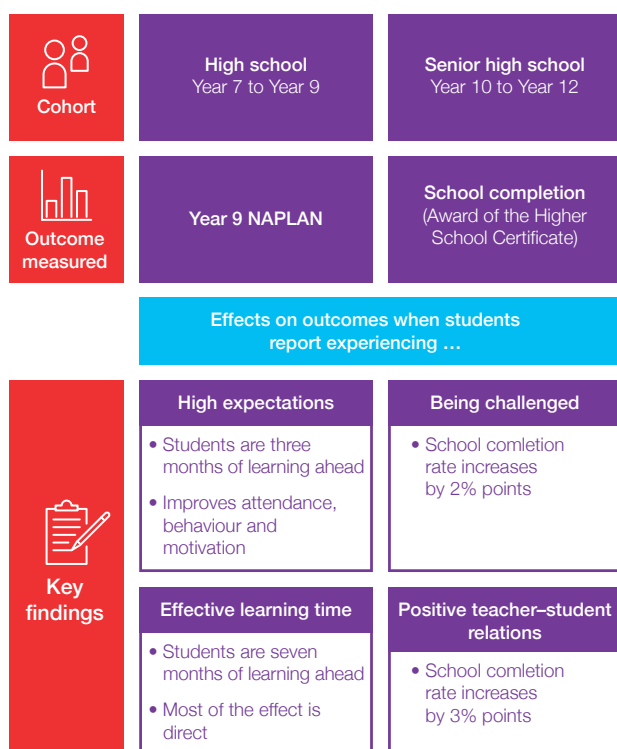
Cohort	**High school** Year 7 to Year 9	**Senior high school** Year 10 to Year 12
Outcome measured	**Year 9 NAPLAN**	**School completion** (Award of the Higher School Certificate)

Effects on outcomes when students report experiencing …

Key findings	**High expectations**	**Being challenged**
	• Students are three months of learning ahead • Improves attendance, behaviour and motivation	• School comletion rate increases by 2% points
	Effective learning time	**Positive teacher–student relations**
	• Students are seven months of learning ahead • Most of the effect is direct	• School comletion rate increases by 3% points

Figure 1 The effect of classroom and teaching practices on student outcomes

Introduction

Research shows that student engagement is linked to effective teaching and classroom practices (Lee & Smith, 1996; Klem & Connell, 2004). Schools can create environments that promote learning and high levels of student engagement, by using explicit and effective teaching strategies, and setting high expectations for achievement (CESE, 2015). These aspects of schooling have become even more important in recent years due to the increased focus on completing high school and undertaking post-secondary education. For instance, there is now evidence that positive engagement during the school years is an important factor not only in enrolment but in the completion of post-secondary education (Lawson & Lawson, 2013).

Methodology

The findings reported in this paper are based on two longitudinal cohorts from a student survey instrument known as Tell Them From Me (TTFM), run

in government schools in New South Wales, Australia. Both cohorts ran from 2013 to 2015 and covered the full span of secondary schooling in the state (Year 7 to Year 9, and Year 10 to Year 12).

The findings from this study are a result of collaboration between the Centre for Education Statistics and Evaluation (CESE) within the NSW Department of Education, and the Institute for Social Science Research (ISSR) at The University of Queensland.[1]

Cohort 1: Year 7 to Year 9

Analysis of the Year 7 to Year 9 data (6800 students) used structural equation modelling (SEM) to unpack the complex relationships between engagement, classroom practices and NAPLAN reading[2] performance. The modelling explored how engagement influences performance, and vice versa; and the relationship between classroom practices and performance as mediated by engagement. Results show how much a difference of one point in each of the TTFM measures affects NAPLAN reading scores. This is illustrated in Figure 2 (p. 55), which depicts two hypothetical students in the same hypothetical school, who are taken to be identical in a range of measurable attributes (e.g. socio-economic status and prior academic performance) but not in their TTFM responses for the measures in question. For instance, Student A has a teacher who uses effective classroom practices; Student B does not. Differences in NAPLAN scores between students are reported using a 'months of progress' approach (Goss, Sonnemann, Chisholm, & Nelson, 2016), which measures the months of learning it would take a typical NSW Year 9 student to move from one NAPLAN score to another.

Cohort 2: Year 10 to Year 12

For the Year 10 to 12 data (10 800 students), multilevel logistic regression was used to explore the relationships between different measures of student engagement and teaching practice, and the individual/family/ school factors that may impact a student's likelihood of completing Year 12. The aim was to determine whether school completion was more likely for certain groups of students or types of schools than others. In Figure 3 (p. 55), odds ratios, which denote the relative odds of an event, are converted to the predicted probability of different 'hypothetical' types of students completing school. These hypothetical students are characterised by identical socio-demographic characteristics and

Figure 2 The direct and indirect effects of effective learning time and expectations for success on reading performance in Year 9

* Educational plans (plans to finish Year 12 and attend university or VET) are not controlled for in these calculations.
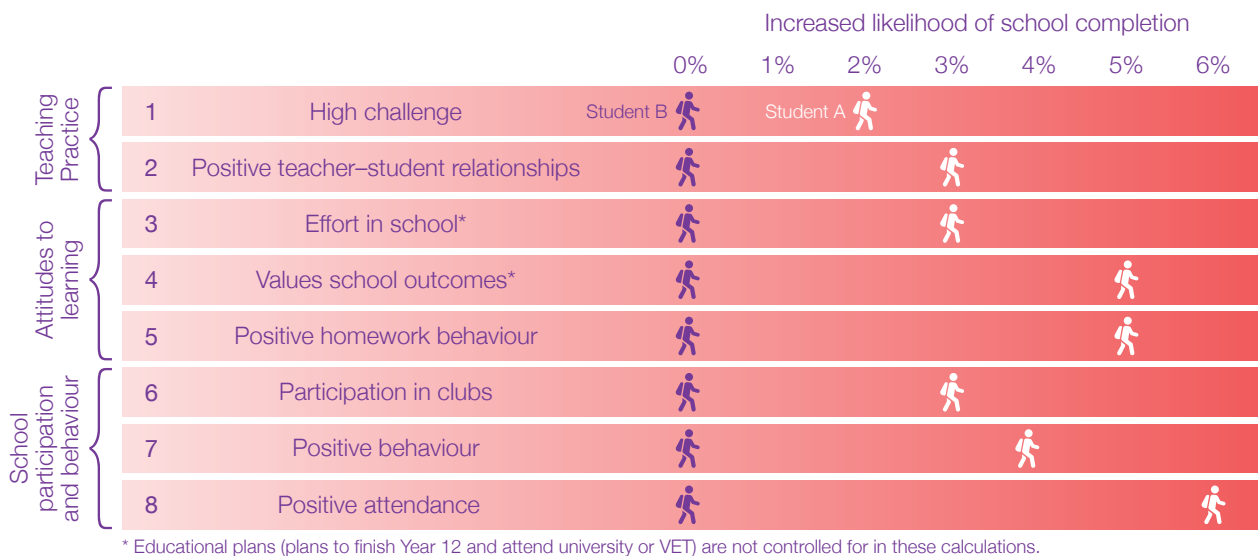
Figure 3 Predicted increase in school completion rate of students who report high levels of engagement

either low engagement or high engagement in the TTFM measures. For example, imagine Student A has positive attendance at school and a predicted probability of school completion of 84 per cent, while Student B has poor attendance and a predicted probability of 78 per cent. This indicates that the likelihood of a student with positive attendance completing Year 12 is six percentage points greater than a student with poor attendance. Note that all other student, school and engagement characteristics are held constant in this example.

Results/Discussion

Cohort 1: Year 7 to Year 9

Figure 2 highlights those classroom practices reported by Year 7 students that were found to have statistically significant and marked effects on Year 9 NAPLAN results.

Modelling shows that where two students are identical in terms of socio-economic status and prior academic performance, a Year 7 student who reported

receiving effective learning time (ELT) or high academic expectations can be seven and three months ahead, respectively, in Year 9 from a student who does not (CESE, 2017).

In the TTFM survey, ELT refers to teacher use of classroom time, such as whether classes are well organised and whether important or difficult concepts are taught well. Teachers' effective use of learning time affects student learning directly, by unlocking learning that improves academic performance; and indirectly, by increasing student engagement in school, which then improves performance. In the study, a majority of the reported improvement (85%) for ELT was the result of direct effects on performance, while 15 per cent was due to indirect effects on performance, through improved intellectual and institutional engagement.

The aspects of teaching that make up the effective learning time measure in TTFM include:

- organising lessons well
- paying particular attention to how important ideas are taught and helping students understand their significance
- requiring students to demonstrate mastery, especially of difficult ideas
- allowing students to ask questions and ensuring responses are clear and have been understood.

Wang & Holcombe (2010) found that students who learn in supportive classroom environments that promote mastery of classroom content have, on average, enhanced engagement and learning outcomes. In their study of middle-school students in the US, Fredricks, Blumenfeld, and Paris (2004) similarly found that students exhibited higher cognitive (intellectual) engagement and greater use of learning and metacognitive strategies when they had teachers who presented challenging work and pressed for understanding.

Like ELT, high teacher expectations were found to affect student learning directly (60%) and indirectly (40%). The direct effects stemmed from strategies such as teachers encouraging students to work hard (and students responding by doing so), while the indirect effects took place through stronger engagement in the form of improved behaviours and academic interest and intrinsic motivation.

Some of the ways that teachers demonstrate high academic expectations of their students, as measured in TTFM, are:

- being clear about what is expected of students and following up on expectations
- making it clear to all students that they must work hard to succeed

- encouraging students to do better, for instance, through personal best goal setting; that is, a student's attempt to improve on or match their previous best standard of performance
- providing feedback that explicitly identifies the next learning steps and the skills necessary to improve
- expecting homework to be done on time.

Lee and Smith (1996) highlighted the importance of having consistent and clear expectations for students in order to keep them engaged and foster learning at school. Klem and Connell (2004) similarly found that students whose teachers and school held high standards for academic learning and conduct, and had fair and clear expectations, were more likely to be engaged in and connected to school. These studies demonstrate the important links between engagement and effective teaching and classroom practice.

Cohort 2: Year 10 to Year 12

Figure 3 shows the indicators of engagement and teaching practice captured in Year 10 that are significantly and positively associated with school completion two years later. It reports how much more likely a student who reports high levels of engagement in each of the engagement and classroom practices is to complete Year 12 than a student who reports disengagement and low levels of classroom practices. Reported differences account for student socio-economic status and prior achievement, other engagement indicators and, in most cases, students' plans for school completion and further education.

It should be noted that the likelihood reported for each individual measure is cumulative and can be aggregated when a student experiences more than one type of engagement. For example, a student who has positive teacher–student relationships, positive homework behaviour and positive attendance could be approximately 14 percentage points more likely to complete Year 12 than a student who has low engagement in all three measures. Students' effort in school and their valuing of school outcomes are only significantly associated with school completion when students' educational plans are not included in the statistical model. This result suggests that these types of engagement have a positive impact on shaping students' plans for school completion, which in turn impacts their actual completion.

Modelling reveals that Year 10 students who report high levels of challenge (i.e. that their classes deal with difficult or challenging material) were two percentage points more likely to complete Year 12 than students with the same academic characteristics who report low levels of challenge.

Challenge is widely viewed as being critical for student engagement and achievement and can be used to counteract student disengagement (Shernoff, Shernoff, Csikszentmihalyi, Shneider, & Shernoff, 2003). In contrast, a lack of challenge can lead to drop-outs or underachievement at school, particularly among high-achieving students from disadvantaged backgrounds who are less likely to achieve as highly as their advantaged peers (Wai & Worrell, 2016; Yazzie-Mintz, 2010).

Like challenge, teacher–student relationships can help prevent and/or lower the risk of students dropping out of high school (Barile et al., 2012; Krane, Karlsson, Ness, & Kim, 2016; Lee & Burkam, 2003). Croninger and Lee (2001) specifically found that informal talks between teachers and students outside the classroom have a strong impact on reducing dropout in academically and socially at-risk students.

Students' attitudes toward learning are also important for decreasing the likelihood of students dropping out of school (Fall & Roberts, 2012). Research shows that the degree to which students value school is closely linked to positive educational outcomes (Wigfield & Cambria, 2010) and is a critical predictor of students' persistence in their education (Eccles & Wigfield, 2002; Wang, 2012). In contrast, student misbehaviour, truancy, and poor attendance can all result in lower graduation rates (Archambault, Janosz, Fallu, & Pagani, 2009; Finn, 1989; Rumberger & Lim, 2008). In such situations, extra-curricular activities can positively influence students' educational aspirations and overall academic potential, by increasing students' engagement and attachment to their school. For example, Fredricks and Eccles (2006) found that participation in school clubs predicted higher grades and educational expectations up to two years later.

Conclusion

This study demonstrates that when students receive high-quality teaching with a focus on high expectations, appropriately challenging content and constructive relationships between teachers and students, they do well across a number of indicators of success throughout secondary school.

Crucially, our research shows that when teachers demonstrate high expectations for all and employ effective and explicit teaching practices, their students respond through improved academic interest and intrinsic motivation, attendance, behaviour and perceptions of the value of homework and study.

More information

A report on the modelling work using the Year 7 to Year 9 cohort is available here: https://www.cese.nsw.gov.au/publications-filter/improving-high-school-engagement-classroom-practices-and-achievement.

To get updates on new TTFM-related and other CESE publications, subscribe to the CESE mailing list at: https://www.cese.nsw.gov.au/contact-us, or follow CESE on Twitter: https://twitter.com/nswcese.

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Assessing accomplished teaching with reliability and validity: The ACER Portfolio Project

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Abstract

We know that good teachers are worth their weight in gold. But if good teaching is to be truly valued, the teaching profession must be able to demonstrate that it can evaluate itself in ways that are reliable, valid and fair. This capacity is central to any profession. It is also central to lifting the status of teaching, rewarding accomplished teaching and enabling teaching to complete with other professions for our ablest graduates. Recent OECD reports emphasise the necessity of strengthening the teaching profession, which depends upon widespread use of evidence-based teaching practices.

Building the capacity for evaluation is the purpose of the ACER Portfolio Project: to develop valid and feasible methods by which teachers can demonstrate the ways in which they meet the Australian Professional Standards for Teachers at the Highly Accomplished level. This presentation reviews the work of the Portfolio Project in developing an assessment and evaluation framework for Highly Accomplished teaching, piloting the assessment tasks with teachers, training assessors, setting standards, and identifying benchmarks for highly accomplished teaching.

For more information go to: https://portfolio.acer.org/

The ACER Portfolio Project

In 2012, all Australian education ministers endorsed a set of principles and processes for the certification of teachers who met the Australian Professional Standards for Teachers (the Standards) at the Highly Accomplished and Lead Teacher levels (the Guide).[1]

The Guide sets out two central stages in the assessment process:

- *Assessment stage 1* involves the assessment of evidence submitted by the applicant against the Standards.
- *Assessment stage 2* consists of direct observation of the applicant's practice by an external assessor, and discussion with the applicant and the applicant's supervisor (and perhaps other colleagues nominated by the applicant).

The purposes of the ACER Portfolio Project[2] were relevant to Assessment stage 1, which requires applicants to submit evidence about their practice for assessment by certifying authorities. The project team developed methods designed to assist teachers in that process; in particular, a set of portfolio tasks[3], which together, would help them demonstrate how they met the Standards at the Highly Accomplished level.

Each portfolio task provided teachers with a set of guidelines for preparing an entry to be placed in their professional portfolio, each based on teaching a unit of work with one class. Each provided a structure within which teachers could show how they provided quality opportunities for students to learn. Four portfolio tasks were prepared for generalist primary teachers and four for secondary science teachers, and trialled with teachers to test their feasibility, clarity, validity and reliability, as well as the impact of preparing an entry on a teacher's professional learning.

We then investigated whether it was possible to train assessors to assess portfolio entries to high levels of consistency and whether it was possible, thereby, to identify benchmark entries and to set standards. Two groups of assessors were trained, one to assess entries from primary teachers, the other to assess entries from secondary science teachers. Assessors also evaluated the entries for their fairness, clarity and validity, and reported on the impact of the training on their professional learning.

Stages in the Portfolio Project

While the Standards describe what Highly Accomplished teachers know and do, they are not 'standards' in the strict meaning of that term. They needed to be operationalised; that is, valid and reliable methods for providing evidence needed to be developed, as well as methods for judging whether that evidence met the Standards (Ingvarson & Hattie, 2008).

Three questions had to be addressed in making the Standards operational and in developing a framework for the assessment of Highly Accomplished teaching.

1. *What is to be assessed?* In this case, the Standards defined what was to be assessed in the certification system: what Highly Accomplished teachers know and do.
2. *How will it be assessed?* The second stage in the Portfolio Project was to identify how the Standards would be assessed. Valid and reliable methods were needed by means of which teachers can demonstrate how their practice meets the Standards in their school context.
3. *How is the evidence to be judged and the standard set?* The purpose of the third stage was to investigate whether it was possible to train assessors to identify portfolio entries illustrating different levels of performance (i.e. benchmarks) in relation to the Standards, with high levels of consistency.

Methods for assessing teacher performance: The portfolio tasks

Table 1 (p. 61) provides summaries of the four portfolio tasks for primary teachers. Details of the task guidelines can be found at https://portfolio.acer.org/guidelines. Each task has clear sections with question prompts and strict page limits for each section. Tasks are accompanied by criteria indicating how each entry will be assessed.

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[1] AITSL 2012, Certification of Highly Accomplished and Lead Teachers in Australia, Education Services Australia, Carlton South, viewed April 2015, http://www.aitsl.edu.au/docs/default-source/default-document-library/certification_of_highly_accomplished_and_lead_teachers_-_principles_and_processes_-_april_2012_file.pdf.

[2] Members of the Portfolio Project team included Hilary Hollingsworth, Elizabeth Kleinhenz, Marion Meiers, Anne Semple and Lawrence Ingvarson.

[3] A portfolio is simply a container into which samples of professional performance and accomplishments are entered. A portfolio task is a set of guidelines for preparing an entry for a professional portfolio. A portfolio entry is a completed portfolio task ready to be entered into a portfolio.

Table 1 Summaries of four portfolio tasks for primary teachers

Task number	Primary teaching portfolio entries
1	English: This portfolio entry invites you to show how you have taught students to develop their capacities in writing for a range of audiences and purposes.
2	Mathematics: This portfolio entry invites you to demonstrate how you have built students' understanding of important mathematics content through class discussion.
3	Inquiry skills: This portfolio entry invites you to demonstrate how you have engaged students in collaborative investigations that have strengthened their inquiry skills and deepened their conceptual understanding, as described in the Australian Curriculum.
4	Engaging colleagues in an improvement initiative: This portfolio task invites you to initiate and manage a project in collaboration with colleagues that improves teaching practice and learning opportunities for a targeted group of students in your school.

The portfolio tasks are designed as authentic performance assessment tasks. They are tasks that match the normal duties of teachers, no matter the context in which they are teaching.

Each portfolio task aims to give teachers a structure, and prompt questions that would enable them to provide clear and convincing evidence of their ability to teach at the Highly Accomplished level. Each task provides a scaffold for documenting a coherent case of their teaching. It is hoped that teachers would regard the tasks as consistent with their normal teaching responsibilities: not as additional work, or irrelevant hurdles to jump over for assessment purposes.

Each portfolio task provides teachers with a clear idea of what they are asked to demonstrate and how it will be assessed. The structure of each task reflects the basic architecture of good teaching; from knowing where students are at in their learning, setting worthwhile goals based on this knowledge, implementing learning activities clearly linked to the goals, assessing student learning in light of the goals, providing timely and useful feedback, and reporting student learning and moving on to set new worthwhile learning goals. Accomplished teaching has this basic underlying structure, and demonstrates strong links between its components and coherence in the overall performance.

The Portfolio Project assessment framework

The purpose of an assessment framework is to ensure that the portfolio entries, as a group, provide a representative sample of evidence about a teacher's practice in relation to the Standards. The number of tasks is determined by the need to ensure that a sufficient number of independent pieces of evidence are gathered to provide a reliable basis for generalising about a teacher's performance in relation to the Standards. It is impossible for one task to do this.

Table 2 (p. 62) shows the Portfolio Project assessment framework for Highly Accomplished primary teaching. It shows that, together, the four entries provide a sample of evidence relevant to *all of the Standards*. However, if the framework is to provide a valid basis for making decisions about a teachers' performance, it is necessary not only to cover the Standards, but also to ensure that, together, the portfolio entries provide:

- evidence *covering the main components of the curriculum* that a teacher is responsible for teaching (to ensure this, a primary teacher's entries provide evidence of teaching in several subject areas, not just one)
- evidence *covering several core teaching skills* reflective of accomplished teaching (to ensure this, each entry provides evidence of a different pedagogical skill).

Table 2 illustrates how these requirements were met. The dark purple shows where the main emphases rests for each entry in terms of the Standards. Entry 1 is designed to provide evidence particularly relevant to Standards 3 (Plan for and implement effective teaching and learning) and 5 (Feedback and assessment skills), based as it is on samples of students' writing over time. It also provides some evidence in relation to Standards 1, 2, but not Standards 4, 6, or 7.

Table 2 Assessment framework for Highly Accomplished primary teaching

APST Standards		Portfolio entries			
	Curriculum focus	Entry 1 English: Writing	Entry 2 Mathematics	Entry 3 Inquiry skills	Entry 4 Teacher leadership
	Teaching skill	Monitoring and feedback	Glass discussion	Collaborative group work	
	Main sources of evidence	Student work samples	Video-based	Video-based	Documented accomplishments
1. Know students and how they learn					
2. Know the content and how to teach it					
3. Plan for and implement effective teaching and learning		■	■	■	
4. Create and maintain supportive and safe learning environments			■	■	
5. Assess, provide feedback and report on student learning		■			
6. Engage in Professional Learning					■
7. Engage professionally with colleagues, parents/carers and the community					■

Entries 2 and 3 are based on video recordings and are designed to provide evidence in relation to Standard 4 (the Classroom Learning Environment) as well as Standard 3. With Entry 2, the focus shifts to mathematics and the quality of discourse that a teacher can create to promote mathematical understanding, also providing evidence in relation to Standard 3.

With Entry 3, the focus shifts to inquiry skills, as emphasised in the Australian Curriculum, and the teacher's capacity to promote student investigations through collaborative group work to develop those skills. Importantly, teachers are asked not only to provide evidence, but to indicate also how that evidence shows they are meeting the Standards.

Entries 1 to 3 thereby ensure that a teacher's portfolio includes evidence of planning and teaching units of work in several subjects, not just one. Similarly, Entries 1 to 3 also ensure that a teacher's portfolio includes evidence of the ability to implement several core teaching skills, not just one. These requirements increase the number of independent sources of evidence and thereby promote greater reliability in making judgements about a teacher's performance.

Entry 4 directly addresses Standards 6 and 7 in the APST, and the emphasis through all the Standards that Highly Accomplished teachers are active contributors to their schools as professional learning communities. Entry 4 requires a teacher to initiate and document a small project that engaged colleagues in improving the quality of learning opportunities for a designated group of students. It also provides evidence in relation to Standards 1 to 5.

The field test

The portfolio tasks were subjected to a careful review of their clarity, validity, and fairness by external panels of teachers in each field. After revision, and a second review by the external panels, a general invitation was sent out mid-2015 to teachers in each field to undertake one portfolio task. Twenty-one teachers completed a portfolio entry and submitted it electronically by the end of 2015. Trial teachers were also provided with an

evaluation guide[4] for each portfolio entry, indicating the evidence that assessors would be looking for and how they would make their overall judgment using a four point scale.

Trial teachers rated the clarity, validity and fairness of the portfolio tasks highly. They also reported that preparing their entry was a valuable professional learning experience that improved their teaching.

Setting standards for portfolio entries

Training assessors

The second stage of the Portfolio Project investigated whether it was possible to train assessors to score the portfolio entries consistently and identify benchmark entries; that is, entries rated consistently by assessors as illustrating different levels of performance on score scale.

Invitations were distributed widely to teachers interested in being trained as assessors, generating considerable interest. Sixteen primary teachers from different states and school systems participated in the training over three days to assess the primary portfolio entries and 12 science teachers from different states and school systems participated in similar training for the secondary science portfolio entries.

Training of assessors took place at ACER late in 2015. The first aim was to ensure that assessors had a clear understanding of the four portfolio tasks – what each task was measuring and what evidence to look for, as described in the relevant evaluation guide. The second was to minimise bias and to ensure that assessors carefully documented the evidence they saw and made their judgments independently using an Assessment Record Form (ARF). The ARFs ensured that the assessment process was transparent and reproducible, providing records of how assessors arrived at their judgments, and thereby also legally defensible.

Assessors were trained to use a four-level scale for judging portfolio entries, where a score of 3 meant assessors agreed the entry provided clear evidence of meeting the key criterion for that entry. A score of 2 meant there was evidence, but it was insufficient and a score of 1 meant there was little or no evidence. A score of 4 meant the evidence more than met the certification level and was uniformly convincing, coherent and consistent.

As they read each entry, assessors were trained to follow a 'scoring pathway' consisting of two stages: an 'analytic stage' that required them to first record the evidence they saw relevant to the criteria for each

section in their ARF and where they saw it, before making judgments for each section, followed by a 'holistic stage' in which they 'stepped back' and reviewed the entry as a whole and judged the extent to which there was clear, consistent and convincing evidence across the entry that the key criterion for that entry had been met. The key criteria summarised what assessors were to look for in the entry.

The key criterion for Entry 1, for example, asks the assessor to judge whether:

> The entry provides clear evidence that the teacher has engaged students in writing for a range of purposes and audiences, catering for the diverse learning needs of students in planning classroom activities, and enabled all students to make progress in their knowledge and understanding of writing.

In making their overall judgement, assessors were trained to focus on the coherence and consistency across the stages documented in an entry. For example, they were asked to look for clear links between:

- evidence about the students and the selected learning goals
- the learning goals and the learning activities, materials and resources
- the learning goals and the methods of monitoring and assessing student learning
- the teacher's analysis of and reflection on their teaching and the evidence of their students' learning.

As a final step before making their final judgement, and to minimise bias, assessors were also required to consider questions such as:

> Does the entry still meet the certification level, even if the approach used by the teacher is not the one you would have chosen to use yourself?

Identifying benchmark portfolio entries

Following training, assessors began judging portfolio entries independently and submitting their assessment record forms. Figure 1 (p. 64) shows, for example, that 11 out of 14 assessors gave Writing Entry P1004, an entry on writing from a primary teacher, a score of 3, which meant that most assessors thought the teacher's performance was at the certification level.
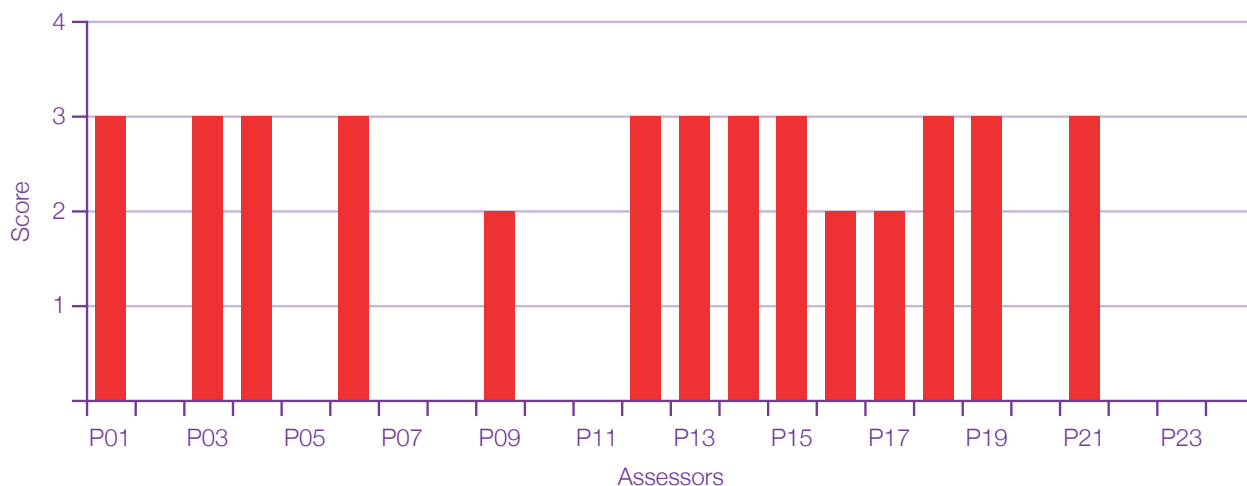
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4   https://portfolio.acer.org/guidelines
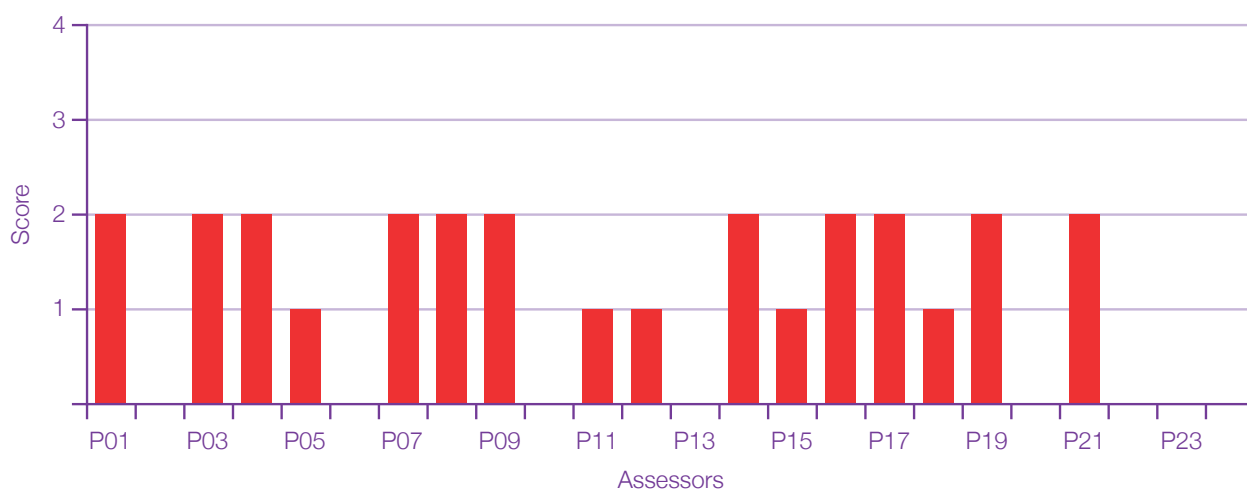
Figure 1: Writing Entry P1004

Figure 2: Writing Entry P1033

Figure 2 shows that 11 out of 16 assessors gave Writing Entry P1033, another teacher's writing entry, a score of 2.

A 'benchmark' is an example of what the Standards looks like in practice. An important aim of the Portfolio Project was to investigate whether it was possible to identify benchmark entries. A portfolio entry could be labelled as a 'benchmark portfolio entry' if there was a high level of agreement among assessors about the level of performance it represented.

The level of agreement about scores for Writing Entry P1004 means that most assessors judged it to be a clear example of a performance that met the certification level. It almost warranted being labelled a benchmark 3; an example of entry with a score of 3. All assessors agreed that Writing Entry P1033 did not quite meet the certification level of performance. Eleven out of 16 gave it a score of 2, meaning that it provided limited evidence of a performance at the certification level. However, the level of agreement is not high enough to warrant using the entry as a benchmark.

Assessors went on to assess entries that primary teachers had submitted in the other three categories, mathematics discourse, inquiry skills, and engagement with colleagues, with similarly high levels of agreement.

Indications were, therefore, that that portfolio entries could be assessed reliably. However, trials with much greater numbers of portfolio entries and assessors would be needed to substantiate claims in this direction. The training also indicated that benchmark entries representing performance at different score levels could be identified, though higher levels of agreement would be desirable (which may point also to the need to refine or clarify some aspects of the portfolio task guidelines themselves).

Further trials providing more entries will be needed to build a larger 'stock' of benchmark entries representing each score level. This will be essential for later and more thorough training of other assessors. Trainers use benchmark entries to sharpen assessors' abilities to discriminate between portfolio entries that represent

different levels of performance. They also use them to show assessors that, although different in approach, portfolio entries may nevertheless represent the same level of performance in relation to the Standards.

Assessor's views of the portfolio tasks and the assessment process

Following the training, assessors were asked to complete a survey similar to that completed by the field test teachers. Assessors also rated the validity and fairness of the tasks highly, but indicated the need for more work on the clarity of the guidelines. Assessors felt increasingly confident about the consistency of their assessments and found the assessment process a valuable professional learning experience.

Conclusion

The Portfolio Project aimed to provide teachers applying for certification with practical and valid means by which they could show how they met the Standards. The structured nature of the portfolio tasks, with clear guideline prompts and word limits, meant that teachers found them feasible and that assessors were abler to assess portfolio entries consistently.

Each portfolio task provided teachers with a clear idea of what they were being asked to demonstrate and how it would be assessed. This is a fundamental requirement for assessment of performance in any field, especially in the professions. Trial teachers clearly appreciated this structure.

In contrast with the AITSL Guide that asks a teacher to 'evidence' the Standards by collecting or gathering existing evidence, the portfolio tasks invite a teacher to create or produce coherent examples of their teaching performance, by initiating and documenting, analysing and reflecting on units of work that they have taught to particular classes. This meant that that the process of preparing an entry was also a vehicle for promoting professional learning, with spin-off benefits for their schools, especially if groups of teachers were preparing entries for certification together,

There is clearly more work to be done before the assessment framework and portfolio tasks can claim to provide a valid approach to differentiating teachers who have attained the Standards of performance at the Highly Accomplished level from those who as yet have not. The same applies to methods be used currently by

certifying authorities in each state and territory, and in each sector.

However, an important outcome of the Portfolio Project so far is that it does provide teachers with tasks that they can undertake with some confidence in their validity and, when completed, submit as part of their evidence in applying for certification. Our hope is that, if our assessments prove to be sound, responsible authorities might also encourage teachers to use them as evidence for certification purposes. We also believe the Portfolio Project points the way to a more economically affordable, administratively feasible and legally defensible certification system, major long-term considerations if a certification system is to 'go to scale'.

Australia's current ambitions to establish a respected and nationally consistent certification system for Highly Accomplished and Lead Teachers will live or die depending on the trust the profession, the public and employing authorities are willing to place in the validity, reliability and fairness of the assessment methods that underpin certification decisions (Ingvarson, 2013). Without such a guarantee, the original objective that a nationally consistent certification system would lift the status of teaching, provide stronger incentives for professional learning, reward accomplished teaching more appropriately, and thereby enable teaching to compete more effectively with other professions for our ablest graduates, will not be realised (Ingvarson, 2014).

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Graduate Teacher Performance Assessment: An intervention project at the intersection of standards, professional knowledge and assessment

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Abstract

The benchmarking of education systems has been accompanied by an increasing policy interest in the evidence base for initial teacher education and the related claims about graduate quality. In some countries, this has also fuelled the move to install standards that seek to specify competence on entry to teaching and at stages of career progression. In Australia, referents for these efforts include the *Australian professional standards for teachers: Graduate teachers* (AITSL, 2011), and National Program Standards (AITSL, 2015). It was in the context of policy-driven reform in Australian initial teacher education (ITE) that a consortium of 13 ITE providers from states and territories came together to trial the Graduate Teacher Performance Assessment (GTPA). Underpinning the work from the start was the recognition of the need for collective action and collaborative professionalism in authentic cultural change. In this paper I will present some insights into the lived experience of the GTPA, identifying both conceptual and practical aspects and some lessons learned.

Introduction

In Australia, efforts at system reform and change in initial teacher education (ITE) are attempting to infuse standards into practice within the broader goal of building an evidentiary basis for showing both graduate competence and the quality of ITE programs. This includes the policy initiative to move towards teacher performance assessments. The aim of the following discussion is to present some foundational understandings of the Graduate Teacher Performance Assessment (GTPA)[1], and to open discussion of how collaborative professionalism[2] can support cultural change in ITE.

The turn to professional standards

The increasing use of criteria-based approaches to assessment and the parallel rise of interest in professional standards in teacher education are consequences of decades of research in educational assessment and evaluation, and what Sadler (2005) refers to as the sound theoretical rationale and educational effectiveness of these approaches. However, the arrival of professional standards and the aligned focus on instrument validation, judgement consistency and moderation have not been uniformly greeted as positive in teacher education. This reflects the competing views of the function of assessment standards and how they serve to support (or limit) the agency of those involved in ITE.

In 2011, the Australian Institute for Teaching and School Leadership (AITSL) promulgated the Australian Professional Standards for Teachers (APSTs) (AITSL, 2011) to provide a basis for quality improvement and competence within the profession. With national and state commitment to standards as necessary quality indicators of teacher education, the latest shift was to introduce national program standards (AITSL, 2015) to be applied in all higher education institutions (HEIs). The imperative of implementing professional standards and program standards has given rise to intensifying calls for reforming ITE. These calls fuelled the latest review of the TEMAG report (2014) and a key recommendation to introduce teacher performance assessments to provide evidence of graduate teacher competence.

While standards and assessment are featured in several ITE reports internationally, expectations of the nature and function of standards appear to vary, even considerably (e.g. Wyatt-Smith & Looney, 2016). A

fundamental conclusion of the TEMAG report is the requirement for a move to *standards as inputs* and evidence to show *standards achieved.* This involves the introduction of teacher performance assessments (TPAs) as culminating assessments intended to produce summative evidence of professional competence.

Building an evidence base in initial teacher education

The concept of the GTPA was framed within the notion of assessment as a post-modern project (Broadfoot, 2009). In this enterprise, a priority was to validate the instrument. This included applying recognised standard-setting methodologies; generating evidence showing how these methodologies had been applied; undertaking moderation to show the reliability and degree of judgement consistency; setting the standard at the threshold or cut-score, and finally, producing exemplars as referents for the standard. This approach heralded the carrying forward of the traditional assessment canons of validity and reliability, along with the trilogy of standards, evidence and moderation. A related goal is to ensure the connectedness of the GTPA back to the APSTs, a necessary condition for it to function as a summative culminating assessment of pre-service teacher competence. In undertaking this work, the extant literature on existing TPAs was examined, along with a wide range of research in teacher education, and more generally, on teaching, learning and assessment. This was foundational to establishing the underlying conceptions of teaching and assessment design to be taken up in the project.

Collaborative professionalism

One aim was to open the way for new identities for pre-service teachers and new relationships with teacher educators, supervising teachers (sometimes known as mentors or school-based teacher educators), and policy personnel through a model of dynamically networked relationships. A second aim was to address underpinning conceptions of teaching and the design issues in the architecture of the instrument. Operationally, consideration was given to how to make the four dimensions of the assessment – purpose, context, mode and organisation – fit-for-purpose. The focus was on teacher knowledge and decision-making and the appraisal of the impact of teaching on learning. We considered collaboration outside of traditional compartments of ITE (school/universities), engaging with Teacher Education Regulatory Authorities,

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[1] The GTPA was developed by the Learning Sciences Institute Australia, ACU, beginning 2015, and implemented in a large-scale trial with a consortium of 13 universities and other stakeholders. We wish to acknowledge the partnership with the regulatory authority, the Queensland College of Teachers, the funding support of AITSL and ACU, and the commitment of teacher educators. The GTPA has received endorsement from AITSL for implementation in Australian Higher Education Institutions in 2018.

[2] Collaborative professionalism involves actors in teacher education from universities, schools and employing authorities working together on problem-solving and inquiry into practice.

education sectors and related employment authorities. We also considered the desired dispositions of early career teachers that put student learning at the centre, along with developing evaluative abilities to appraise the impact of practice on student learning. This framing suited the perspective that we were bringing to the question: Who is responsible for ITE? Our collective answer was that, in order to improve ITE, responsibility was to be vested with teacher educators and shared in new types of relationships with schools. This approach supported the goal for multiple research, policy and practice perspectives to come together for the rigorous and systematic work of validating the GTPA, applying recognised methodologies for standard setting and moderation.

Throughout, we recognised the opportunities for collaboration and for prioritising agency in and with the profession as a means to counter-balance any press for standardisation in ITE. We also recognised what Broadfoot (2009, p. viii) referred to as the 'combination of bureaucratic administration, widespread social penetration and global dispersal which the 20th century development of examination and assessment of all kinds produced, and further, how these had produced a megalith so deeply rooted in public consciousness and so powerful in its influence that alternatives are almost literally inconceivable'. The opportunity was there for organically growing a new type of agency in ITE through a shared focus on the GTPA. However, for this to be realised, there was a clear need to capture the knowledge, skills and capabilities in the APSTs and to build these into the GTPA in ways recognisable to the teaching profession and Australian Regulatory Authorities responsible for ITE program accreditation and teacher registration.

We also recognised from the start that the fields of educational assessment and measurement, and the field of teacher education had tended to remain compartmentalised from one another. The project provided a context for authentic collaboration across disciplines and more specifically, at a substantial scale across institutions that had not come together previously for a common enterprise and shared dialogue. Systematic processes for standard setting, validation and moderation provided the reason and the contexts for collaborative professionalism, referred to earlier. The collaborations spanned geographic borders, university programs from early years to senior schooling, and state and federal government policy and curriculum contexts.

The next section of this paper gives a brief overview of two considerations that needed to be addressed in developing and implementing the GTPA, first is the expectation of authenticity as a design feature of the instrument, and second, the requirement that the GTPA provide opportunities for pre-service teachers to demonstrate competence in planning, teaching, assessing, reflecting and appraising, including the use of evidence to inform practice.

Designing an Australian teacher performance assessment

Part 1: Authenticity as a design feature

In the Australian context, a TPA is expected to *show* classroom practice. It also must be *authentic*, and provide a culminating assessment of competence or profession readiness. An authentic assessment has been described as one that can assist pre-service teachers to link 'generalizations about practice to apparently idiosyncratic, contextualized instances of learning' and 'include opportunities for developing and examining teachers' thinking and actions in situations that are experience based and problem oriented' (Darling-Hammond & Snyder, 2000, p. 524). The authenticity of the assessment is inherent in its ability to capture pedagogic decision-making in real time. This is connected to its claim to be ecologically valid and 'representative of the way knowledge and skills are used in real-world contexts' (Stobart & Gipps, 2010, p. 204). Authenticity is recognised through the specific knowledge and ways of working within a knowledge domain or discipline, beginning with initial planning decisions based on collected data and evidence of student learning to teaching decisions taken in situ. This calls for discernment in deciding to continue with, adapt or alter a teaching plan by revising, differentiating, or accelerating learning in whole-class settings and for individual students, according to students' specific learning needs and dependent on the continuous flow of information over the course of a lesson. Darling-Hammond and Snyder (2000, p. 527) outlined four aspects of authentic assessments of teaching:

1. Assessments sample the actual knowledge, skills, and dispositions desired of teachers as they are used in teaching and learning contexts, rather than relying on more remote proxies.

2. Assessments require the integration of multiple kinds of knowledge and skill as they are used in practice.

3. Multiple sources of evidence are collected over time and in diverse contexts.

4. Assessment evidence is evaluated by individuals with relevant expertise against criteria that matter for performance in the field.

Part 2: A focus on evidence and 'showing' practice

The GTPA has been designed to provide opportunities for pre-service teachers to demonstrate how they are active professionals and how their judgements support learning and learners. This extends to how actual teaching practices and instructional decision-

making are informed by actual evidence of learning. For this reason, the GTPA is concerned with the demonstration of competence and the in-the-head decision-making that informs the actions and talk in the classroom. A pre-service teacher's use of evidence to establish a student's current level of performance, the desired level of performance, and strategies to close the gap is part of this decision-making. This stance is consistent with the value of selecting and incorporating evidence from a range of possible sources, and using this to plan, review, modify and improve teaching and learning that has been identified as an important skill for contemporary teachers (Hamilton et al., 2009; Little, Gearhart, Curry, & Kafka, 2003; Matters, 2006).

There is a growing body of research and policy material (Wyatt-Smith, Alexander, Fishburn, & McMahon, 2017) that suggests that assessment is not always explicitly or systematically taught in teacher education academic programs. The GTPA can be viewed as a response to the observation in the TEMAG report that assessment capabilities should be a strengthened focus in ITE, as mentioned earlier. The assessment field has known for some time the importance of developing teachers who are data savvy, are able to use evidence in instructional decision-making, and provide effective feedback. Cowie and Cooper (2016, p. 159) have described it as 'the growing imperative for teachers (student teachers, mentor teachers and initial teacher educators) to be assessment and data literate'.

Mandinach and Gummer (2016) have proposed a conceptual framework identifying a vast array of knowledge, skills and dispositions that teachers require for data literacy. This focus on dispositions is not new. Several decades earlier, Sadler (1987) identified the assessment dispositions that teachers need to guide their practice, including their willingness to develop students' evaluative expertise over the course of their schooling. This will not occur routinely. Instead, Sadler makes clear that it requires that explicit provision be made in the course of instruction to build students' own assessment knowledge, including knowledge about the desired features of quality performance, and opportunities for students to develop abilities to self-monitor quality on completion of a piece of work and during its production. Further, for the teacher, instructional decisions can be made based on an interpretation of previously collected evidence of learning as well as in-the-moment or incidental (unplanned) evidence collection. The latter can include observations as well as decisions taken in the course of classroom

talk and interactions in whole class, small groups and in working with individuals. The GTPA has been designed to provide evidence that pre-service teachers are discerning in how they plan; the choices they make in collecting evidence; how they infer meaning from the evidence, drawing on theory and research, and how they take action in their practice to progress learning. A main challenge for GTPA design was capturing decision-making in progress. Korthagen and Vasalos (2005, p. 68) describe this process as activating reflection during teaching 'to make contact with the core qualities which are of importance at that particular moment'. Reflective practice involves pre-service teachers critically analysing, justifying and defending their pedagogic decision-making in context. The focus here is on the 'why' of teaching – why is one strategy/practice better to use than another for this child or group of children? When asking 'why', pre-service teachers are required to not only articulate their practice but also justify their pedagogic decisions through connecting research, theory and practice. This perspective on reflective practice offers 'a lens that can usefully link the background experiences and beliefs of a teacher to his understandings of his own practice' (Edwards & Edwards, 2017, p. 191).

Conclusion

In conclusion we offer four main ideas. First, we join with Donaldson (2010) in asserting that 'quality teacher education has to have a strong evidence base' (p. 56), while we also recognise how measures of effectiveness are difficult to identify and disentangle from other factors. Second, we highlight the fundamental significance of how professional standards for teaching are conceptualised and how they are expected to function. Third, we see merit in connecting *standards as decontextualised expectations* of practice and *standards as evidence*, the aim being to prepare teachers to be active professionals who bring an inquiry approach to their practice and a willingness to 'see' its impact on learning. Finally, the model of teacher preparation that divided the academic program from the school-based program, usually known as 'prac', is no longer relevant. We have the opportunity for collaborative professionalism across teacher educators in schools and universities, with employing agencies and with accreditation agencies. Nothing less than this is needed if we are to rebuild the status of the profession and maintain public confidence in teacher preparation.

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Enhancing teaching and learning through design practice

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Abstract

Design is part of a teacher's practice on a daily basis. Teachers are constantly designing and redesigning learning experiences for their students. However, the notions of the teacher as designer or 'teacher design practice' are rarely used as frameworks within teacher education or continuing professional learning. In fact, 'teacher design thinking', that is, how school teachers think about and engage in design practice has been an under-researched area. Design thinking has the potential to provide teachers with a scaffold to reflect upon contextual and evidence-based factors when designing learning experiences for their students. However, we need to know how teachers engage in design and how their practice might be better supported. This paper will provide an overview of design thinking, and how it fits within teachers' work. Results of a recent Australian study, which investigated early career and experienced teachers' design practices will be detailed with a view to considering a model of teacher design thinking that may be integrated into teacher education and development to ultimately make a difference for student learning.

Introduction

Design is part of a teacher's practice on a daily basis. Teachers are constantly designing and redesigning learning experiences for their students. However, the notions of the teacher as designer or teacher design practice are rarely used as frameworks within teacher education or in continuing professional learning. In fact, teacher design thinking, that is, how teachers think about and engage in design practice has been an under-researched area. Design thinking has the potential to provide teachers with a problem–solution scaffold to reflect upon contextual and evidence-based factors when designing learning experiences for their students. However, we need to know how teachers engage in design and how their practice might be better supported.

Investigating teacher design practice

In order to better support teachers' design practice, we first need know how teachers currently engage in design. The challenge here is in the predominately cognitive nature of this aspect of a teacher's work. We have conducted 48 in-depth case studies with experienced (teaching for 10 or more years) and early career (five years since completion of teacher education degree) Year 5 and 6 primary school teachers. We were particularly interested in how primary school teachers design because they are responsible for the majority of a student's learning experiences across disciplinary boundaries.

Our study was qualitative in approach and involved four phases (Figure 1). We invited teachers to participate in a study in one of two research environments. In Phase 1, participants engaged in a design task in the simulated setting of a university laboratory setting (n = 21). In Phase 2, teachers participated in the naturalistic setting of their school context (n = 11). In both settings, the design task focused on creating a unit of work for the Australian Curriculum. The goal here was to use this task as a mechanism to explore teachers' cognitive processes as they engaged in the pedagogical design of a coherent set of lessons that should have made connections across the curriculum and cumulatively built students' knowledge and skills. We interviewed teachers about their usual design practice, administered a video-recorded, think-aloud protocol while participants designed the unit of work, asked them to reflect on their design and collected their design artefacts. For Phase 2 teachers, we also examined their design practices while they taught the unit to their students through records in a teaching diary and follow-up interview. In Phase 3, we analysed the collected data to understand how the teachers designed, with a particular focus on comparing how early career and experienced teachers approached design. We used these preliminary findings to develop

a teacher design thinking model, which we tested in Phase 4 with early career teachers (n = 16).

While acknowledging that design thinking is an individual cognitive act, design work is undertaken in context. Teachers work is influenced by social norms, government policy, school strategy, rules, resources, and interactions with fellow teachers (Hargreaves & Fullan, 2000). To engage with both the psychological and sociological influences of teacher design work, we used an activity theory (AT) framework (Engeström, 2001) to guide the questions we asked of participants and the analysis of data. Thus, in the study, we conceptualised the teacher (subject) designing a teaching program (object/ive) within a system comprised of rules, community, division of labour and tools. This allowed us to elicit the individual and contextual influences on design thinking and practice through both deductive and inductive approaches.
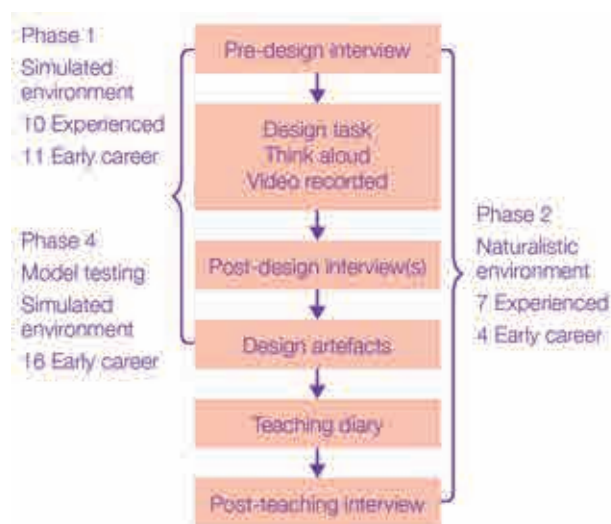

Figure 1 Four-phase research approach

How teachers design

We found some consistencies in the ways all our teacher participants designed and their design considerations. Most teachers explained that their usual approach to design involved others in their school (AT: division of labour) with many describing a cooperative approach to design. When we observed them in their design task, most teachers took an iterative approach to their design work moving between thinking about high level aspects of the overall unit of work to specific design elements of lesson activities or teaching resources. Most teachers initiated their design work by identifying the syllabus outcomes to be addressed by the unit. Most took inspiration from others referring to sample units of work, with experienced teachers often

taking a case-based reason approach (AT: psychological tools) by referring to their past experiences. Our teacher participants used a range of resources to support their design work (AT: physical tools) such as paper and pencil brainstorming, online searching for sample units and teaching resources, and templates for recording their unit of work, sometimes these were school-mandated (AT: rules).

We also identified clear differences between the way experienced teachers and early career teachers engaged in design and thinking about their designs. While both initiated their design work by defining the syllabus outcomes they needed to address, early career teachers tended to refer more closely to the syllabus documents and document their chosen outcomes verbatim at the outset of the design process. While both early career and experienced teachers started with syllabus outcomes, experienced teachers tended to spend time considering issues for the whole unit while early career teachers often moved directly to begin defining specific lessons. Experienced teachers' consideration of the design problem was wider ranging than early career teachers. It often included a more explicit attention to student needs and interests but often also considered the teacher's own professional interest and learning opportunities (AT: objectives). Unlike experienced teachers, early career teachers tended not to refine the scope of their unit of work as their design progressed. As such, they often maintained the initial set of syllabus outcomes to be addressed. Experienced teachers' solutions (units of work) often reflected their considerations for differentiation for the range of learners in their class and also often included specific opportunities for diagnostic, formative and summative assessment.

Our findings were consistent with research on design thinking within traditional design disciplines such as engineering, graphic and industrial design. Razzouk and Shute's (2012) review provides a helpful understanding of characteristics, processes, and differences between novice and expert design thinkers. They identified the iterative nature of the design process across design disciplines; experts' tendency to draw upon their past problem–solution experiences; expert (breadth) versus novice (depth) approaches to design. This literature base and our empirical evidence provided us with a platform to develop a model aimed to specifically support teacher design thinking.

An evidence-based model to support teacher design thinking

There is no one model of design thinking that can be directly adopted from other design disciplines to fit teacher practice. In fact, within design disciplines there is not one standard model. Models, or tools, that are used to promote design thinking variably include stages of identifying a problem to be addressed, researching the audience and context in which the problem exists and ways the problem has been addressed in the past, proposing, testing, refining and evaluating solutions to the problem. Drawing from the many models available, the literature from other design disciplines and our analysis of data from the first two phases of our study, we defined an evidence-based model to support teacher design thinking. Importantly, our model needed to account for how teaching differs from other design professions and disciplines in two key ways. First, teachers have a very different relationship with the 'audience' who is involved in the problem. While an engineer or industrial designer experience a more removed relationship with a client, a teacher experiences a high level of interaction with their students and has access to wide-ranging information about those students. Also, other designers may be involved in developing and testing their proposed solutions, teachers go further with responsibility to enact the solutions and thus bring their own individual and professional knowledge and needs to the implementation of a solution.
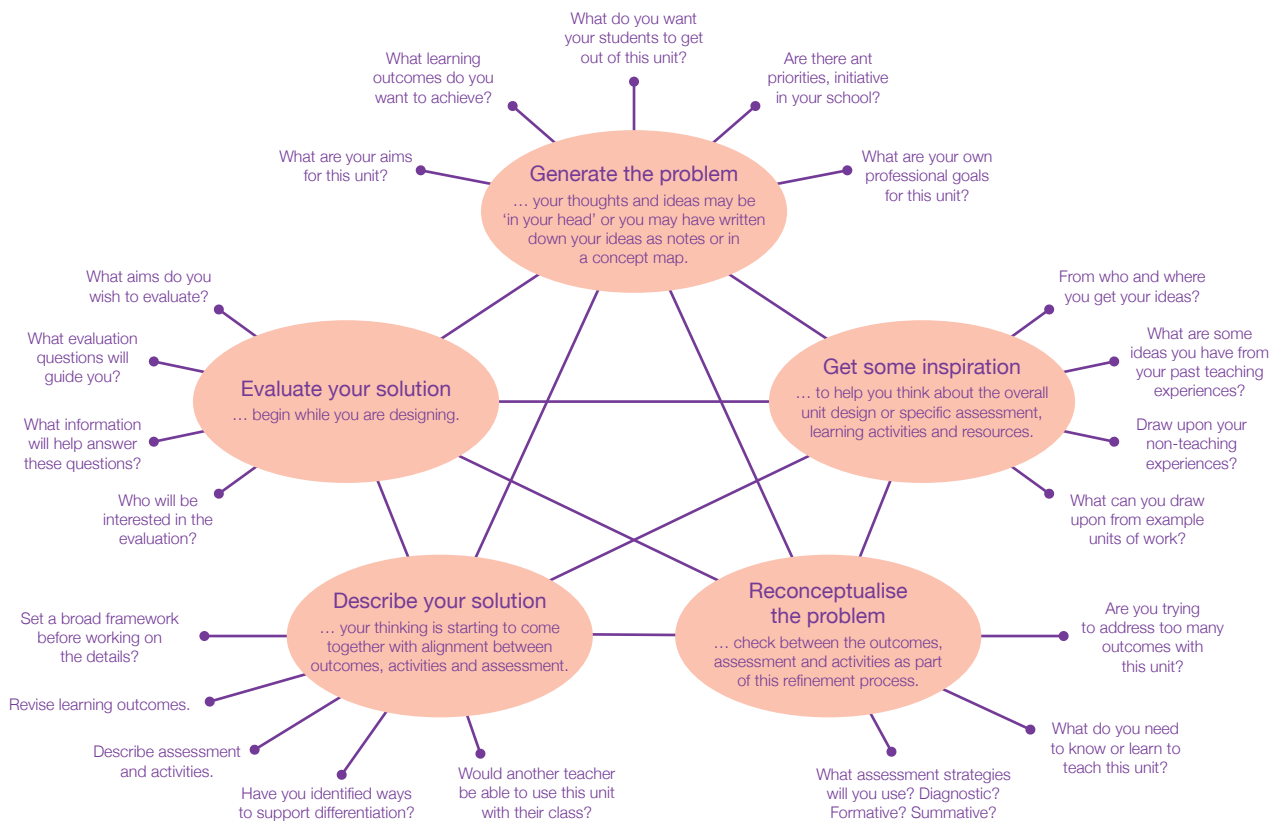
Figure 2 Initial teacher design thinking model

Our initial model (Figure 2) defined five interconnected action-oriented stages focused on problems and solutions:

1. Generate the problem.
2. Get some inspiration.
3. Reconceptualise the problem.
4. Describe the solution.
5. Evaluate the solution.

The model aims to:

- highlight the iterative process of design
- emphasise both defining and refining the design problem
- stress the importance of an evidence-based and evaluative approach to design.

Each stage in the model provides guidance on how to approach design and takes a key question approach with an aim to help stimulate design considerations.

How teachers engage with design thinking support

The design thinking model developed in our study aims to provide early career teachers with both prompts for what to consider when designing learning experiences for their students and prompts for how they might approach the design process and what tools might support them in that process. The final phase of the research project (phase 4) focused on investigating how participants engaged with the model. In this phase, our 16 early career teacher participants were introduced to, but not trained or required, to use the model when undertaking the design task. We presented a visualisation of the model in paper-based form displaying the interconnected stages as well as further detail for each stage. We explained that the model had evolved from our prior work with teachers. We advised participants that the model was available to them through their design task but not necessary for them to use. Subsequently, we observed if and how they interacted with the model when designing and then asked them to provide feedback on the model after they completed their design task.

All early career teacher participants engaged within the model in some way during their design tasks. The participants indicated that they did struggle with

problem-solution terminology within the model as this was not how they conceptualised developing a unit of work. Many indicated that they wished they had access to such a model during their teacher education program. They noted its value in 'prompting' their thinking. A number of participants mentioned some specific questions that stimulated their thinking. They indicated that it helped them take a 'step back' from the detail that they were working on and consider the whole unit and whether they had 'missed anything' in their design.

Conclusion

While design work is a key part of teaching, we often do not conceptualise the design thinking activities teachers engage in when they develop learning experiences for their students. There are both similarities and differences in the contexts, approaches and considerations teachers engage in to that of other design disciplines. Our research has highlighted that a design-thinking approach may be helpful way to support early career (and pre-service) teachers to develop their design practices in a problem–solution frame but this needs further evidence-based refinement to account for the specialised nature of teaching.

Acknowledgements

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Equipping teachers with tools to assess and teach general capabilities

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Dr Claire Scoular is a research fellow at ACER, and the Assessment Research Centre at The University of Melbourne. Her expertise is embedded in the application of psychological measurement and establishment of good assessment practices. Claire is interested in the assessment of 21st-century skills, and she provides technical expertise on a number of research projects in developing both online and offline assessments of social and cognitive skills. In addition, she has held an advisory role on 21st-century skills policy through consultancies with organisations such as World Bank, the Brookings Institution, and several ministries of education. At the University of Melbourne, Claire's PhD identified a measurement methodology, including scoring protocols and task templates, for assessing collaboration in online automated environments. She is passionate about the improvement of assessment practices in education, and is contributing to the Centre for Global Education Monitoring at ACER to develop tools and methodologies to enable countries to report and monitor learning progress in alignment with the United Nation's Sustainable Development Goal for Education. Much of Claire's work focuses on system strengthening in developing countries primarily through capacity building in test development, data analysis and assessment practices.

Abstract

There is wide recognition that students need to be equipped with appropriate social and cognitive skills demanded by society and the workforce. The unresolved question is how to do this. Many education systems globally are addressing this demand by including skills such as critical thinking, problem-solving, collaboration, and creativity into curriculum documents or supplementary materials. However, there is little research to guide educators in teaching such skills at school level. The need to develop practical solutions for assessing and teaching social and cognitive skills, broadly classified under the umbrella '21st-century skills' or 'general capabilities', is ever increasing. An integrated approach to teaching and assessing the skills across domain areas is necessary for sustainability. Traditional methods of assessment are not sufficient to capture the complexity of how general capabilities are applied in real-world settings, and innovative methods need to be sought and validated. Teachers require professional development, resources and tools to be effective.

This presentation outlines a study undertaken by the Centre for Assessment Reform and Innovation (CARI) at ACER to develop an assessment framework and a set of proof-of-concept tasks for measuring and monitoring the skills in the classroom. Through a combination of curriculum-focused assessment tools, learning progressions, and professional development, the agenda is to equip teachers to integrate teaching and assessing of general capabilities into their classroom. The assessment tools involve complex problem-solving tasks in which students need to demonstrate collaboration, critical thinking, creativity, information literacy, and communication skills. Learning progressions have been proposed for each of the skills to support identification of levels of proficiency and monitoring of student growth. This paper presents the work of the project so far and outlines plans for validation of the assessment framework, tools and learning progressions.

Introduction

Gonski et al. (2018) have called for Australian education to increase its focus on teaching general capabilities. Over the past five or so years, the focus around general capabilities has substantially shifted from the question of why we should be assessing and teaching the skills to how we can do so. Many schools or systems are adopting an agenda for integrating, teaching and assessing general capabilities but get into difficulty when it comes to identifying supporting resources. With different perspectives and little concrete evidence, educators are understandably uncertain about which perspective to adopt. Unfortunately, we are in a holding pattern. Schools may not be in a position to take a risk in adopting one approach over another without evidence of its effectiveness and researchers can't provide evidence of effective approaches until they can collect sufficient data from which to test.

Many teachers recognise the value of teaching general capabilities and are open and enthusiastic, but have found that they have not been adequately prepared to teach these skills and consequently lack confidence in implementing lessons or strategies that focus on them (Scoular & Care, 2017). From jurisdiction to jurisdiction, there are wide variations in terminology, approach and aspiration, and evidence of what is working is sparse. There is a lack of viable and robust assessment tools especially in the context of K–12 classrooms (Voogt & Roblin, 2012). Teachers may be uncertain of the expected outcomes in comparison to traditional lessons

and this is reasonable given that there is a lack of research evidence concerning this, and there are no specifications of learning outcomes that are aligned with available assessments.

To address these issues, the Centre for Assessment Reform and Innovation (CARI) at ACER has developed an assessment framework for measuring and monitoring the skills in the classroom. Through a combination of curriculum-orientated assessment tools, learning progressions, and professional development, the agenda is to equip teachers to integrate teaching and assessing of general capabilities into their classroom.

Assessment framework

Our approach is premised on the fact that, in real-world settings, general capabilities are used in combination and that measuring them as isolated skills is not valid. When solving a complex problem in real life, critical thinking skills are not employed on their own, they are supported by the application of other social and cognitive skills such as collaboration, information literacy to research and obtain information, and creativity to arrive at novel and workable solutions.

Five skills were selected for inclusion in this study: collaboration, critical thinking, creative thinking, information literacy (research skills), and communication. Collaboration refers to the capacity of an individual to effectively participate in a team, and encompasses attributes such as perseverance, contributing to

team knowledge, valuing contributions of others and resolving differences. Also important to note that a collaborative activity should be one where participants are engaged in active discourse, not merely division of labour, to accomplish a task. Critical thinking refers to the cognitive process of critically evaluating information and arguments, seeing patterns and connections, constructing meaningful knowledge, and applying it in the real world. It encompasses the subject's ability to draw on the synthesis of the information presented to design a course of action to investigate the problem, and evaluate the effectiveness of the strategy adopted. Creative thinking is the capacity to generate many different kinds of ideas, manipulate ideas in unusual ways and make unconventional connections in order to outline novel possibilities that have the potential to elegantly meet a given purpose. Information literacy, with particular reference to research skills refers to the ability of individuals to use information and communication technologies (ICT) appropriately to access, manage and evaluate information to develop new understandings. Finally, communication refers to the capacity to effectively present one's idea to a target audience, with well-thought through organisation, clarity in content or ideas and effective delivery.

There has been a focus in the literature of teaching general capabilities using problem-based or inquiry-based learning (Hmelo-Silver, 2004) – most likely because problem-solving is one of the most frequently mentioned 'in demand' skills and features consistently across frameworks. Complex problem-solving refers to 'the capacities to solve novel, ill-defined problems in complex, real world settings' (World Economic Forum, 2016). Throughout the problem-solving process, students need to employ a multitude of cognitive and social skills broadly classified under the umbrella of 21st-century skills or general capabilities to define the problem and plan and execute strategies in order to arrive at a solution to address it. Complex problem-solving provides a sufficiently rich and extended activity for students to employ the range of general capabilities

we are interested in measuring. Therefore, each of the skills presented in this study are contextualised in complex problem-solving activities. Primarily positioned as the context for students to work collaboratively with their classmates to come up with feasible solutions, the problem tasks are designed to give students the opportunity and time to engage and demonstrate the general capabilities. By nature, 21st-century learning activities are often open-ended, involve unbounded sets of information, and there may be ongoing redefinition of the goal of the task. It is important that students develop skills to establish and adapt goals according to available information, seek out relevant and valid information for the task, and continually monitor their own progress.

The assessment framework is presented in Figure 1. This framework forms a theoretical basis and guides a structured approach in the design of problem tasks, location of assessment points and identification of indicators for the skills being measured. Assessing a few skill strands simultaneously in complex problem-solving seems fairly feasible given that existing frameworks on collaborative problem-solving (Griffin & Care, 2015), creative problem-solving (Feldhusen & Goh, 1995) and information problem-solving (Brand-Gruwel, Wopereis, & Walraven, 2009) share similar problem-solving heuristics first proposed by Polya (1957). The procedural steps outlined by Polya are presented on the far left of Figure 1, and the assessment tasks in this study are designed around the same stages of process. Problem-solvers typically need to first understand and define the problem and then plan, therefore in the assessment task at these stages they are presented with the problem and provided an opportunity to generate possibilities to solve the problem. The next step of the process is to act on the plan therefore, in the assessment tasks, they are asked to implement a strategy or approach from the possibilities generated. Finally, students need to reflect and communicate so, in the assessment tasks, students are expected to evaluate the solution to the problem and communicate their solution effectively.

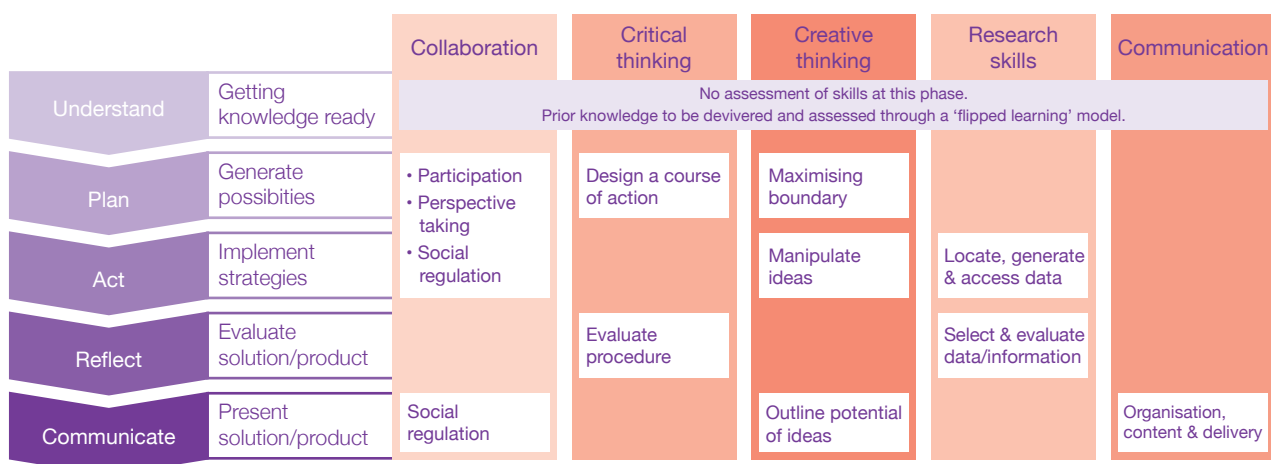|		Collaboration	Critical thinking	Creative thinking	Research skills	Communication
Understand	Getting knowledge ready	No assessment of skills at this phase. Prior knowledge to be delivered and assessed through a 'flipped learning' model.				
Plan	Generate possibilities	• Participation • Perspective taking • Social regulation	Design a course of action	Maximising boundary		
Act	Implement strategies			Manipulate ideas	Locate, generate & access data	
Reflect	Evaluate solution/product		Evaluate procedure		Select & evaluate data/information	
Communicate	Present solution/product	Social regulation		Outline potential of ideas		Organisation, content & delivery

Figure 1 The assessment framework

Learning progressions

To support teachers to teach and assess these skills, we need a clear idea of how students demonstrate these skills, and how they progress over time. Current educational assessment reform calls for assessments to be centered on evidence of progress and growth (Gonski et al., 2018; Masters, 2013). Providing information on student performance at a single point in time is not as useful as presenting a continuous pathway of learning, since by its very definition learning requires progress. Learning progressions can provide crucial information to teachers, not just about student proficiency, but in identifying what students need to learn next to increase proficiency. They can also support the monitoring of student progress across grades, which traditional grade-based benchmarks don't always allow for.

Most efforts in the development of research-based learning progressions have been limited to areas such as literacy, numeracy and in science (Black, Wilson, & Yao, 2011). However, these could prove valuable in understanding and supporting skill development of the general capabilities. In this study, a theoretical progression has been developed for each of the skills. The study builds upon previously-established learning progressions on collaboration in the ATC21S project (Griffin & Care, 2015), critical thinking (ACARA, 2013; New Pedagogies for Deep Learning Global Partnership, 2014) creative thinking (Anderson, 2016), information literacy in the ICILS study (Fraillon, Schulz, & Ainley, 2013) and communication (Kerby & Romine, 2009). Empirical evidence from the assessment tasks is intended to provide validation of these progressions. Table 1 presents an extract from the learning progression of critical thinking.

Table 1 Viable progressions in critical thinking skills

Elements	Low	Medium	High
Identifying patterns and making connections	Learners can see simple patterns and connections.	Learners can make connections between significant ideas, issues, thinking etc.	Learners are skilled in making connections, identifying patterns and seeing relationships and navigate a sea of knowledge in an interconnected world.
Knowledge construction	Learners struggle to engage in meaningful knowledge construction but are still guessing their approach to tasks.	Learners find different points/pathways into learning, building on their existing knowledge and beliefs and can analyse/construct knowledge one discipline at a time.	Learners' knowledge construction is insightful, connected and interdisciplinary and involves interpretation, analysis synthesis and evaluation.
Apply logic and reasoning	Identify the thinking used to solve problems in given situations.	Assess whether there is adequate reasoning and evidence to justify a claim, conclusion or outcome.	Analyse reasoning used in finding and applying solutions, and in choice of resources.
Draw conclusions an design a course of action	Share their thinking about possible courses of action.	Draw on prior knowledge and use evidence when choosing a course of action or drawing a conclusion.	Use logical and abstract thinking to analyse and synthesise complex information to informat a course of action.
Evaluate procedures and outcomes	Check whether they are satisfied with the outcome or tasks or actions.	Evaluate the effectiveness of ideas, products, performances, methods and courses of action against given criteria.	Evaluate the effectiveness of ideas, products and performances and implement courses of action to achieve desired outcomes against criteria they have identified.

ACARA, 2013; New Pedagogies for Deep Learning, 2014

Assessment tools

To date, two assessment tasks have been developed, and another two designed for assessing the general capabilities as outlined in the assessment framework. One developed task has been designed for Year 8 students and is situated in a humanities context, the other is designed for Year 5 and is situated in a science, technology, engineering, arts and mathematics (STEAM) context. Development of tasks across Years 5 and 8 should provide evidence of the maturation of the skills, and should allow for monitoring of student growth across the grades. An integrated approach to teaching and assessing the skills across domain areas

is necessary for sustainability. Therefore, the problem-based tasks were contexualised in both humanities and STEAM domains. Development of tasks across different subject domains should also allow identification of potential transferability of the skills across contexts.

Figure 2 presents two activities from the Year 8 humanities task in which the students have to work out how best to settle refugees in their local community. In session 1, students are introduced to the problem in groups of three. The need to demonstrate collaboration, critical thinking and creativity to generate a list of possible solutions, debate the most creative (yet plausible) ideas, and negotiate and assign roles going forward to enable differentiated access to resources.

Template for students to identify ideas that will support smooth resettlement
Smooth resettlement of refugees in a local community involves a concerted effort by various stakeholders. What do you think these concerted efforts might look like?
Be as creative as you can. Try to come up with eight different ideas

	Brainstorm a list of suggestions	Checklist to assess the creativity of your ideas
1	Enter text here	Is the idea … • unusual or original • effective and coherent • able to meet the purpose • a well-thought through experimentation (evidence of attempting to try out a new idea with clear approach to its experimentation) • aesthetically pleasing or elegant in its approach.
2	Enter text here	
3	Enter text here	
4	Enter text here	Overall, there area … • lots of different ideas or elements • few ideas or elements but they have many possibilities • considers multiple perspectives instead of from a single narrow view.
5	Enter text here	

Figure 2 Screenshots from humanities Year 8 task, refugee settlement

In this study, the assessment tasks are delivered via Google Classroom, because it offers a low cost platform on which to try the proof of concept, is readily available to schools and is familiar to many teachers and students. Students complete the tasks in the online environment which allows for responses to be recorded automatically. Eventually a future system would generate reports for teachers that they can triangulate with their own observations, and use of the learning progressions to build a picture about their students' proficiency across the general capabilities. Through the use of classroom-based problem tasks set in a variety of contexts, the study focuses on observing student behaviour, interaction and examining the thinking process behind their proposed solutions as they engage with the tasks, with the aim to accurately locate student skill levels on the learning progressions.

Work has already begun in trialling the two classroom-based assessments in Australian schools. Sufficient data will have been collected by mid 2018 to allow for analysis. Early analysis of the trial data is enabling the researchers to refine the delivery and resourcing, which supports the task and associated scoring protocols, so as to ensure valid, accurate and well-targeted assessment of the general capabilities it requires students to demonstrate.

While the use of complex tasks that measure multiple skills is highly valid, the scoring of the outcomes from the assessment are equally complex. Different parts of the overall task require particular skills. To represent this complexity, we have adopted a Q-matrix approach. The Q-matrix is a table that specifies which skills are required to successfully complete each part of a task, in which the task components are listed in the rows and the skills are listed in the columns. To add to the complexity, the sources of data from the task components may differ too. For example, a computer log file of how many of the research resources were accessed and for how long might supply measures relevant to assessing research skills, whereas the quality of a students' self-reflection about their collaboration in a group might come from the teacher using a scoring rubric. Once sufficient response data have been gathered, the next phase of the project will involve investigating the use of different scoring models to adequately represent each skill.

Limitations of the study

The tasks that have been developed represent a proof-of-concept and are, therefore, not as fully developed as assessment tasks for rigorous assessment would be. Also, the number of measures that can be derived per skill across each task is limited and causes a paucity of data. However, the eventual design is that students would, over the course of an academic year, complete several general capability assessment tasks in different subject areas. This would provide sufficient measurement points per skill, based on the assumption that the skills that are manifested within each task regardless of the subject area in which they are applied.

Conclusion

It is acknowledged that the sorts of 21st-century skills and general capabilities increasingly expected of school graduates and employees can manifest themselves in an enormous range of expressions, contexts and applications that are beyond the scope of a small suite of classroom tasks to definitively assess. Nevertheless, it is important work to find well-considered and reliable ways teachers can elicit, isolate and measure such seemingly nebulous skills in some form, if only so as to demystify the notion that such skills can't really be taught – and assessed – in the first place. Once this has been achieved, and using correctly-tuned, teacher-friendly assessment methods, it is hoped that schools will continue a propagation of the CARI project's approach so as to embed 21st-century skills more comprehensively in the curriculum and the classroom.

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Using measures of quality to improve the learning outcomes of all children

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Dr Dan Cloney is a research fellow in the Centre for Education Policy and Practice at the Australian Council for Educational Research. Dan's expertise is in early education, cognitive development, academic achievement and inequality.

Dan's most recent work includes longitudinal studies in Australia and Indonesia. One of these, the Overcoming Disadvantage in Early Childhood Project, is a partnership with the Australian Literacy & Numeracy Foundation to study the effectiveness of a preschool intervention in New South Wales. Another, the UNICEF Modelling of Universal Pre-Primary Education, is a study of the impact of investment in early childhood programs in the Regency of Bogor, Indonesia. Dan was also a research fellow on the E4Kids study, which is Australia's largest longitudinal study of the contribution of early childhood programs to children's learning and development.

Dan's recent publications focus on the potential for high-quality early childhood programs to reduce SES-related achievement gaps.

Abstract

There is compelling evidence that high-quality early childhood education and care (ECEC) programs can act to narrow achievement gaps attributed to social inequality. This evidence is typically observed in model programs, designed by experts and offered to vulnerable families outside the market. In everyday settings, where market forces may price families out of certain programs or poor local availability may preclude attendance, ECEC programs do not appear to deliver these significant gains or close these gaps. There is a need to continually improve quality in all ECEC settings to deliver on the potential of early education. It is unclear, however, how quality improvement can be achieved in way that will deliver the best start in life for all.

This paper looks at what early childhood interaction quality looks like right now in Australian services and internationally. Specifically, what educator practices are related to children's learning and development? This paper contributes to the knowledge about quality improvement in two ways. The first is related to how educators can leverage research into pedagogical quality to collect data and improve their own practice. The second relates to the organisation of the ECEC system and how it must be arranged to ensure all children get equal access to high-quality ECEC experiences. Together, these two contributions have the potential to increase the effect ECEC programs have on children's learning and development outcomes and to deliver on the promise of narrowing achievement gaps and breaking the link.

This paper explores the challenge of lifting the quality of Australian ECEC programs, so that the system can deliver on the promise of reducing achievement gaps related to disadvantage. Specifically, this paper brings together the latest research to ask how large-scale psychometric analysis can be used at the classroom level for educators, or communities of educators, to: (1) collect their own data about their practice, (2) visualise it on a continuum of pedagogical quality, and (3) use this information to demonstrate growth in quality.

Introduction

There is evidence of the potential for high-quality early childhood education and care (ECEC) programs to reduce and even close achievement gaps attributed to relative disadvantage. This is a key part of efforts to reduce unjust, unnecessary and preventable inequities caused by entrenched and intergenerational socio-demographic circumstances (Goldfeld et al., 2017, 2018). Participation in model ECEC programs – specifically designed by experts and provided to vulnerable families outside the everyday market – is associated with significant and life-long benefits (Schweinhart, 2005). In carefully designed studies, greater developmental gains are seen for children in high-quality ECEC programs when compared to low-quality programs (Burchinal et al., 2008; Duncan & Sojourner, 2013). These studies, however do not address the fact that the everyday market tends to produce lower quality programs than seen in the model programs; ECEC programs in the US, UK and Australia demonstrate that some aspects of ECEC quality are low across the entire population (Tayler, Ishimine, Cloney, Cleveland, & Thorpe, 2013), and that children from disadvantaged backgrounds face significant barriers to accessing high-quality programs or any programs at all (Cloney, Cleveland, Hattie, & Tayler, 2016; Cloney, Cleveland, Tayler, Hattie, & Adams, 2017a; Hatfield, Lower, Cassidy, & Faldowski, 2015).

The implication of these patterns is that ECEC programs do not appear to be delivering on their potential to reduce inequality. In Australia, for example, children's early oral language skills vary significantly at age three and those who are behind early, continue to be behind (or potentially even further behind) when they enter school (Tayler, Cloney, & Niklas, 2015). These early gaps are strongly associated with later gaps in school achievement. For example, children who had low, compared to average, oral language skills at 3 years of age scored significantly lower on the National Assessment Program – Literacy and Numeracy (NAPLAN) domains of reading, writing and language conventions at Grade 3 (approximately five years later). The magnitude of this difference is as large: 90 scale points (spelling), which is more than 1.5 standard deviations (Tayler et al., 2016b).

This paper presents a way of addressing these issues, and ensuring that ECEC programs live up to their potential to close achievement gaps related to inequity or disadvantage. A method is presented to use data from large-scale research to produce a practitioner-focused quality improvement tool. By allowing educators to locate their current practice on an empirically validated continuum of instructional quality, they can undertake appropriately targeted, incremental quality improvement. Improvements in instructional quality are known to contribute to children's learning and development outcomes.

Measuring early childhood education and care quality – what is important?

This paper focuses on the quality of instruction and brings together the findings from new research (in particular, Cloney & Hollingsworth, manuscript submitted for publication), to answer two questions: first, can we produce a reliable and valid continuum of instructional quality using the Classroom Assessment Scoring System (CLASS) (Pianta, La Paro, & Hamre, 2008), and second, how can this continuum be used to lift the quality of instruction in Australian ECEC programs?

The analysis in this paper uses data from a large, longitudinal study designed to estimate what early childhood programs add to children's learning and development from the ages of three to eight years in Australia. The CLASS is a tool that measures the quality of teacher–student interactions in the classroom. Measures of interaction quality are widely used by researchers and by governments and are shown to be predictive of children's learning and development (Sabol, Soliday Hong, Pianta, & Burchinal, 2013). The CLASS yields ratings on a scale of one to seven on three domains: emotional support, classroom organisation and instructional support. This paper only focuses on instructional support. This domain is theoretically and empirically associated with children's cognitive and academic achievement in early childhood and school literature (Hamre et al., 2013; Pianta & Hamre, 2009; Pianta et al., 2008).

The positive relationship between instructional support and early outcomes is despite the observed pattern of instructional support being scored low in the population of ECEC programs. Observed effect sizes (ES) in everyday settings for reading and language outcomes range from very small (figure significant but effect size not stated in Hamre et al., 2013) to small (ES = 0.23) (Burchinal, Vandergrift, Pianta, & Mashburn, 2010). Observed ES in everyday settings for mathematics outcomes are larger (up to ES = 0.34) (Burchinal et al., 2010). A US study found that instructional support only predicted reading and mathematics achievement above a threshold of 3.25 (on a seven-point scale) (Burchinal et al., 2010) while the average score observed in the study was only 2.05 (1.4 SD lower than the threshold) (Tayler et al., 2013). In studies where the threshold was set lower (e.g. to ensure sufficient numbers in the contrast group) effects were not as clear. A threshold of 3 (out of 7) has shown no effect for early literacy and a small effect for inhibitory control (ES = 0.23) (Hatfield et al., 2016). There is a clear opportunity to push instructional quality in all settings up to levels known to have impacts on learning and development.

Method

Participants

More than 2500 children participated in this study, and the study protocol provides specific details of the sampling and measurement used (Tayler et al., 2016a).

The data presented here are from the 2011 wave of data collection and include observations of 993 classrooms including: International Standard Classification of Education (ISCED) (UNESCO, 2012) level 010 (e.g. child care), ISCED 020 (pre-primary programs for mostly four year olds), and the first year of ISCED 100 (e.g., the first year of school for mostly 5 year olds) that were located in 647 individual schools or services). Home-based services were excluded.

Instrumentation

The CLASS measures three domains: emotional support, Classroom Organization, and instructional support. The observer scores 10 indicators nested within these three domains (four, three, and three indicators within each domain, respectively). To get a score for each domain, an observer scores each indicator on a scale where 1–2 is low quality; 3–5 is mid quality; and 6–7 is high quality. The domains and indicators that make up CLASS are described in Table 1 (p. 86). Note that these are the descriptions for the pre-K version of the measure (generally for children aged three to five); however, this analysis also includes ratings on the K–3 measure that includes the same domains and indicators; however the description of the indicators is changed to be contextually appropriate to the age group (Pianta et al., 2008).

This paper only focuses the instructional support domain, and the estimated scale reliability is 0.89 (Cloney et al., 2015a, 2017). Additional information regarding the training of observers, inter-rater reliability, and model estimation can be found in Cloney et al. (2017b).

Analytical approach

The data from the 993 classrooms is modelled as a multidimensional partial credit model (Adams, Wilson, & Wang, 1997). All three CLASS domains are modelled simultaneously, but only the instructional support continuum is presented here. This continuum is different from the instructional support score given from the CLASS manual as it takes in to account measurement error as well estimating the relative difficulty of each of the indicators in order to place classrooms on the continuum.

Table 1 Description of the indicators (dimensions) and factors (domains) of the instructional support domain of the Classroom Assessment Scoring System

Domain	Dimension	Description
Instructional support	Concept development	Measures the teacher's use of instructional discussions and activities to promote students' higher-order thinking skills and cognition and the teacher's focus on understanding rather than on rote instruction.
	Quality of feedback	Assesses the degree to which the teacher provides feedback that expands learning and understanding and encourages continued participation.
	Language Modeling	Captures the quality and amount of the teacher's use of language-stimulation and language-facilitation techniques.

Table adapted from Pianta et al., 2008

Results

Instructional support continuum

This study builds on the results published in Cloney and Hollingsworth (manuscript submitted for publication) and Cloney et al. (2015a, 2015b, 2017b), which illustrate how more advanced modelling techniques could overcome the psychometric limitations of CLASS already reported in the literature (e.g., Pakarinen et al., 2010). The key finding of these papers is that the underlying theorisation of the CLASS is sound, and the orthodox measurement approach is limited.

Figure 1 (p. 87) is an item map that summarises the findings of the model for instructional support. The vertical dotted line represents the continuum of instructional support from low (bottom of the figure) to high (top of the figure). The dots represent the observed distributions of classrooms on this continuum. Three columns, for the indicators that make up instructional support, show the thresholds for the indicators. For example, CD.2 means the second threshold for concept development. This is the location on the instructional support continuum at which a classroom or an educator would have a more than 50 per cent chance of scoring 3 or higher on concept development (note that the first threshold, CD.1 represents the location where a classroom or educator would have a greater than 50 per cent chance of being scored 2 or higher: there are 7 – 1 = 6 thresholds in the model). For this paper, it is important to note that that the threshold CD.2 represents a classroom moving from low- to mid-quality on concept development and yet the distribution of observed classrooms (representative of classrooms in

Australia) shows approximately three-quarters of classrooms operate below this level (the 75th centile is -0.59 logits). This implies that concept development is difficult to exhibit – rarely observed – in classrooms. Only classrooms scoring very high on the instructional support continuum could be expected to be demonstrating the behaviours described in the upper indictors of concept development. Compare it with progressing from low- to mid-quality for, Language Modeling (LM.2: more than 50 per cent of classrooms operate above this threshold on the continuum of instructional quality).

From these results, it is clear that the behaviours described in the CLASS manual are not equally difficult to demonstrate at each scoring point – that is, scoring a 1 on CD is not the same as scoring a 1 on LM, rather, some behaviours are more challenging to demonstrate that others. This is shown in Table 2. Of note, CD appears to be the most difficult to demonstrate (e.g. the relative size of the low scores, shaded in grey) of the indicators.

Conclusion

This study demonstrates that a continuum of instructional quality can be produced from the CLASS measure. A major barrier, however, to the use of the CLASS measure is that it requires significant training to yield data and analysis to produce interpretable results – such a process is more aligned with research or with monitoring than it is for use in the classroom (Cloney & Hollingsworth, manuscript submitted for publication). This discussion, therefore, considers how the results presented above can be applied in the quality improvement efforts of educators.
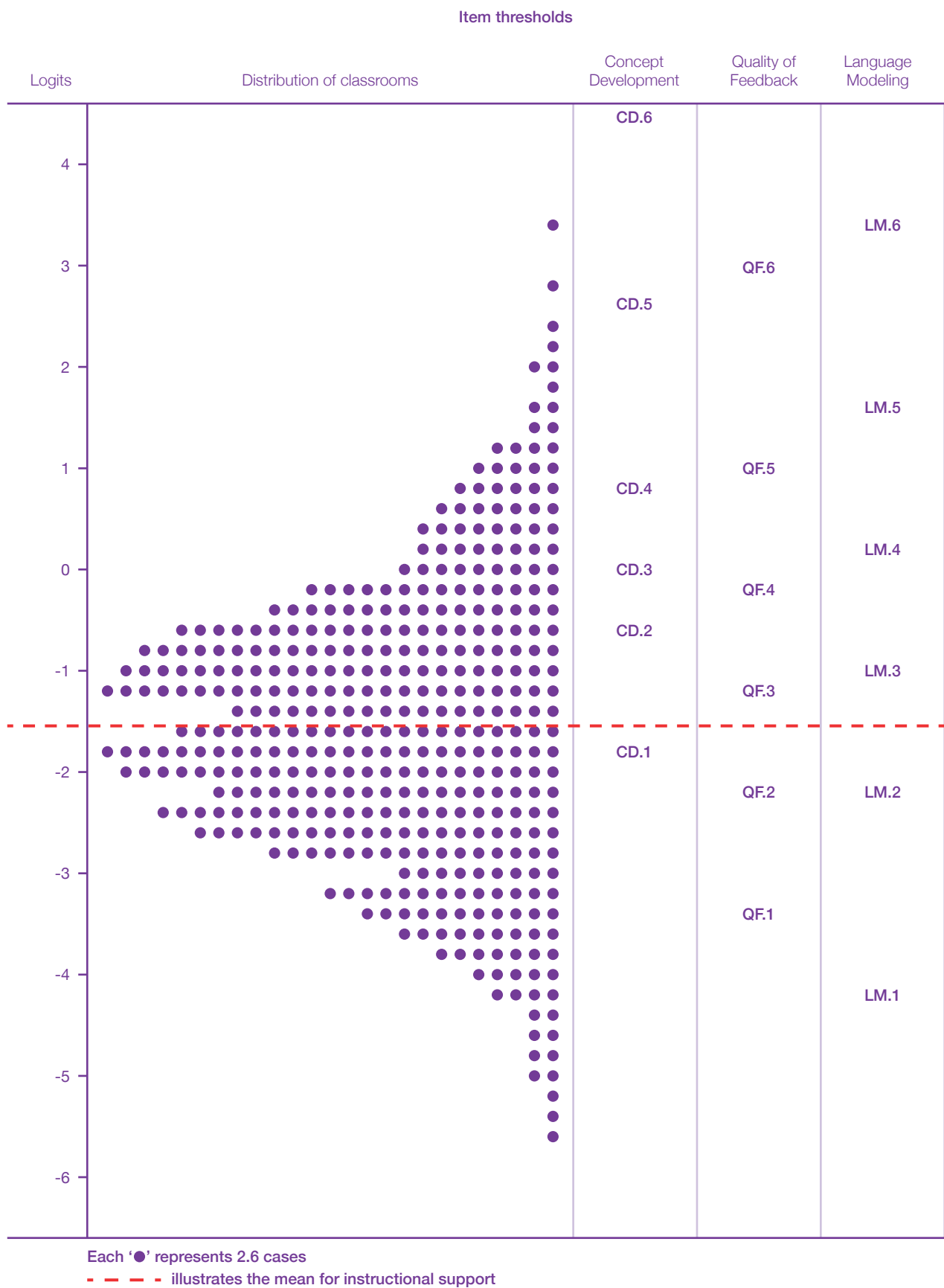
Item thresholds

Logits	Distribution of classrooms	Concept Development	Quality of Feedback	Language Modeling

Figure 1 Wright map of multidimensional partial credit model of CLASS instructional support

Each '●' represents 2.6 cases

- – – - illustrates the mean for instructional support

Table 2 Illustration of the continuum of behaviours making up instructional support using evidence from IRT analysis

Logits	Concept development[1]	Quality of feedback[2]	Language modeling[3]
4	The educator often provides opportunities for students to be creative and/or generate their own ideas and products exemplified by brainstorming, planning and producing. The educator consistently links concepts and activities to one another and to previous learning.	The educator often provides additional information to expand the students understanding or actions exemplified by expansion, clarification and specific feedback. The educator often offers encouragement of the student's efforts that increases student's involvement and persistence exemplified by recognition, reinforcement and observed student persistence.	There are frequent conversations in the classroom exemplified by back-and-forth exchanges, contingent responding and peer conversations. The educator often repeats or extends the students' responses including elaboration.
3			
2			
1	The educator sometimes provides opportunities for students to be creative and/or generate their own ideas and products exemplified by brainstorming, planning and producing. The educator sometimes links concepts and activities to one another and to previous learning.	The educator occasionally provides additional information to expand the students understanding or actions exemplified by expansion, clarification and specific feedback. The educator occasionally offers encouragement of the student's efforts that increases student's involvement and persistence exemplified by recognition, reinforcement and observed student persistence.	There are limited conversations in the classroom. The educator sometimes repeats ort extends the students' responses.
0			
-1			
-2	The educator rarely provides opportunities for students to be creative and/or generate their own ideas and products. Concepts and activities and presented independent of one another, and student are not asked to apply previous learning.	The educator rarely provides additional information to expand the students understanding or actions. The educator rarely offers encouragement of students' efforts that increases students' involvement and persistence.	There are few, if any, conversations in the classroom. The educator rarely, if ever, repeats or extends the students' responses.
-3			
-4			
-5			
-6			

Descriptions are adapted from Pianta et al., 2008.

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[1] Descriptions of the behavioural markers of *creating*, and *integration* are given. The other behavioural markers within this dimension are *analysis and reasoning, and connection to the real world*.

[2] Descriptions of the behavioural markers of *providing information* and, *encouragement and affirmation* are given. The other behavioural markers within this dimension are *scaffolding*, feedback *loops*, and *prompting thought processes*.

[3] Descriptions of the behavioural markers of *frequent conversation*, and *repetition and extension* are given. The other behavioural markers within this dimension are *self- and parallel talk*, and *open-ended questions*, and *advanced language*.

The instructional support continuum can be used to focus and support the efforts of educators. It provides a clear understanding of what quality looks like, can be used to locate the level of practice, and can be used in everyday settings. The continuum provides educators with a map showing levels of practice from low to high quality. By qualitatively comparing their own practice to the described continuum, educators can locate themselves and the set of behaviours proximal (but above) their own level of practice. This is the target area for quality improvement and can be done without the need for complex analysis.

An applied example of this can be seen through the lens of the Structured Stimulation of Teacher Reflection (SSTR) approach (Hollingsworth & Clarke, 2017). The instructional support continuum is the element of practice to plan for. Educators should then proceeds plan around demonstrating this focus and record their practice (e.g., through peer observation or recording). Following this, the educator can use the recording or peer observation to collect evidence of their behaviours as described on the continuum ('What I saw', My thoughts about what I saw', and 'What I might do differently'), and then engage in a professional conversation about their practice.

The innovative part about this process of quality improvement is that the cycle of reflexive practice is centred on strong empirical evidence – the educator seeks to locate themselves on the continuum and improve their practice by moving from their current location to the next highest location on continuum. Educators can see, therefore, that if they are located at the lowest levels on the instructional support continuum than demonstrating higher levels of concept development is, on average very difficult. Educators will likely be demonstrating more growth in Language Modeling than in concept development at this location on the continuum. This approach means that unrealistic quality improvement or professional learning targets are not set and that growth is structured in a way that is commonly observed in other similar classrooms.

Most importantly, this focus on quality improvement is most likely to be associated with growth in children's learning and development. Ensuring that quality improvement efforts focus on aspects of quality that are most likely to yield improved growth for children is critical for the ECEC market to deliver on its potential. This is most important for programs providing services to low income or vulnerable children. At present, we know these programs are the lowest quality (on average) and should be provided with the most support to lift quality to levels likely to narrow persistent achievement gaps. This is the only way to ensure that all children have the best start in life and to eliminate inequities that are unjust, unnecessary and preventable, and caused by entrenched sociodemographic circumstances.

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Poster presentations

The algorithmic identity

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Digital identities are nothing new. From digital footprints to learner profiles, most students know that they have a digital footprint. Similarly, teachers are aware that through various academic analytics, they are able to receive insights from NAPLAN data and other sources, and gain projections on student ability. However, when we venture into the classroom, and look at tools such as the popular behaviour management app ClassDojo, awareness and understanding of how student data are collected and used is less well known. Privacy legislation and design provide frameworks to guard against students' personal data from being shared; however, when their data is anonymised, it is commonly shared or sold to various external stakeholders. Therefore, ClassDojo may well be the greatest source of children's behavioural data, collected from within the classroom. This raises multiple ethical considerations.

With increasing technological power, tools are being created to mine and make predictions from anonymised data. By creating what has been called an 'algorithmic identity', external stakeholders can make correlations between populations of students and various categories to make predictions. The algorithmic identity is defined as 'an identity formation that works through mathematical algorithms to infer categories of identity on otherwise anonymous beings' (Cheney-Lippold, 2011) and it uses statistical commonality models, to determine student gender, class, or race among other things. Notably, unlike NAPLAN data, the algorithmic identity is not verifiable or authenticated. It is an inferred identity assigned to the student to meet the goals and drivers of the external stakeholder.

The literature presents multiple ethical concerns with the use of an algorithmic identity in contexts that require the use of a verified identity, such as education. This is because the algorithmic identity needs to categorise the data to make it meaningful, and with any algorithmic sorting process there is a reduction of the complexities of the individual. Student data becomes benchmarked according to various measureable types and the meaning of those categories (e.g. why it fitted the category) doesn't always align with the sense making of the student or teacher. For example, what does it mean to be successful? Was it getting 90 per cent on a written test or attending classes every day. How does success change for each student on a day-to-day basis?

Therefore bias can be evident in the results, and in some cases this can lead to discrimination. Notably, this discrimination is not deliberate, it is an implicit bias that even behemoths such as Google are unable to prevent, yet tools using the algorithmic identity are being offered to K–12 classrooms in the form of dashboards and other tools to analyse learning data. This poster raises awareness of these notions to K–12 teachers, to encourage ethical debate to feel confident in challenging the insights provided to them and as a result, explore what questions to ask and when, to prevent bias and discrimination from entering the classroom via these digital channels.

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Using an inclusive early childhood framework to narrow the gap on the Australian Early Development Census data

Mary McLennan, Kristina Brown, Jodie Peel, Katelyn McInnes, Mikaela Farrell and Kate Walker
Sir Thomas Playford Kindergarten, SA

Early childhood educators at Sir Thomas Playford Kindergarten in the Elizabeth South region, South Australia implement the inclusive Pyramid Model with Fidelity. Their mission is to ensure that they use an inclusive multi-tiered framework to narrow the gap on the increasing number of children experiencing vulnerabilities on the Social Competence and Emotional Maturity domains on their Australian Early Development Census (AEDC) data. The Pyramid Model is an inclusive positive behavioural intervention and support (PBIS) framework that uses systems-thinking and implementation science to promote evidence-based practices.

Sir Thomas Playford Kindergarten is in its first year of researching and implementing the Pyramid Model. The Learning Evaluation is being used as the methodology to blend quality improvement with the Active Implementation Framework to study and to drive rapid cycles of improvement. The focus in this first year is to establish the universal level of the Pyramid Model – to have nurturing and responsive caregiving relationships with all children, their families and collaborative relationships with all team members while developing high-quality inclusive supportive learning environments. To conduct their real-time assessment of the intervention, Pyramid Model, and the implementation with Fidelity, they are using the Preschool-Wide Evaluation Tool (PreSet) data, Teaching Pyramid Observation Tool (TPOT) data, Inclusive Classroom Profile (ICP) data, Behaviour Incident Report (BIR) data, Tier 1 (Early Childhood) Universal Support Checklist Implementation Fidelity with the Early Years Learning Framework. Teaching practices for what inclusive nurturing and responsive relationships look like and how to develop high-quality inclusive supportive learning environments will be shared together with insights from their research data and their future research directions.

Fostering the development of self-directed learners

Stella Vosniadou, Karla Pobke, Jayne Heath, Bronte Nicholls, Penny Van Deur and David Jefferies
Australian Science & Mathematics School, and Flinders University

We will describe a project designed to document and improve educational practices developed at the Australian Science & Mathematics School (ASMS) to foster the development of self-directed learners (SDL). The project also disseminated these practices to four secondary schools with a low ICSEA (Index of Community Socio-Educational Advantage) value. It included a professional learning program for teachers who then designed a SDL curriculum for participating students and a development of a SDL plan to help students reach a better understanding of themselves as learners and define their educational goals. The professional learning program involved both face-to-face and online sessions and was designed to help teachers examine their beliefs about teaching and learning, and their impact on teacher practices and student learning. It also aimed to provide ideas, support and resources about how to design and implement a core SDL curriculum for a whole-school approach. The SDL plan paired individual students with teachers who adopted a variety of practices to help their students set, reflect and take action to achieve their learning goals.

A questionnaire given to the students before the beginning of the program was instrumental in identifying areas in which students needed most help. Students' questionnaire responses indicated that there were important differences in their learning needs. Some students needed to work more on their beliefs about themselves as learners and on building their self-confidence while others had high self-confidence and achievement goals but needed to work more on their learning strategies. Feedback from the teachers and students who participated in the program indicated increased development of teacher capacity to lead and deliver the program at their school, increased student recognition of the areas they needed to improve most and understanding of the strategies that would help them do so. Results from the pre/post survey also indicated significant positive changes in teacher and student beliefs about learning and SDL strategies.

You are what you read: What do Taiwanese high school teachers choose for summer reading?

Shu-Hua Tang

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The purpose of this study was to understand what Taiwanese high school teachers choose for their students to read during the summer vacation. The phenomenon of 'summer loss' has been well reported since the pioneering research of Heyns (1978) and Entwisle et al., (1997). Subsequent studies that adopted the seasonal perspective (e.g., Downey et al., 2004) also confirmed that the different learning activities engaged during the vacation by the high- and low-achievers may well explain why the achievement gap exists between the two. Because reading can serve as an effective tool for adolescents to broaden their world views and expand their knowledge spectrum, the choice of outside-school reading becomes an important task for educators. Unfortunately, many high school teachers neglect the power of outside reading and choose books mindlessly. It is worth investigating what types and topics of reading are selected.

This study used content analyses to explore the top readings picked by Taiwanese high school teachers. The 2016 high school book list from Taipei Public Library was used as the data source. Taipei Public Library is one of the biggest government-funded libraries in Taiwan, and it has a database of the reading lists of all schools since 2009. To obtain the representative data, this study eliminated books chosen by fewer than five schools. Books intended for parents or adults were also removed. Consequently, 317 books were included in the final list.

To understand the types of book choices, the books were grouped into three categories: narrative, informational and argumentative. It was found that the informational texts comprised the majority of texts (59%), then narrative (28%), and then argumentative (13%). Further, most informational texts focused on topics of information (n = 147) (i.e. topics not covered in schools but considered important, such as science, economics, business, and social issues, etc.). Topics concerning personal growth and life struggle issues were mostly chosen in the narrative category (n = 48). Finally, topics on self-reflection and critical thinking were mostly chosen in argumentative texts (n =20). To conclude, although most high school teachers have recognised the importance of summer reading and have selected quality books, there are still some problems. For example, why are books intended for adults chosen? In addition, summer reading, by definition, is read independently by students at home during vacation. Without teacher scaffolding, do these informational texts give information that will be understood by adolescents? This study suggests that in the choice of educational and interesting books for adolescents, the principle of gradual release of responsibility should be taken into account (i.e. considering both students' ability and interest when selecting books).

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Teacher cultural confidence

Dr Susan Staring and Associate Professor Jennie Bickmore Brand
Australians Together

Teaching practice that makes a difference requires cultural and pedagogical knowledge both during initial teacher education and ongoing professional practice. This poster presentation draws on a range of research that shows low levels of teacher confidence in addressing AITSL Standards 1.4 and 2.4, particularly in teacher and student awareness of Indigenous culture and history. Researchers from Charles Darwin University, University of South Australia, ACER and the Australians Together Critical Thinkers Forum are conducting joint research projects to examine ways to improve teacher awareness and confidence in meeting these AITSL Standards. This poster includes practical ways in which teachers can include Aboriginal and Torres Strait Islander people groups, history and culture in authentic and respectful ways and develop curriculum units that demonstrate cross curriculum priorities. The presentation includes a newly developed learning framework linked to the Australian Curriculum with online resources that address ACARA F–10 coded content for English, maths, science and HASS (humanities and social sciences). It also includes samples of curriculum units, student work and video illustrations of practice.

This presentation offers some preliminary findings and opportunities for further research and will point to research on teacher preparation. Despite there being over 6000 units delivered in initial teacher education programs across Australia, there is a substantial difference in the quality of attention being given to the preparation of graduate teachers to engage with Indigenous people, history and culture in the classroom. The presentation will shine the light on best practice and the designating of competence in Indigenous cross cultural engagement as a graduate attribute. A desktop audit in the tertiary sector has revealed a range of ways in which AITSL Standards 1.4 and 2.4 is attended to in teacher preparation programs from bundling it in with diversity, race, religion and low SES, to validating the contribution of Indigenous Australians past and present, including students in the classroom. In spite of the sound rhetoric of universities in strategic plans and closing the gap intentions, this study shows there is still a long way to go in translating this to satisfactory practice, and in understanding and embracing the history and culture of Indigenous people. In the words of Andrew Peters who facilitates the Indigenous Tourism course at Swinburne University, 'At the moment, most people see Indigenous culture as a separate thing to them; but it should be a part of them,' he says. 'When that happens, I can retire'.

Classroom behaviour management in inclusive schools in Indonesia: Proactive or reactive?

Pramesti P Paramita, Angelika Anderson and Umesh Sharma
Monash University

Classroom behaviour management is an essential skill for inclusive school teachers, as it facilitates the achievement of instructional goals and reduces the barrier to inclusion. This poster presents the result of a study which aimed to investigate Indonesian inclusive primary school teachers' likeliness to use proactive and reactive behaviour management strategies in their classrooms. Consistent use of proactive, preventative approaches to classroom behaviour management has been shown to eliminate problem behaviours and increase student learning.

The context of the study is public primary schools delivering inclusive education service in Indonesia. Research has found that, despite the average level of general teacher competency, teachers in Indonesia felt less competent in the area of classroom management. Although positive behaviour management strategies such as explaining classroom rules and delivering praise have been employed, corporal punishment is still used in some schools.

Data was collected through a survey using a *classroom behaviour management strategies questionnaire*, which described 19 proactive and 14 reactive management strategies derived from the literature. The participants of this study were 582 teachers from 48 inclusive public primary schools in Surabaya, Indonesia. The result of the survey indicated that teachers in inclusive primary schools in Indonesia were more likely to employ proactive (M = 4.39) than reactive (M = 2.43) classroom management strategies. A comparison of teachers reported use of proactive and reactive strategies across gender, age and years of teaching experience will be presented, along with a table describing mean rating for each specified classroom management strategies.

The findings of this study provide important information for supporting Indonesian primary school teachers in implementing effective behaviour management strategies in their classrooms. Results are discussed in terms of their implications for future research and teacher professional learning on classroom behaviour management.

Piloting the Students With Additional Needs assessment and reporting tools for use in Germany

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The University of Melbourne / University of Potsdam

Theoretical background: The Students With Additional Needs (SWANs) assessment and reporting program (e.g. Woods & Griffin, 2013; Strickland & Woods, 2016) draws on an empirically-based learning progression and uses teacher observation to monitor student learning process across foundational learning areas, such as numeracy, literacy and digital literacy. It provides teaching strategies targeted to the different levels of student ability to assist teachers to intervene accurately in the learning of students with additional needs. A preliminary approach to investigate various aspects of validity (Wolfe & Smith, 2007) is to pilot the assessment for use in an international context. To examine the appropriateness of the SWANs assessment and reporting program for German students with special educational needs, this study will share the initial exercises involved in an international adaptation and validation of an assessment.

Research question: The study seeks to answer: What changes to the SWANs numeracy, literacy and digital literacy assessment and reporting tools are recommended by representative users to make the tools appropriate for a German context? Accordingly, the study aims to gather specific information in regards to different facets of the tools (e.g. skills/behaviours, wording, format, teaching strategies).

Methods: The study will use focus group discussions within a workshop approach to gather qualitative data from representative teachers of students with additional needs in German schools. Teachers with expertise or interest in the teaching and learning of numeracy, literacy and/or digital literacy for students with additional needs will be asked to review translated versions of the SWANs assessment and reporting tools. Feedback will be sought regarding the appropriateness of the tools in the context of German schools and classrooms, as well as the wording. With the German context in mind, questions will be asked about the appropriateness, observability, and perceived value of the assessed skills and behaviours, the interpretability of the translated version and the reporting format, and the appropriateness, interpretability, and perceived value of the teaching strategies. Teachers will be asked to remove, modify or add content as they see fit. They will be provided with hard copies of all materials, as well as case studies of students to provide stimulus for discussion. Teachers will also be asked to complete a short survey to describe their teaching experience and background.

Results: Data will be collected in September 2018 and analysed using thematic analysis and scoring.

Interpretation of findings: This study will involve the translation of the assessment from English to German, the engagement of representative end users with subject matter expertise, and the consideration of sociocultural context in the educational assessment of students with additional needs. Such exercises seek to address various aspects of validity (Wolfe & Smith, 2007) to support a high-quality adaptation of three assessment and reporting tools, in preparation for further validation studies in the future.

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Gender and empowerment in second language learning: Motivation and enjoyment in learning Japanese in a Brisbane girls high school

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As opposed to Europe, Australia is geographically isolated and there is no necessity to speak a second language as most of the population communicates in English. Ironically, Australia is multicultural with many different nationalities living harmoniously in a mixed-race society. In a society such as this, how effectively can students learn a second language at school? How can we motivate students to learn a second language if they have no inclination to learn? As Carr (2003) described that while European countries are driven to have all students learn two additional languages at school, 'Australia clearly does not share these objectives', 'Australian students continue to exit the language classroom at the earliest post-compulsory opportunity'. It can also be learnt from Carr's discussion on the problem of teaching with a traditional methodology of second language learning, in which the focus is on a grammar-based way of teaching, while the new approach has focused on more communicative, task-based and interactive approaches (Carr 2003).

Carr and Pauwels (2006) sought to account for perceived differences between boys' and girls' investments in foreign language learning in secondary schools in Australia, as boys in this context were often seen to disengage from L2 learning opportunities. There has also been argument regarding boy's poor relationship to languages other than English (LOTE) in comparison to girls. Boys are labelled as being good at maths and science, while girls are good at language. I considered whether this was true: are girls keener to learn a second language?

The aim of this presentation is to describe how effectively teachers can teach language education in girls' schools and motivate the girls to learn and hence increase their employment opportunities globally and locally. In addition, learning a second language becomes a means of empowerment for them. I would like to present a case study of a girl's school in Brisbane where I currently work. I have investigated the practical method of teaching Japanese and motivating the students of a Year 8 Japanese class in which the subject is not elective, but students have to continue to attend language lessons for one year. While I believe that good interpersonal relationships are key to motivating students, anthropology may be an effective methodology that could be utilised to develop a rapport with students.

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Research in schools: Building teacher capacity through collaborative action, research and inquiry

Natalie Horrobin
Independent Schools Queensland

As the context within which schools strive to prepare students to 'become successful learners, confident and creative individuals, and active and informed citizens' (Ministerial Council on Education, Employment, Training and Youth Affairs, 2008 cited in Cole, 2012, p. 2) continues to evolve, developing a culture of ongoing professional learning not only contributes to good student outcomes but also to building collective efficacy (Hattie, 2012) amongst staff. However, it is only when educators have the power to take responsibility for designing and leading their own professional learning that they become change agents, contributing to sustainable school improvement (Donohoo & Valesco, 2016).

Supporting the idea that *every school can build teacher capacity through collaborative research*, Independent Schools Queensland assists teams of researchers and empowers research leaders to create the culture, structures and dispositions for continuous professional learning; to make data-driven decisions regarding pedagogy and assessment (Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009); and empowers colleagues to challenge existing practice to better understand student learning through undertaking a research project aligning to a school priority. Within the Research in Schools Program are three different options for schools wishing to create a culture of learning through research: (1) action research, (2) inquiry research, (3) school-wide inquiry research.

'Action research' provides the opportunity for small collaborative teams of teachers and leaders to implement action research to investigate data and innovate with new strategies to systematically craft, develop and share a process of best practice. Teacher research is focused on an area of significance and is linked to school strategic plans to actively contribute to school improvement. This type of professional learning drives school improvement and fulfils the characteristics of effective professional learning (Piggott-Irvine, 2007), which positively influences practitioners' analytical thinking, flexibility, professional self-efficacy, collaboration levels and sense of self as lifelong learners (Day & Sammons, 2016).

'Inquiry research' teams develop a research question to articulate their focus for the research. They develop an investigation and implement an inquiry research spiral driven by reflection on data for an area impact within their own context which is also linked to their school strategic plan. Through the spiral of inquiry, teachers are engaged in a collaborative analysis of what is going on for their learners and their motivation for new learning is enhanced because of the direct connection to their own contexts (Timperley, Kaser, & Halbert, 2014).

Inquiry research may be adopted as a professional learning approach within a school and can simultaneously be completed by multiple school-wide teams. Inquiry research teams develop a research question based on a specific topic within the overarching research focus, which is also linked to the school strategic plan. Inquiry research teams develop an investigation and implement an inquiry research spiral driven by reflection on data to affect an area of significance with school-wide relevance.

To empower school teams to engage in sustainable professional learning, regardless of chosen methodology, together with a research mentor, they will undertake initial brainstorming, research question development, creation of action plans and sharing.

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Timperley, H., Kaser, L., & Halbert, J. (2014). *A framework for transforming learning in schools: Innovation and the spiral of inquiry*. Melbourne, Australia: Centre for Strategic Education.

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Conference program

Conference program

Networking function

We look forward to you joining us at the networking function to mingle and socialise with new contacts or catch up with friends in a relaxed atmosphere.

Book Launch: *I'm the Principal: Principal learning, action, influence and identity*
Emeritus Professor Stephen Dinham OAM, The University of Melbourne

Entertainment: Afghanistan and Indian Music by Sash Studios Ustad Sarshar on the Sitar and Ali Sarshar on the Tabla

Venue: Pyrmont Theatre Foyer   **Time:** 5.15 – 7.15pm

Day 1 – Sunday 12 August

12.00 – 1.00	**Registration**
1.00 – 1.15	**Welcome to Country**
1.15 – 1.30	**Conference opening:** Mark Scott AO, Secretary of the Department of Education, NSW
1.30 – 1.45	**Graduation ceremony:** Graduate Certificate of Education, Assessment of Student Learning
1.45 – 2.45	**Karmel Oration:** The role of educator expertise in the 'fake news' world Laureate Professor John Hattie, The University of Melbourne
2.45 – 3.15	**Afternoon tea**
3.15 – 4.15	Laureate Professor John Hattie & Professor Geoff Masters AO in conversation: Evidence-based teaching practices

4.15 – 5.15	Presentation session 1		
Session 1A	**Session 1B**	**Session 1C**	**Session 1D**
Pyrmont Theatre	**Room C2.1**	**Room C2.2 + C2.3**	**Room C2.5 + C2.6**
Evidence-based approaches to school improvement: The Kimberley Schools Project Emeritus Professor Bill Louden The University of Western Australia	**Making a difference in learning through arts-rich pedagogy** Professor Robyn Ewing AM The University of Sydney	**Transforming learning with information and communication technologies: Insights from three decades of research** Professor Romina Jamieson-Proctor Australian Catholic University	**Early literacy skills: Finding the right pathway for each child** Danielle Anzai ACER

5.15 – 7.15	**Network Function** (Pyrmont Theatre Foyer)

END DAY 1

Day 2 – Monday 13 August

8.30 – 9.00	Arrival tea/coffee

9.00 – 10.00	**Keynote 1:** The role of evidence in teaching and learning, Professor Geoff Masters AO, CEO, ACER

10.00 – 10.30	Morning tea

10.30 – 11.30	**Presentation session 2**		
Session 2E	**Session 2F**	**Session 2G**	**Session 2H**
Room C2.5 + C2.6	**Room C2.2 + C2.3**	**Pyrmont Theatre**	**Room C2.1**
Driving one's own learning – full speed ahead! Motivationally anchored instruction Dr Alison Davis Vision Education, NZ	**Making a difference through Quality Teaching Rounds: Evidence from a sustained program of research** Laureate Professor Jennifer Gore The University of Newcastle	**Communicating student learning progress: What does that mean, and can it make a difference?** Dr Hilary Hollingsworth and Jonathan Heard ACER	**Conversation with a keynote** Professor Geoff Masters AO ACER

11.30 – 12.30	**Presentation session 3**		
Session 3I	**Session 3J**	**Session 3K**	**Session 3L**
Room C2.5 + C2.6	**Pyrmont Theatre**	**Room C2.2 + C2.3**	**Room C2.1**
Making online group-work work: Scripts, group awareness and facilitation Professor Peter Reimann The University of Sydney	**Teaching practices that improve performance, attainment and engagement: Results from a longitudinal study of high school students in New South Wales** Ian McCarthy CESE	**Assessing accomplished teaching with reliability and validity: The ACER Portfolio Project** Dr Lawrence Ingvarson ACER	**Conversation with a keynote** Professor Doctor Eckhard Klieme Goethe University, Germany

12.30 – 1.30	Lunch

12:45 – 1.15	**Lunchtime session:** Learn about graduate study with ACER (bring your own lunch) Room C2.1

1.30 – 2.30	Presentation session 4		
Session 4M	**Session 4N**	**Session 4O**	**Session 4P**
Room C2.5 + C2.6	Room C2.2 + C2.3	Pyrmont Theatre	Room C2.1
Graduate Teacher Performance Assessment: An intervention project at the intersection of standards, professional knowledge and assessment Professor Claire Wyatt-Smith Australian Catholic University	**Enhancing teaching and learning through design practice** Professor Lori Lockyer University of Technology Sydney	**Equipping teachers with tools to assess and teach general capabilities** Dr Claire Scoular ACER & The University of Melbourne	**Using measures of quality to improve the learning outcomes of all children** Dr Dan Cloney ACER

2.30 – 2.45	**Break/move to Plenary**

2.45 – 3.45	**Keynote 2:** Teaching quality: Core content implemented through evidence-based methods with structure, support and challenge Professor Doctor Eckhard Klieme, Goethe University, Germany

3.45 – 4.00	**Conference summary:** Anthony Mackay AM, Centre for Strategic Education, Melbourne **Conference close:** Professor Geoff Masters AO, CEO, ACER

Venue floor plan

Legend:
- Enquiries
- Pyrmont Theatre
- Conference rooms
- Toilets
- Public lift
- Goods lift

NOTE: Registration on Ground Floor (Level 1)

PYRMONT THEATRE

ACCESS

ACCESS

C2.1
C2.2
C2.3
C2.4
C2.5
C2.6
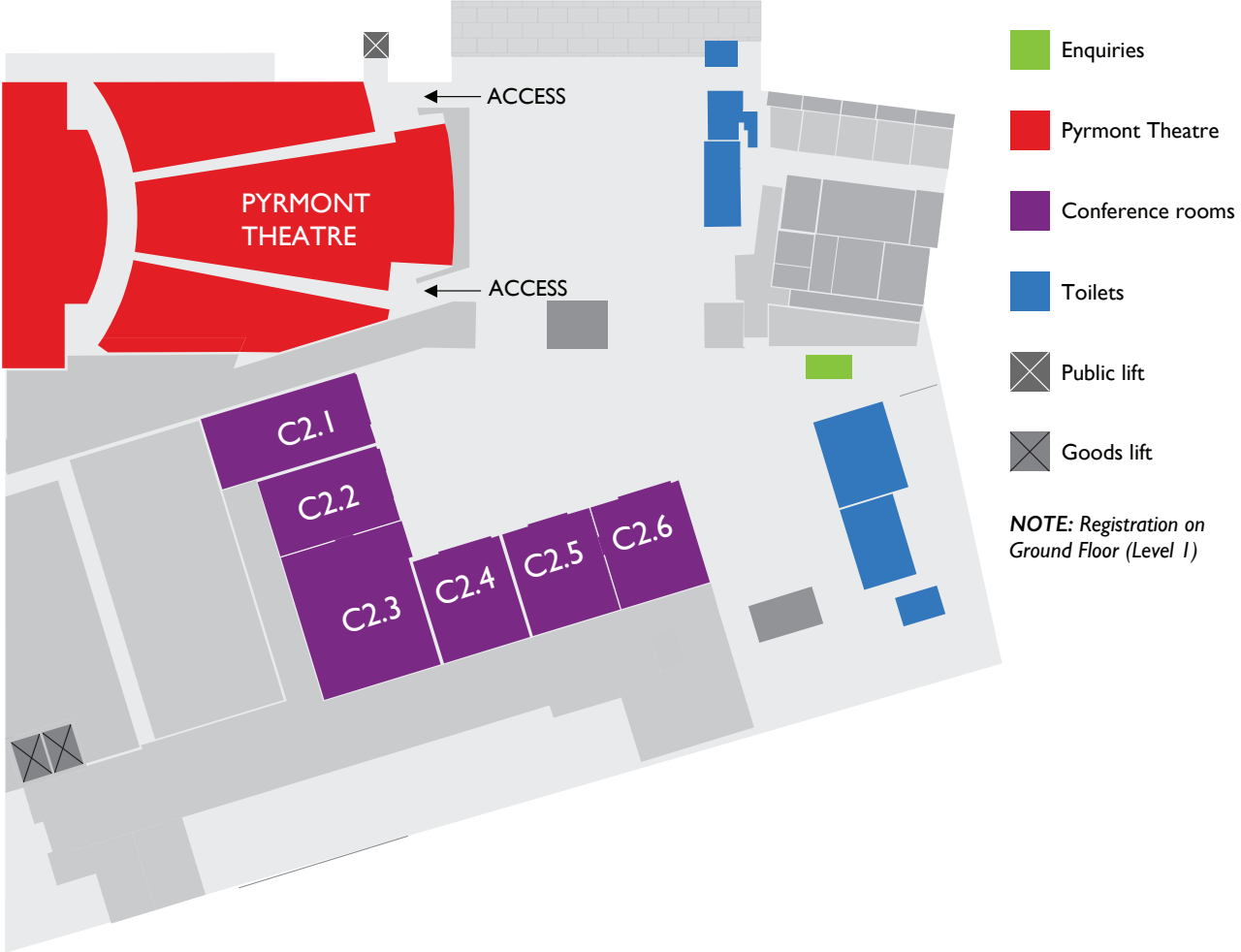
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Elise Pape
Year Leader and Classroom Teacher, Oakleigh, Victoria

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The course is intended for educators new to online facilitation or aspiring to improve their skills in in online facilitation. It will equip participants with the skills and knowledge to be an effective online facilitator. The focus of the course is on the theory and practice of online pedagogy, how to facilitate online discussion and collaboration, and support student learning in the online environment.
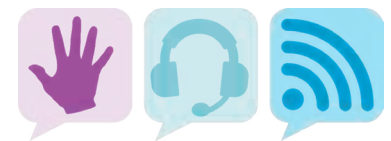
The Westmead Feelings Program 1

This course has been developed in partnership with The Children's Hospital at Westmead. The course is intended for educators and allied health professionals who work with children with autism and intellectual disability. The course demonstrates strategies to provide training in the Westmead Feelings Program to children, their parents and teachers. On successful completion of the course, participants will receive a certificate of achievement, certification to deliver the program, and the opportunity to register their names on an ACER register of preferred facilitators.

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This course is for educators who are just starting to use ACER's PAT assessments. It explains the PAT assessment terminology, describes the purpose of all aspects of PAT assessment reports, and uses case studies to illustrate practical teaching strategies to improve student learning.

ACER Professional Learning courses

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Getting Ahead with PAT

This course is for participants from schools and educational systems who are currently using PAT and wish to deepen their knowledge, practice and staff capacity through a shared understanding of the PAT assessment suite. The focus of the course is on providing participants with an in-depth knowledge of the purpose of assessment, how to use PAT data to plan for learning, and how to promote a culture of professional learning.

It is recommended that at least two participants per school undertake this course.

PAT- R Comprehension for Action Research: from administration to impact

This course is for participants from schools and educational systems who already have established processes for PAT data analysis, and who wish to deepen their knowledge and practice related to PAT-R Comprehension assessment and use PAT data to inform teaching and student learning through an action research approach.

PAT- Maths for Action Research: from administration to impact

This course is for participants from schools and educational systems who already have established processes for PAT data analysis, and who wish to deepen their knowledge and practice related to PAT-Maths assessment and use PAT data to inform teaching and student learning through an action research approach.
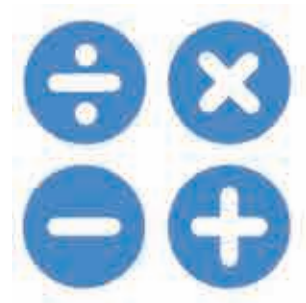
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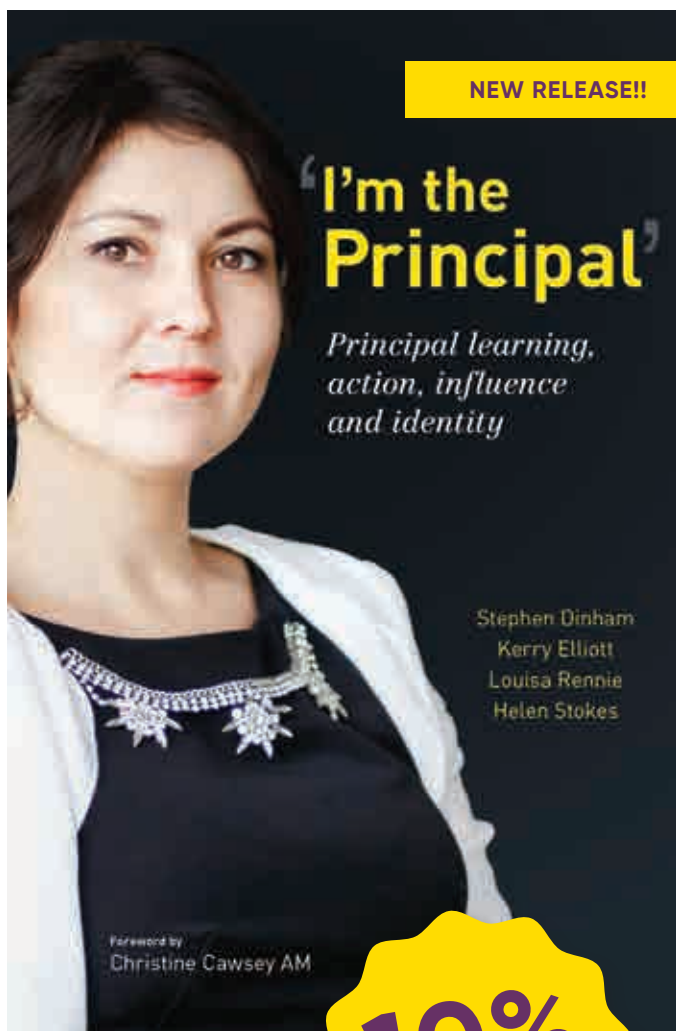
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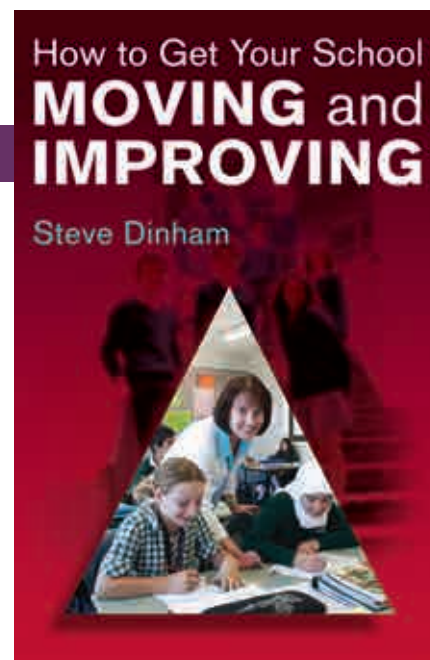
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