



University of South Australia

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Introduction

Part 1 of this document is based on the detailed notes from the small group discussions of conferees in the Theme Group Discussions which took place on Day 3 of the Conference. These discussions followed on from the Distillations of Practice (Days 1 and 2) and provided vital information to AAMT for the ensuing documents for education authorities about improving mathematics outcomes for Aboriginal and Torres Strait Islander learners.

Part 2, the Conference Proceedings, provides the abstracts from the presentations with links to many of the PowerPoint presentations and papers.

Part 3 provides information from the online survey participants completed for the conference evaluation. They provide valuable insights into peoples' thoughts and reflections about the conference, about their work in the field, and about some ways forward.

About the Conference

On Days 1 and 2 of the conference, outstanding classroom practitioners who had been nominated by various systems from all states and territories in Australia showcased their current practice in 30 minute presentations – the Showcases of Practice. From the outset teachers were encouraged to co-present with Aboriginal and Torres Strait Islander Educators¹ (AEs) and researchers who might be working with them. In many schools AEs play an important and significant role in the education of Aboriginal and Torres Strait Islander students and with the formation of relationships between teachers and families – two crucial aspects to improving teaching and learning outcomes.

1. In this paper we use the term Aboriginal and Torres Strait Islander Educator (AE). AAMT recognises that there are many terms used to describe Aboriginal people who work (paid and, sometimes, unpaid) in schools and in programs to support students' learning such as 'Aboriginal and Islander Education Worker' and 'Aboriginal Education Officer'.

The ongoing development of pedagogy is equally vital and that the rigour in doing this is well served with a collaboration between, and support from, experienced researchers. Hence, a number of academic researchers were also involved in presentations.

Following each Showcase, conferees were asked to distil what had been presented, with a view to identifying the critical messages, as well as the implications for policy and practice. Arising from this process of distillation, it was envisaged that a range of insights into current practices in mathematics teaching and learning for Aboriginal and Torres Strait Islander learners would emerge. Issues could then be highlighted and suggestions for future action for improvement identified.

On Day 3 of the conference, participants took part in small group discussions on the six key themes in numeracy, mathematics and Aboriginal and Torres Strait Islander learners that conferees identified from the Distillation of Practice. These were:

- Community and school engagement
- Professional learning and pre-service
- Research and evidence
- School organisation and school change
- Responsive mathematics pedagogy
- Curriculum and assessment.

The records of these discussions have been developed into the Theme Group Discussions forming Part 1 of this document.

Part 1

Conference Summary (Theme Group Discussions)

This section provides a summary of the Theme Group discussions that emerged from the Showcases and Distillation of Practice sessions. It is intended to provide a framework to inform future policy and program in numeracy and mathematics for Aboriginal and Torres Strait Islander and Torres Strait Islander learners.

The six themes from the Conference discussions have been reorganized into the following themes and these are, in no order:

1. Community and school engagement
2. Leadership for school change
3. Pedagogy and classroom practices
4. Research
5. Professional learning

A sixth group on Curriculum and assessment was also established at the Conference. The group discussed the theme that mathematics is a cultural practice and its consequences. Their conclusions and suggestions have been incorporated within these five themes – particularly in Theme 2 - Leadership and school change. Naturally there is some overlap between the themes.

The Theme Group discussions focused on these three questions:

- Where are we now?
- What are the issues?
- What are some ways forward?

The following sections summarise these discussions.

Theme 1

Community and school engagement

Where are we now?

There is a strong emphasis through policy and programs on ‘community engagement’ as a means for helping improve educational outcomes for Aboriginal and Torres Strait Islander young people. Advice and support often remains at the ‘general’ level, with the result that, whilst some schools have great success, many schools put significant time into well-meaning but ineffectual ‘general’ programs and actions.

It seems that general directives and generic advice around ‘engaging with community’ are not readily able to be translated into action that generates educational outcomes. Schools and their Aboriginal and Torres Strait Islander communities both report frustration that their high hopes are often not realised in practice. At best, these schools’ actions result in “*love your local black fella*”² and fall well short of contributing in meaningful ways to the sort of “*social, cultural and academic inclusion*”³ that supports Aboriginal and Torres Strait Islander students to reach their full potential at school.

There are, however, success stories in mathematics and numeracy. Those reported at the Conference tend to be small and somewhat isolated. Some characteristics of these successful initiatives in mathematics include⁴:

- Being parent and family focussed, rather than beginning with an intention to engage the whole community;
- Focussing on learning and including Aboriginal and Torres Strait Islander students, but with connections and implications that are well beyond the students’ learning of mathematics.
- Ensuring AEs have the opportunity to make strong contributions to the quality and effectiveness of the programs and whose work is recognised and respected by both the school and the community.
- Continuity within schools comes from a strong relationship with Community, through allowing space for Aboriginal and Torres Strait Islander people within the school and a strong understanding for any new staff that this is an integral part of the school.

Programs such as these can lead the way for and ‘seed’ more general initiatives within the schools.

What are the issues?

Many factors are experienced as barriers to establishing school community engagement in support of Aboriginal and Torres Strait Islander students’ learning of mathematics. Some of these are general in nature; others are more specific to mathematics.

General issues

2. Hughes, P. 2012. Make It Count Network Meeting, Sydney.

3. Morris, C, Thornton, S, Toberty, K, Statton, J (2012). Numeracy, mathematics and Indigenous learners: Developing responsive mathematics pedagogy, unpublished paper.

4. See Part 2 of the Conference Summary: Conference Proceedings.

- Schools need to spend the time and effort to develop a strong rationale and purpose for community engagement – it must be something that is widely understood and valued by teachers before taking even the first steps to build relationships between teachers and parents of Aboriginal and Torres Strait Islander students.
- Many teachers and others make ill-informed generalisations about Aboriginal and Torres Strait Islander, ‘community’ and culture. Unless challenged, these assumptions will work against achieving positive outcomes from community engagement.
- Teachers often have limited knowledge of Aboriginal and Torres Strait Islander ways of knowing, learning and doing.

Issues that are specific to mathematics in schools

- Schools and teachers struggle to identify where and how to start with community engagement that supports mathematics in the school, particularly in the light of the fear many express that they will ‘do the wrong thing’.
- Capacity of the school’s leadership to incorporate a robust and effective community engagement program as part of a systematic approach to whole school change in terms of mathematics for Aboriginal and Torres Strait Islander students.
- Teachers often have limited knowledge of Aboriginal and Torres Strait Islander ways of knowing, learning and doing in relation to the learning of mathematics.
- Having AEs who are able to play significant roles in community engagement initiatives that support mathematics learning in the school.
- Many Aboriginal and Torres Strait Islander parents and community members have poor perceptions of mathematics in schools, and a fear of the subject, often related to their personal experiences when at school.

What are some ways forward?

Effective community engagement is a critical component of achieving social, cultural and academic inclusion of Aboriginal and Torres Strait Islander young people. It is arguable that, historically, mathematics has been an area of schooling that has been associated with the greatest levels of exclusion of Aboriginal and Torres Strait Islander young people, with all the resultant limiting of life choices. Hence, particular attention to building community engagement in and through mathematics is warranted.

Effective community engagement requires commitment to the development of learning-oriented relationships by both the school and community. *“It starts with a conversation and you can’t dictate how that conversation is going to go. From the relationship you get the cultural responsiveness and your role is defined as you go along.”*⁵

Some specific strategies and orientations for engaging parents, families and communities with Aboriginal and Torres Strait Islander students’ learning of mathematics have been identified:

- Ensure that there is an orientation to two-way learning – members of the community learn from the educators and school personnel learn from the community. Effective programs will enable parents and others to engage with their children around the mathematics in school. Equally importantly, these programs also allow school staff to

5. Matthews, C & Yunkaporta, T (2012). Conversations from the AAMT Special Interest Conference Numeracy, mathematics and Aboriginal and Torres Strait Islander learners, Adelaide.

observe and interact with Aboriginal and Torres Strait Islander people in learning and teaching situations. The deepening of their appreciation and knowledge of Aboriginal and Torres Strait Islander ways of knowing, learning and doing and the home language of mathematics will enrich their relationships with students, and inform their work in the classroom.

- Build the ‘pedagogical voice’ of AEs who support teaching and learning in classrooms. ⁶ In many cases and in many ways, AEs are the interface between schools and the community. Their important role in the classroom is strongly enhanced through deliberate strategies to build their knowledge and understanding of mathematics, and how it is learnt – their ‘pedagogical voice’. In the context of programs for community engagement in mathematics, this voice in turn enables them to help build appreciation of school mathematics for community members involved. Equally, as members of the community themselves, they are able to help portray Aboriginal and Torres Strait Islander community members’ ways of knowing, learning and doing.
- Build the capacity of AEs to take important leadership roles in community engagement programs in mathematics. The effectiveness of these programs can be greatly enhanced when AEs have, and are seen to have, significant leadership roles. Some of this capacity comes from their ‘pedagogical voice’ – they know their stuff. Other components come from the school’s leadership actively promoting and supporting their AEs’ leadership roles in these programs.
- Focus on demystifying mathematics in community engagement programs. This can occur in a variety of ways:
 - Processes and activities that seek to connect the worlds of community members with the world of school mathematics;
 - Careful attention to the language of mathematics – meanings, uses etc – in order for parents and community members to have access to the mathematical ‘discourse’ of their young people’s schooling;
 - Cross-age tutoring in which older students ‘teach’ their younger siblings and peers, and even the adults present if that is appropriate; and
 - Active involvement of community members in mathematics ‘camps’, special mathematics days and excursions involving Aboriginal and Torres Strait Islander students.

In addition to these targeted strategies for use in community engagement programs, many incidental opportunities to engage parents and community members will become apparent when teachers and schools are better attuned to notice these. This requires whole school change to establish a culture that values and enables strong levels of Aboriginal and Torres Strait Islander community engagement in mathematics.

6. AEs work in a variety of roles - some specifically in supporting classroom work and others specifically in community engagement with others in a combination of the two.

Theme 2

Leadership for School Change

Where are we now?

The role of school leadership is vital to school change and is highly documented. There is an extensive literature on matters such as educational leadership styles and leadership development. Leadership that is specific to Aboriginal and Torres Strait Islander education forms part of the available literature and there are several initiatives nationally, such as the *Stronger Smarter*⁷ and *Dare to Lead*⁸ strategies, supporting leaders in schools. Both have been active in developing leadership and supporting school change to improve the learning outcomes and life opportunities generally of Aboriginal and Torres Strait Islander young people in remote to urban school communities across Australia.

On the other hand, although leadership of mathematics at the school level has been recognised as important and some strategies have been developed, there is no equivalent national approach specific to mathematics education for Aboriginal and Torres Strait Islander students. It is clear though that, whether it is school change in Aboriginal and Torres Strait Islander education or in mathematics education, establishing professional learning communities has been identified as a powerful mechanism.

Some principals and schools have worked successfully at the intersection of Aboriginal and Torres Strait Islander education and mathematics education and some of the characteristics of their approaches include:

- Vision and drive of the principal around the changes needed in the school;
- A culture of high expectations of Aboriginal and Torres Strait Islander students and their teachers;
- Investment in Aboriginal and Torres Strait Islander educators as mathematics educators and as leaders in the school and the community;
- Establishing, maintaining and supporting purposeful relationships between those involved in the education of each child;
- Planning and practice that is informed by the collection and analysis of data;
- A culture of expectation that pedagogy is constantly evolving, with teachers continually running a lens over their work in the classroom;
- Practical support for quality teaching such as provision of resources (including curriculum and assessment) and teachers supporting and mentoring one another; and
- An emphasis on the proficiencies in the implementation of the Australian Curriculum: Mathematics.

7. The Stronger Smarter Institute is in the Queensland University of Technology.

8. Dare to Lead is an initiative of the Principals Australia Institute.

What are the issues?

There are many issues and challenges faced by school leaders. Some of these are particular to where a school might be located geographically (remote, rural, regional, urban) or particular characteristics of the school community. Others are generic to many schools such as, importantly, the mathematical content and pedagogical content knowledge of classroom teachers.

General issues

- Engaging with Aboriginal and Torres Strait Islander communities is a major strategy for Aboriginal and Torres Strait Islander education throughout Australia. There are often difficulties, either perceived or actual, in doing this as schools struggle with appropriate and purposeful ways to achieve this.
- Principals feeling isolated geographically and/or professionally (working to specifically improve mathematics education for Aboriginal and Torres Strait Islander students is not a common area of interest).
- A sense of lack of capacity to develop and nurture purposeful relationships that support teaching and learning of each student.
- Transience of staff and principals causing lack of continuity, and limiting progress in the achievement of the goals of whole school plans.
- Often schools have the required data but do not make good use of it because the school does not have the capacity to analyse and interpret it, and then to use their interpretations of the data to inform their actions.
- Lack of knowledge about why and how the culture of students is important in the teaching and learning of mathematics for Aboriginal and Torres Strait Islander students.

Issues that are specific to mathematics in schools

- Attitudes and assumptions by some educators that *'Some kids can't learn maths'*.
- Perceptions of and about mathematics such as what it is and what it means.
- Lack of strategies in the face of absenteeism/transience/lack of retention that is seen to create particular problems of continuity in learning mathematics.
- Level of content and pedagogical content knowledge in mathematics of teachers.
- The sense that there is a single, universal 'answer' to the question of how to teach mathematics to Aboriginal and Torres Strait Islander students or otherwise.
- The number of apparently markedly different frameworks for the teaching and learning of mathematics.

What are some ways forward?

Professional learning communities are, if they are well-constructed and supported, collaborative and inquiry based, at the same time challenging and safe for those involved. They offer a space for addressing many of the issues outlined above.

Engaging outsiders to support developments in mathematics education and Aboriginal and Torres Strait Islander education through, for example, practitioner - researcher partnerships can contribute significantly to professional learning communities. This is particularly important and valuable for an

area that has not had much attention in the past. It can also provide opportunities for teachers to gain further accreditation through courses offered by universities.

These communities can provide a way forward by way of:

- Courageous conversations between principal and teacher, teacher and teacher – conversations about deep personal issues such as deficit assumptions and beliefs about students, the community etc.
- Consistent and effective use of good data tools that go beyond NAPLAN and are part of teachers' business.
- The collaborative thinking and effort (school and parents/community) with a shared vision and commitment that enables mathematics to be integrated into Whole School Plans and strategic directions.
- Outreach to, and sharing with other schools, is valuable for the recipients; but it also forces rigorous thinking in connecting with others, thus ensuring the ability to be 'walk the walk, not just talk the talk'.
- The intersection of Aboriginal and Torres Strait Islander education and mathematics education referred to earlier and highlighted in the Conference Discussion Paper is exciting new territory which needs to be explored; with an evidence focus and inclusive of:
 - a) 'Cultural competency' of leaders and staff.
 - b) Focus on quality pedagogy and teaching in mathematics through building educators' content and pedagogical content knowledge in mathematics.
- Mentoring and supporting new staff, including principals and leaders – 'this is what we do and why we do it in this school' as the message.
- Identifying the roles of AEs and supporting them to do their work in mathematics and community and school leadership.
- Providing sufficient resources - such as time for teachers and AEs - and funding to participate in these communities
- Collaborative development of a pedagogical framework for teaching mathematics that is owned by the members of the professional learning community.
- Acknowledging and publicising a job well done.

Theme 3

Pedagogy and classroom practices

Where are we now?

The Conference brought together a group of teachers and other educators who shared their practical insights into the pedagogy they were using to try to make a difference in mathematics learning for Aboriginal and Torres Strait Islander students. An over-arching theme in their presentations of their classroom work was that ‘context’ is a critical component that requires careful consideration. Whilst this necessarily leads to diversity in the detail of pedagogy in mathematics, three areas were common – cultural inclusion leading to some insights into responsive pedagogy in mathematics; structures that support learning; and strategies for providing multiple modes of learning. Within these three there was a range of aspects that have been identified as contributing to classroom success. These are outlined below.

Responsive pedagogy in mathematics

- Identifying and taking into account in their teaching of mathematics Aboriginal and Torres Strait Islander students’ world views and ways of knowing, working and learning.
- Focusing on building learning related relationships with Aboriginal and Torres Strait Islander students.
- Recognising that Aboriginal and Torres Strait Islander students may often have strong cultural connections to ‘country’ and acting on these by looking for ways of connecting mathematics to ‘country’.

Structures in the classroom that support learning of mathematics

- Establishing routines and consistency as part of the classroom ‘norms’.
- Making the learning goals – for the lesson, for the unit of learning etc. – intentional, explicit and understood by the students.
- Exploring and using ‘context-based’ approaches.
- Giving clear and well-known processes for scaffolding students’ learning in mathematics.
- Giving careful attention to the language of (western) mathematics and the home language of mathematics.

Strategies for providing multiple modes of learning

- Students watching as teachers (or others) model the mathematics ie doing the mathematics, articulating it, applying it.
- Providing means for student control and choice within their learning.
- Providing time for students to reflect on their learning.
- Giving opportunities for independent and collaborative learning.

- Using story-based learning.
- Students interacting with mathematics through ‘body-hand-mind’¹⁰.

What are the issues?

There is an increasing body of evidence that pedagogy and related classroom practices in mathematics that are successful for Aboriginal and Torres Strait Islander students also work well for other students.

However, the reverse is not necessarily true – what works for other students may not work well for their Aboriginal and Torres Strait Islander counterparts. This is a fundamental issue – whilst a starting point in identifying pedagogy and practices to use with Aboriginal and Torres Strait Islander students can be looking at ‘good teaching of mathematics’ it cannot be assumed that it will be good for them. It is a matter that needs to be explored in order to identify evidence of success with Aboriginal and Torres Strait Islander students. It was also noted that Aboriginal and Torres Strait Islander students are more vulnerable to ‘bad’ pedagogy than their non-Aboriginal and Torres Strait Islander counterparts.

Another key issue is that there is no single ‘answer’ to the question of appropriate pedagogy for Aboriginal and Torres Strait Islander students. It is teachers’ professional responsibility to identify and use a pedagogy that includes all of students. Such a pedagogy – and the associated classroom practices – will be characterised by being responsive to diversity in order to meet each student’s learning needs.

Other important issues identified by participants at the Conference as having an impact on pedagogy and practices for mathematics include:

- Standard Australian English is not always the first language of Aboriginal and Torres Strait Islander students.
- Learning outcomes in mathematics can be compromised, or even lost if there is an excessive focus on cultural and social inclusion of Aboriginal and Torres Strait Islander students.
- Pedagogy and practices in mathematics can and should be underpinned by rigorous and honest analysis and interpretation of evidence.
- Many teachers lack strategies for learning about Aboriginal and Torres Strait Islander students, families and the school and community context. Many teachers are also frightened that they will ‘do the wrong thing (culturally)’ and so do nothing in terms of connecting with students, their families and communities. This is standard business for educators. Teachers need to reflect on this fear, understand it and then feel the fear, and do it anyway.
- Individual teachers can make a difference in Aboriginal and Torres Strait Islander students’ learning and take a leading role, but systematising good teaching across the school can only come through whole school approaches.
- Many teachers do not believe/see themselves as competent users of mathematics and/or teachers of mathematics.

10. Such as encountered with the YuMI Deadly Maths where students develop two-way connections between reality, representational activities, and mental modes in mathematics.

What are some ways forward?

Fundamental to ensuring Aboriginal and Torres Strait Islander students reach their potential in mathematics is establishing pedagogy and associated classroom practices that take account of, and build on Aboriginal and Torres Strait Islander ways of knowing, learning and doing mathematics. This will inevitably lead to a move away from a 'transmission' model for the teaching and learning of mathematics.

Some general principles for pedagogy in mathematics for Aboriginal and Torres Strait Islander students were identified as ways forward:

- Establishing effective ways of capitalising on the potential of AEs in schools to contribute to the development of pedagogy for mathematics such as a two-way approach to teaching and learning.
- Establishing a learning environment that is predictable (for students, parents and teachers) through structures and routines, and clear expectations. An 'apprentice model' can provide the overall framework for this consistency such as 'I do - you watch; I do -you help, You do - I help, You do - I watch'.¹¹
- Give consistent and explicit attention to the language demands inherent in learning mathematics.
- Using story-based learning will draw Aboriginal and Torres Strait Islander students (in particular) into the learning 'conversation' by way of social and cultural inclusion.
- Using mathematics as a way of communicating, to tell stories, and where it is seen as an abstraction of reality with symbols that are telling the story.
- Establish and support whole school change initiatives that are well supported, built into the school development plan, owned by the school and community etc.
- Leaders need to be alert to, and address issues of teachers' inadequate knowledge of mathematics content when this inhibits their capacity to develop effective pedagogy in mathematics for Aboriginal and Torres Strait Islander students.

11. See Presentation #25 Learning mathematics by watching on p. 25.

Theme 4

Research

Where are we now?

One of the aims of the conference was to bring together people from around the country involved in projects in mathematics education for Aboriginal and Torres Strait Islander students. To a greater or lesser extent all of these projects involve research. It was evident that there is a range of focus and research methodologies from projects in a variety of locations. Most of the current research is focussed on primary education and is state or locally based, with a leaning towards more remote locations. There is a reasonably heavy emphasis on research associated with students not reaching agreed benchmarks in mathematics. This explains to some extent the focus on more remote settings since NAPLAN and other data identifies that a disproportionate number Aboriginal and Torres Strait Islander students in remote Australia do not achieve agreed minimum benchmarks in mathematics and numeracy.

Generally these research projects are short term and are government funded through the Australian Government's Closing the Gap, Smarter Schools National Partnerships or Australian Research Council initiatives. Many are about testing 'good, mainstream mathematics' with Aboriginal and Torres Strait Islander learners and adapting these to suit the context in which they're operating.

What are the issues?

An over-arching issue for schools is the 'evidence-based' emphasis in contemporary education. In the field of Aboriginal and Torres Strait Islander students' learning of mathematics there is currently a relatively small body of research that can inform practice – schools and even systems can struggle to identify practices and approaches that have a sufficient 'evidence-base'. This 'small' field of research is also probably better suited to national approaches with local flavour, rather than the eight states and territories pursuing individual and often unconnected approaches to research.

In addition to these over-arching matters, conferees identified other issues, including:

- Coherent, purposeful sharing of research and research findings is currently limited, with the result that there is a lack of impact nationally.
- There is a challenge of dissemination of research findings for widespread impact.
- Small scale research projects may have a contribution to make to the field but have difficulty being recognised and thus disseminated in a competitive publishing environment.
- Many projects are 'run' by mathematics educators and often do not benefit from partnerships with Aboriginal and Torres Strait Islander researchers or researchers in Aboriginal and Torres Strait Islander education.
- Using data collection tools that may be inappropriate in the particular context as they are culturally inappropriate (eg there are well-known language issues and NAPLAN questions, particularly for remote schools).
- Stereotyping of Aboriginal and Torres Strait Islander students' learning of mathematics that often comes from inappropriate generalisations of other findings.

- Although it is appropriate for teachers and schools to test ideas from elsewhere, this must be done critically – the issues and needs can be so acute for some teachers and in some schools that there can be an uncritical adoption of ‘good ideas’ without evidence for their setting.

What are some ways forward?

Conferees generally agreed that a coherent and sustained effort on research that supports Aboriginal and Torres Strait Islander students to achieve their potential in mathematics is required. The key sense of the suggestions below is that this needs to be developed through genuine collaboration between all those committed to this cause.

- Establish an inclusive research network that welcomes and promotes dialogue between members from Aboriginal and Torres Strait Islander education and from mathematics education.
- As a matter of some urgency, Governments, researchers and professional organisations need to collaborate to develop a research agenda with priorities (short, medium and long term). At this stage it is not appropriate to define an agenda from the conference input. However, some general considerations for this research agenda are:
 - Identifying, developing and defining effective (valid and reliable) data tool;
 - The role of questioning in the mathematics classroom;
 - Relationships that impact on teaching and learning.
 - The role of language in mathematics, including how to develop effective pedagogy to build a bridge between specialized mathematical language and dialects of Aboriginal and Torres Strait Islander English, and Aboriginal and Torres Strait Islander languages;
 - Critical evaluation of current mathematics programs that are being used or developed in schools;
 - Drawing on Aboriginal and Torres Strait Islander pedagogies and exploring the implications for mathematics.

Many other, often quite specific foci will emerge on consideration of other aspects of this Conference Summary.

- Collaboration between Governments, researchers and professional organisations would also be able to develop agreed protocols and practices for research at different ‘grain sizes’ (classroom, school, Cluster, system and national). Some broad orientations of research methodologies that focus on mathematics for Aboriginal and Torres Strait Islander learners were identified by conferees.
- Researcher - practitioner partnerships (these link with and build into professional learning communities mentioned in the Leadership and School Change section).
- Investing in increasing teacher and school capacity to be involved in research (time; up-skilling etc).
- A cyclic approach that responds to evidence that emerges along the way (Action Learning).
- Drawing on Aboriginal and Torres Strait Islander research methodologies.

Theme 5

Professional learning

Where are we now?

It is recognised that there are an assortment of opportunities for professional learning in both mathematics education and in Aboriginal and Torres Strait Islander education. However, professional learning that is about Aboriginal and Torres Strait Islander students learning mathematics is mostly confined to individual projects and some system initiatives and for many is a relatively unfamiliar concept.

These opportunities in professional learning are offered through a variety of modes and models and are directed mainly at teachers and conferees reported that programs and processes do not always reflect current best practice in professional learning.

What are the issues?

There is a clear appetite for effective professional learning for teachers, Aboriginal and Torres Strait Islander educators, and leaders to increase their knowledge, understanding and skills in relation to Aboriginal and Torres Strait Islander students learning mathematics. Many recognise the need for professional learning particularly in mathematics content and pedagogical content knowledge and/or in working effectively with Aboriginal and Torres Strait Islander students, parents, families and communities.

There are many issues connected to this 'clear appetite' for professional learning:

- Limited opportunities for professional learning related to both mathematics and Aboriginal and Torres Strait Islander education, except in specific projects.
- A focus on general Aboriginal and Torres Strait Islander education professional learning programs (eg Dare to Lead, What Works, Stronger Smarter) without specific attention to mathematics teaching and learning.
- Issues and challenges are profound, so ongoing engagement in professional learning can be difficult or impossible (such as isolation and distance).
- A focus on literacy can be at the expense of numeracy.
- A lack of opportunities for professional learning for Aboriginal and Torres Strait Islander educators to help them realise their potential as educators and community leaders.
- Turnover of staff can lead to lack of continuity of knowledge and experience developed through professional learning over time.
- The divide that can exist between between primary and secondary sectors of schooling in relation to how and what mathematics is taught, and the resultant transition issues for students.

What are some ways forward?

A common direction that has been identified in the Themes covered in the conference is the effectiveness of professional learning communities (PLC) as a way forward. PLCs can serve many purposes and can be vehicles for professional learning, in mentoring people new to school, in peer to peer support etc. The formation of PLCs can occur in varying ways that offer flexibility in the ways they can exist and function. Their foci can support effective pedagogy, community engagement and school change to support mathematics, as reflected throughout the other Themes).

- Ways forward in professional learning that were identified by conferees included:
- Programs require sustained commitment to known principles for effective professional learning (closely related to the classroom; ongoing; support from systems and leaders; peer to peer support etc).
- Need to build excitement about improved mathematics outcomes for Aboriginal and Torres Strait Islander students through sharing and celebrating these (eg through presentations; articles, papers etc).
- The sense and practice of professional learning should be expanded to include purposeful engagement of and with parents and community around mathematics including strategies for learning about Aboriginal and Torres Strait Islander students, families etc.
- General initiatives (Dare to Lead, What Works, Stronger Smarter) need to develop strategies and approaches to support development in mathematics for Aboriginal and Torres Strait Islander students.
- Distance and isolation of many teachers and schools needs consideration through using flexible, creative, innovative models that capitalise on the increasing availability of high speed internet connections.
- In the face of the complexity of issues faced by many teachers and schools, professional learning must have a focus on putting the learning into practice, supported by appropriate follow-up and reflection by those involved.
- Incorporate a clustering approach for professional learning and PLCs - for remote locations this can be achieved through technology.

Part 2

Conference Proceedings

Presentations and papers

1. Strategies for achievement in numeracy for Aboriginal and Torres Strait Islander students

Margaret Dove-Sheedy

The Swan Valley Cluster of schools has a number of whole school approaches including contextualising mathematics and development of specific resources and units of learning which follow a teaching and learning sequence. These are complemented by targeted professional learning of AEs, EAs and teachers, and also mentoring programs between teachers and schools that have proven to be very effective. Details about the pedagogy involved and the key messages from them will be presented.

2. Helping older Aboriginal and Torres Strait Islander students develop a robust understanding of decimal and common fractions

Dianne Tomazos

The learning of mathematics in remote Aboriginal and Torres Strait Islander schools is often neglected in favour of a stronger focus on developing literacy skills. As a result many students reach the secondary years without having the opportunity to learn more than very basic whole number arithmetic. This presents particular difficulties for students who choose to continue their schooling in city schools. In this session, strategies used to introduce secondary students to decimal and common fractions will be shared. The focus has been on developing the initial concept and then accelerating learning without neglecting the depth of understanding needed or future success in mathematics.

Download presentation and paper at <http://aamt.delivr.com/1a8od>

3. Monday Maths Mob at Hebersham

Danielle Upton, Mona McFarlane and Sue Connell

This presentation explores the key learning domains of mathematics engagement, relevance and connectedness in an innovative program that brings mutual benefit to schools and community whilst strengthening Aboriginal and Torres Strait Islander students' attainment and confidence in mathematics. The 'Monday Maths Mob' and 'Koori club' were initiated in 2009 in the Dharug Cluster as part of the Make It Count project and continue to build the mathematics alignment amongst school, class and the home for Aboriginal and Torres Strait Islander students. Key principles and outcomes are presented as the programs are described and discussed.

Download presentation at <http://aamt.delivr.com/1a8od>

4. 'Wanna do more math': Engaging underachieving Aboriginal and Torres Strait Islander learners the YuMi Deadly way

Dean Sorensen, Dion McNeil, Gillian Kidman

The Accelerating Aboriginal and Torres Strait Islander Mathematics (AIM) Program offered by the YuMi Deadly Centre from QUT accelerates the mathematics learning of under-performing students in Years 8–10 by: a) apportioning Years 2–10 Australian Curriculum:

Mathematics content into three years; and b) providing a teaching approach that accelerates mathematical learning. The philosophy of the YuMi Deadly teaching approach is one that requires a 'body', 'hand', 'mind' pedagogy. This presentation will provide examples of this pedagogy. In AIM classrooms, this approach is having a positive impact. Students are willing 'to have a go' without shame; and they develop the desire to learn and improve their numeracy.

Download presentation and paper at <http://aamt.delivr.com/1a8od>

5. Pedagogy: Engagement in a social context

Harry Langes

How often in our teaching career do we hear "Why are we doing this? This is boring!"? It is very important for learning to have students' interest captivated. Once we have channeled this interest we generate engagement, relevance and significance of the learning material and content presented. Students in my class were given a newsletter to take home and immediately set about seeing if the paper plane generated from this could land in the bin. From this an entire unit of work encompassing various mathematics strands was generated with everyone being part of the learning team and sharing of skills. Learning became fun and importantly mathematics relevant. Student outcomes improved greatly and issues normally presented decreased greatly.

Download paper at <http://aamt.delivr.com/1a8od>

6. Worawa Ways of Learning

Sandra Barnes

In order to engage students at Worawa Aboriginal Girls College in active mathematics learning, teachers are developing hands-on activities that build on existing student knowledge and interests. Worawa Aboriginal ways of learning are used to plan and present topics from the traditional Year 7 to 10 school curriculum. Activities such as a Stylin' Up Fashion Parade, creating an Aboriginal and Torres Strait Islander food garden, planning a theatre excursion, or following the progress of our Aboriginal and Torres Strait Islander athletes at the Olympics enable students to explore topics such as algebra, simultaneous equations or geometry in a practical context.

Download paper at <http://aamt.delivr.com/1a8od>

7. Contextually-based resilience mathematics

Stewart McGaffin, Steve Thornton

This presentation will give a practical look at the way Ocean VAE College runs a Contextually Based Resilience Mathematics Program which combines the interest and strengths of both students and staff to create authentic and engaging learning experiences. The program runs for students between Years 4–7 and also addresses transition, relationship building with other students and teachers and concepts of identity. This model of practice looks at ensuring students are equipped with the tools necessary to be a more confident and knowledgeable user of mathematics both at school and in society.

Download presentation at <http://aamt.delivr.com/1a8od>

8. From context to mathematics to context: Mathematising and contextualising

Stewart McGaffin and Steve Thornton

The Make It Count Alberton cluster of schools has developed a theoretically-informed framework for conceptualising the move from context to mathematics to context using the ideas of mathematisation and contextualisation. Our work has led to the development of enhanced mathematical resilience among

Aboriginal and Torres Strait Islander students and has caused teachers to question taken-for-granted assumptions about curriculum and pedagogy. In particular we question the linear, hierarchical structure of traditional curriculum frameworks, and suggest that valuing the inherent unpredictability of learning and the emergence of new knowledge is vital in building connections between mathematics and the real world of Aboriginal and Torres Strait Islander learners, and hence critical in planning authentic and meaningful learning.

9. Talking Numba: Building on different foundations

John Bradbury

Talking Numba is a resource which represents a two pronged approach to remote Aboriginal and Torres Strait Islander mathematics education. Firstly it deconstructs foundational mathematics concepts to increase student accessibility. Each concept is broken down into small, developmental steps and each step is linked to targeted hands-on activities. Secondly it facilitates capacity building of Aboriginal and Torres Strait Islander Assistant Teachers (ATs). The aim is for ATs to present specific activities in the students' first language. The resultant focus on concept building in conjunction with the language of instruction has proven invaluable in a number of ways. Both the use of the resource in classrooms and the resultant discoveries to date will be discussed.

Download presentation and paper at <http://aamt.delivr.com/1a8od>

10. CAPS Kurrawang Primary School

Kerryn Perry

Our school is a small two teacher school in a community in the Goldfields of Western Australia. Implementation of the AICS Numeracy Resources and Quality Learning Principles over the past two years has seen students make considerable progress in numeracy. This session includes how we used:

- Diagnostic tasks to identify students learning needs.
- Focused teaching based on hands on activities to target critical areas of mathematics, namely;
 - Understanding the numeration system and calculation strategies;
 - Capacity matrices to intrinsically motivate students and allow them to track their learning.

The session will include examples of classroom practice, case studies of students and some of the difficulties encountered along the way.

Download presentation and paper at <http://aamt.delivr.com/1a8od>

11. Advantages of explicit teaching

Anna Burrows

My presentation will be based on the programs and teaching pedagogy which have worked in my classroom for Aboriginal and Torres Strait Islander students. The structure of the maths classroom will be explored. Lesson design will be presented in the form of setting clear goals; teaching the content and giving instructions explicitly; gaining feedback by checking for understanding; guiding practice; monitoring independent practice; and reflecting on the lesson. Differentiation which has achieved successful learning outcomes will also be discussed. The impact of challenges with lack of attendance, transience, English as a Second Language/Dialect (ESL/D) and lack of learning environment at home will also be mentioned in the above context.

12. Scaffolding the Big Ideas in Number

Rosemary Wilkinson

As a teacher of the middle primary years this presentation will be aimed towards this teaching sector. The emphasis will be on teaching and learning and is specifically about improving the learning outcomes for the school's Aboriginal and Torres Strait Islander students. There will be a section on using a highly scaffolded pedagogy which has been married with the logical sequence of Big Ideas in Number to increase student confidence, engagement and skills. It will include strategies, learning sequences and a framework. There will be examples of teaching in action and student outcomes that include work samples and evidence that supports the strategy.

Download presentation and paper at <http://aamt.delivr.com/1a8od>

13. Working together

Sandra McLeod, Lisa Gray

After completing the Yumi Deadly Maths program, strategies were implemented into the classroom including linking learning to real life, and ensuring that learning is backed up with written work or practice work where children reflect on what they have just learnt by either writing about it themselves or being prompted by the teacher. Important aspects of teaching mathematics to Aboriginal and Torres Strait Islander children will be discussed including:

- Having a true relationship with students;
- Having attainable goals and tasks;
- Linking learning to past knowledge;
- Using a range of teaching styles;
- Using the YuMi framework when planning learning.

Download presentation and paper at <http://aamt.delivr.com/1a8od>

14. RoleM in Queensland

Danielle Armour, Elizabeth Warren, Angelina Sharry

RoleM is a four-year longitudinal DEEWR funded project now entering its third year of implementation. The project consists of three interlocking arms: effective numeracy initiatives that align with Aboriginal and Torres Strait Islander pedagogy and beliefs, quality teaching and capacity building of Aboriginal and Torres Strait Islander Education Workers, and working together through partnerships, networks and shared leadership. This session shares features of these arms that are crucial to the success of RoleM and maintaining its momentum. Our evidence includes:

- A significant increase in young Aboriginal and Torres Strait Islander students' engagement and learning in mathematics;

- A significant movement towards closing the gap between Aboriginal and Torres `Strait Islander and non-Aboriginal and Torres Strait Islander students' numeracy outcomes.

Download paper at <http://aamt.delivr.com/1a8od>

15. The potential of Getting Ready in Numeracy Program for supporting the learning of Aboriginal and Torres Strait Islander students

Kate Naughtin, Peter Sullivan

The Healesville Cluster of the Make It Count project has been exploring the ways that the Getting Ready in Numeracy Program supports the learning of Aboriginal and Torres Strait Islander students. The program is based on the principle of preparing students for their mainstream mathematics classes so they are better able to learn in those classes. The program has been very well received by tutors, teachers and the students. The session will outline the program and the way it works and present evidence of its effectiveness.

Download presentation and paper at <http://aamt.delivr.com/1a8od>

16. Assess, Plan, Teach: An Aboriginal Independent Community Schools way of teaching numeracy

Alex Hunter, Paul Butters

Aboriginal Independent Community Schools (AICS) is a well established group of schools that vary in size and location around Western Australia. The AICS Numeracy Project headed by Ms Kaye Treacy has in a short period of time been very successful in giving teachers a scope and sequence that targets what assessing, planning and teaching needs to be done for each student in order for them to move on successfully.

During this presentation participants will begin to see how this project has been successfully used in a classroom in a remote Aboriginal and Torres Strait Islander setting. It will highlight specific examples of activities based from the assessing, planning and teaching methods that have been successful at Purnululu Aboriginal School.

17. Maths Mob

Maninder Kaur and Lyne Plummer

Lyne Plummer and Maninder Kaur have been actively involved in the AAMT Make It Count project. An initiative they have undertaken at Doonside Public School is the establishment of 'Maths Mob' which offers fun, hands-on and practical learning activities for Aboriginal and Torres Strait Islander students in K-2, to enhance their love of mathematics. The aim of the program is to improve students' knowledge, skills and outcomes in the various strands of mathematics as a result of engaged learning. Another initiative has been the celebration of Maths Fun Day at the school every year involving all students and staff from P-6.

Download presentation and paper at <http://aamt.delivr.com/1a8od>

18. What make a difference at Doonside

Lyne Plummer and Maninder Kaur

The Make It Count project has concentrated on the explicit use of metalanguage by teachers and students in Numeracy to support Problem Solving. We have sought to be culturally inclusive and responsive to the needs of all students in the school. Each student is an individual who brings their own knowledge and culture into the classroom. There can be no 'one size fits all' in the learning tasks presented to any class. The project has used Lesson Sharing sessions from Kinder to Year 6 to examine the Learning Continuum with a heavy emphasis on differentiating our learning tasks, including aspects of Aboriginal and Torres Strait Islander culture, to promote engagement for all our students.

Download presentation, paper and view video at <http://aamt.delivr.com/1a8od>

19. Teaching in the Territory: An explanation of a numeracy classroom at Humpty Doo

Ali Brady

The early years classroom teacher, working in collaboration with her colleagues, including an Aboriginal Education Worker, has been exploring ways to develop a culturally responsive mathematics pedagogy to improve outcomes for a diverse student cohort that reflects the multicultural, social and emotional diversity of a rural Northern Territory school. Strategies to develop partnerships with Aboriginal and Torres Strait Islander families through Family Maths groups that promote regular and positive engagement, and develop respectful relationships between Aboriginal and Torres Strait Islander families, students and the school staff will be described. The presenters shall share their learning journey and efforts in improving the design of teaching and learning experiences in mathematics through the Eight Learning Management Questions (Smith and Lynch, 2006) and maintaining high expectations of all students.

Download presentation and paper at <http://aamt.delivr.com/1a8od>

20. Make It Count: The OPS way of teaching mathematics

Toni McDonald

Orange Public School has undertaken a pedagogical shift in the way in which mathematics is taught across K–6. After deep reflection, data analysis and open and honest discussions the school undertook the process of moving from a text book driven curriculum to a more hands on, quality delivery of content, assessment and practice. With the support and mentoring of Dr Tyson Yunkaporta, the school incorporated the Aboriginal ways of knowing and implemented the '8 ways of knowing' learning map as the preferred method of delivery of Mathematics. Aboriginal parent consultation in the development of this learning has been a positive and inspiring element of the program.

Download presentation at <http://aamt.delivr.com/1a8od>

21. AICS Numeracy Resource

Corrie Baxter and Elizabeth Gilligan

This workshop looks at the implementation of the AICS (Aboriginal Independent Community Schools) Numeracy Resource and how Aboriginal and Torres Strait Islander teaching assistants have complemented the programme in remote WA schools. This extensive resource supports teachers to develop efficient numeracy strategies, assessment and data collection, and comprehensive learning plans catering for K–12 EAL/D students. The resources are available through an online portal which houses a student tracking tool (AN TT), diagnostic assessment tasks, and focused learning activities. The developmental nature of the strategy ensures that students are always supported to move from known concepts to the unknown. This presentation will show how a group of grade 3/4 students have grown in confidence and made considerable progress in critical aspects of number across a two-year period.

Download presentation and paper at <http://aamt.delivr.com/1a8od>

22. AICS of WA Numeracy Portal

Kaye Treacy

The AICS Numeracy Strategy is focussed on helping teachers and Aboriginal Education Workers to work out what mathematics students' know and what they need to learn, this information is used as the basis for classroom planning. The project includes the development of resources to support teachers to assess, plan and teach students efficiently and effectively. This session will showcase the online resource, which includes:

- Links to the Australian Curriculum Scope and Sequence
- Assessment tasks
- Mathematics content information
- Activities
- AICS Numeracy Tracking Tool, (AN TT) used to monitor students progress
- Planning Tool to create work plans.

Download presentation and paper at <http://aamt.delivr.com/1a8od>

23. Make It Count: Using scaffolding pedagogy to provide mathematics success for Aboriginal and Torres Strait Islander students R-7

Marie Wright

This presentation outlines our current research involving students R–7 in disadvantaged schools as part of the Make It Count: Numeracy, mathematics and Aboriginal and Torres Strait Islander learners project. The research focusses on teacher and student interactions within mathematics lessons. It is a highly 'hands-on' approach that assists learners to develop deep understandings of mathematical concepts. These concepts are foundational to being numerate.

The project is drawing on successful Accelerated Literacy practices (with Aboriginal and Torres Strait Islander learners) and the DECS SA program 'Big Ideas in Number'. The project has had a huge impact on teacher knowledge in mathematics both pedagogical and content.

Download presentation and paper at <http://aamt.delivr.com/1a8od>

24. Making maths come alive through narrative

Stephanie van der Schans, Louise Hodgson

This presentation will focus on stories from a secondary mathematics teacher's classroom including her recent use of narrative as a strategy to engage Aboriginal and Torres Strait Islander students. Stephanie will share how she makes mathematics come alive through building student capacity in the proficiencies of the Australian Mathematics Curriculum. Strategies to cater for diversity will be discussed.

Download presentation at <http://aamt.delivr.com/1a8od>

25. Learning Mathematics by watching others

Matty Braid and Peter Sullivan

This presentation discusses an investigation of pedagogies for teaching Aboriginal and Torres Strait Islander students that minimises talking by the teacher and which encourage the students to watch what the teacher is doing. The overall goal is to explore whether some things might be presented to students visually, without any associated dialogue. The rationale is twofold: one is that both hearing and watching increase cognitive load; the other is that watching seems to connect to traditional ways of learning.

Download presentation and paper at <http://aamt.delivr.com/1a8od>

26. The Power of Many

Ian Tait and Lisa Gray

The Power of Many chronicles the trials, tribulations and outcomes of peer collaboration of both teachers and students across grades five and seven.

Download presentation and paper, and view video of Caleb/Anna at <http://aamt.delivr.com/1a8od>

27. Mudjari'elo

Leanne Thomas

Mudjari'elo supports Aboriginal students enrolled within Education and Training Units in Juvenile Justice Centre. It aims to enhance students' mathematical skills and concepts by

focusing on Numeracy in the Trades, Financial Literacy and Life Skills. Mudjari'elo uses a scaffolded approach to enhance students' capabilities to build on the skills required for numeracy in the trades, and also to build both students and teachers self-confidence in mathematical and numeracy skills.

28. Maths camp and big day out

Brad Jarro, Kate Naughtin and Chris Matthews

The Nerang Maths Camp (Qld) and the Healesville Big Day Out (Vic) aimed to connect Mathematics with Aboriginal culture by involving Elders and leaders from communities in helping students switch on to mathematics through a variety of cultural immersion activities. These included building homes from branches and bark which engaged students in conversations about size, angles, symmetry, stability, capacity, measurement and shape and where numeracy became mathematics and mathematics became numeracy. Sport, art and dance activities also featured, some with a focus on mathematics as a storyteller. These two strategies also immersed non-Aboriginal teachers into Aboriginal community and culture. This presentation will give perspectives from Aboriginal and non- Aboriginal participants involved in the process.

Download presentation and paper at <http://aamt.delivr.com/1a8od>

Part 3

Conference Evaluation

Feedback about the conference was an important step in gauging the impact the conference might have had on participants, and also on the appropriateness of future such events.

A total of 46 participants responded to the questions with an average of 41 responses per question.

1. The conference overall was a success:

- a. 26 participants Strongly Agreed
- b. 19 Agreed
- c. 1 was Unsure

2. What was the standout feature of the conference?

- a. 13 participants responded with the Conference Process
- b. 11 with the Keynote Addresses
- c. 7 with the Distillation of Practice
- d. 6 with the Showcase of Practice
- e. 2 with the Theme Group Discussions.

Further comments were invited for this question with seven participants responding. Their responses included:

Shared passion to work together to improve numeracy outcomes for Indigenous learners.

The whole was greater than the sum of its parts.

Can't pick one – I think the absolute focus on mathematics/numeracy for Indigenous learners was the standout – a rare event!

3. The conference process worked ie beginning with the Showcase of Practice and Distillation of Practice culminating with the Theme Group discussions and presentations?

- a. 24 participants Strongly Agreed
- b. 22 Agreed.

4. Any further comments about the conference process?

Generally there was very positive feedback about the conference process and some very constructive comments about improving the process overall. Professor Russell Bishop's Keynote received favourable comment as it 'gave a balance to the whole conference'. The Showcase of Presentations were well received with many positive comments such as:

It was a completely new experience for me and I loved that it actually prompted participants to synthesise and truly consider what the presenter was saying.

Particularly liked the fact that the audience of the showcase presentations was so varied. This made for rigorous distillation. I believe it would have been less of an impact if the audience was streamlined to be of similar interest areas.

Some felt that 30 minutes was 'a bit short' for the presentations. Others felt the groupings for the Distillation of Practice were 'deep and fruitful'. Feedback suggested that the process of session deconstruction varied between facilitators and having presenters leave the room after they had presented 'with nothing to do for an hour was not a good idea'. Direct feedback to presenters was also suggested.

Comments about the conference overall included:

Smoothly run. Rich in demonstrated outcomes. Great contacts and contributions from many different perspectives.

Interesting process that worked well and led to deep discussion.

It was outstanding how individual views, beliefs and experiences in Indigenous mathematics were respected and taken on by such a wide range of job titles and expertise. The over-arching need and positivity was an exceptional achievement.

5. The Showcase of Practice sessions overall were successful?

- a. 22 participants Strongly Agreed
- b. 21 Agreed
- c. 1 was Unsure
- d. 1 Disagreed

6. For you, what was the standout presentation and what was so good about it?

It was clear from the range and diversity of the 46 comments received that the majority of presentations were 'standout' and appealed to individuals at all levels and in different ways. There were several positive comments about Matty Reid's and Peter Sullivan's presentation on 'learning by watching'. Again, there were a number of favourable comments about Professor Bishop's keynote address. Overall, words such as 'inspirational', 'provocative', 'powerful', 'innovative' were used to describe the presentations.

Each one in its own right had something to offer that you could take back into your own context.

I really did enjoy all the presentations that I had the opportunity to attend during the conference. I believe the choice and diversity of presentations were great. I have learnt, shared and confirmed information with others during the conference. I was particularly inspired by the messages from the Keynote Speakers and really valued the message of a culturally responsive approach for all learners.

7. The Distillation of Practice sessions overall worked well?

- a. 14 participants Strongly Agreed
- b. 27 Agreed
- c. 4 were Unsure
- d. 1 Disagreed

8. Any further comments about the Distillation of Practice sessions?

There was a range of comments from very good to not so good but mostly very favourable with constructive feedback ie:

This is the first time I have experienced that process and it really does enable you to distill the messages but also to get a feel for what other people are thinking. Often you have a point of view but are not sure whether you are the only one thinking like that or others share your view. Also it encourages listening with an open mind not coming with a predetermined fixed view. I thought the process was very powerful.

Care needed to be taken that all participants get a chance to talk. When there is a mix of practitioners and researchers there is always the danger that the researchers' voices dominate. I know that in one of the large sessions that I facilitated, that was they way it was going - it needed quite an effort to invite the quieter and perhaps less experienced participants to have a say - but given the explicit opportunity they did join in and what they had to say added real value to the discussion. Perhaps next time this could be made more explicit.

9. The Theme Group discussions and presentations overall were effective?

- a. 8 participants Strongly Agreed
- b. 28 Agreed
- c. 9 were Unsure
- d. 1 Disagreed

10. Any further comments about the Theme Group discussion sessions?

While most comments suggested that these were an important part of the process there was also a lot of constructive feedback about ways to improve them such as: 'should have had a sharper focus to develop a strong guide for the future' and:

I have some concern that the parameters of the discussions were not completely clear in all instances. By that I mean that I am not completely sure that all participants were in agreement about what constitutes 'good maths teaching and learning' in general and,

as part of that, what we want all students to achieve - and therefore it was difficult/impossible to pinpoint what we need to do for Aboriginal students over and above this, or what we need to do differently, so Aboriginal students too can access this 'good learning'. I also believe there was some confusion between engagement in learning and deep learning of rigorous mathematics. While the former is necessary for the latter, the former is not enough to improve educational outcomes of Aboriginal students. I believe we need greater clarity with regards to these issues before we can make great headway.

11. What do you hope will be the outcomes of the conference (school community/regional/state/national levels)?

There was a lot of very positive and productive feedback about the hoped for outcomes in relation to schools and their communities, about research, and the importance of influencing others. This latter point is especially pertinent to AAMT as it takes a lead at a national level in this area.

School communities

There were many hoped for outcomes about schools and their communities, pedagogy and resources, and about leadership. These included:

That schools and communities work together more, continuing to share experiences and expertise. We are all working to better the outcomes for Aboriginal students but we seem up to now to be working in some ignorance of others.

That schools adopt an approach that is inclusive to the needs of Aboriginal and Torres Strait Islander students and that the ways of teaching will become the way we teach all children starting from the point of KNOWING them and what they know and then teaching in away that they can become independent learners.

Hopefully we have come up with a set of pedagogies that we know are successful with our Indigenous students. We need to be clear that the pedagogy or pedagogies used can vary according to the cohort of students. It may be different on the Lands than in a suburban or city class. This was evident in the showcases.

Ideally I would love to see educators at all levels understand what quality mathematics pedagogy really is and how this impacts on indigenous students. I want to see a rejection of the current "deficit" model in favour of a positive approach to improving outcomes not fixing problems

More (passionate teachers) and (more passionate) teachers. More appropriate (classroom practice) learning experiences for students who are turned off by sitting in rows being talked at!

Teachers, Departments and Ministers will see the value in adopting any recommendations - hopefully they will respond to the fact that what we observed is good teaching for everyone and they are not being asked to implement yet another thing for a small group (in many cases). Teachers will be given time to respond to the recommendations in their forum for schools to access the same presenters that were at the conference.

Greater cooperation between teachers, principals and associations such as AAMT (Too much think they know it all and are unwilling to discuss or listen - in important curriculum leadership positions)

I hope that underperforming school teachers will be able to better themselves based on these professional ideas. I want principals in charge of their staff fleshing out the

conference report around a staff meeting and school going for real change in the area of Indigenous mathematics.

Research

There were comments about outcomes around research with mention of Professor Russell Bishop's work and the desire for research that has 'a more comprehensive, evidence based approach to Indigenous education rather than what often seems to be a grab box of unsustainable smorgasbord approaches with little follow through.

Influencing others

Mathematics for Indigenous children gets '*a much greater chunk of the attention at all levels*' was a common theme which is one of the reasons AAMT held the conference in the belief that this was a necessary step in raising awareness. AAMT is preparing a communiqué based on the findings, messages and recommendations from the conference with suggestions of ways to move forward. It was suggested that any such advice is 'strongly worded' for policy makers, ministers, ACARA, teachers, principals and the support for such action was apparent in the desired outcomes from the conference.

Also raised was the sharing of good practice and that presenters from the conference '*present their programs around the country to other schools who have similar challenges*'.

That AAMT will be in a position to inform states on processes and practices for Aboriginal students numeracy needs.

The disadvantage of having poor numeracy skills in modern society, I think, is hugely under-estimated. Seems still that the emphasis on literacy continues to sideline numeracy.

I think the proceedings of the conference should be highlighted and well publicized for empowering others in the field with the exemplary work being done in different areas.

Greater recognition of the unique challenges facing remote Indigenous learners (esp. wrt language) reflected in policy and legislature at the state and National level!

I would like to see the outcomes become transparent so that our Indigenous Students get the best possible access by all educators to the wonderful work being done across the nation spreading the word.

The conference also provided the opportunity for some significant networking to take place and one desired outcome was 'the development of a network of teachers interested in numeracy education of Indigenous students.' Finally, a comment that sums up the hoped for outcomes:

I believe the conversations that are needed have just started and that we are still at the point of coming to agreement over what the issues are. I do believe that the intent of everybody at the conference was to improve maths educational outcomes for Aboriginal students but I also think that everybody was not in agreement over what that should/ could look like for Aboriginal students. I truly hope that other participants also hope and believe the next step is reaching agreement in what needs to be achieved.

12. How will you use your experiences from the conference?

Overwhelmingly participants' responses were mostly about sharing with others what they had learned from the conference. Others will try out new approaches in the classroom; build support

networks; implement changes in their school; access research; and challenge deficit thinking in their work places.

*It was a great conference and I am very appreciative of having the experience.
The conference inspired me to continue my work in trying to improve maths teaching and learning in our schools - in a way that is inclusive of Aboriginal students.
I was particularly inspired by Russell Bishop and want to read more of his work.
I loved the opportunity to interact with both other teachers and researchers and find I am integrating and thinking about research findings more and more in my own work.
It was a great opportunity to hear and compare my work with that of others in different states and challenged me to re-evaluate some of my own thinking and beliefs.*

13. What would be your recommendations or suggestions for a similar such conference open to educators generally?

The idea of holding a similar sort of conference that was open to anyone was strongly supported with a similar process of presentations followed by the distillation of practice.

Suggestions included:

As many practical, hands on activities that teachers can walk away with and immediately use, underpinned by the theory and understanding of ways of Indigenous learning delivered by 'experts' especially Aboriginal people.

It was a highly worthwhile conference, but the attendees at the conference were the people on the same page. We need to have teachers attend who do not believe that our students are capable of achieving. We need to be targeting teachers that this may actually change the way they interact and teach our kids. If they (the teachers) were the minority of the group their attitudes may be changed by the positive teachers around them.

Presenters' road show where schools get the opportunity to hear from different presenters and pick the most useful practices for their circumstances and are then allocated the resources that go along with that resource.

