Improving numeracy outcomes for Aboriginal students

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Make It Count Clusters across Australia

- Eight diverse Clusters of schools in urban and regional areas of five states, with a Key School in each Cluster
- An average of 100 Indigenous students in each Cluster
- Each Cluster has a different focus for Make it Count and is working with a critical friend to link research and practice.
Much of the present teaching of mathematics, particularly in the primary years, has Aboriginal students doing mathematics that is not related to their world and their everyday experiences. As a result, by the time many Aboriginal students have reached the latter years of primary school they have been alienated from mathematics.

Matthews, Howard & Perry, 2003
Make it Count Clusters

1. Culunga, WA
2. Alberton, SA
3. Noarlunga, SA
5. Orange, NSW
6. Dharug, NSW
7. Nerang, Qld
8. Gladstone, Qld
Alberton Primary Context

- Western Suburbs of Adelaide
- 250 Students Reception – Year 7
- 33% Aboriginal Students
- School focus on Creativity, Discovery and Empowerment
- R-7 Magpie groupings with a focus on student choice and voice
- Shared teaching and planning model
Make it Count Aims

Document and share effective models of teacher professional development, whole school change and community engagement in relation to mathematics and numeracy.

Develop whole school approaches to mathematics and numeracy that result in markedly improved achievement by Indigenous students.

Build and participate in networks and professional learning communities and act as catalyst and support for action by others.
The Initial Alberton model

• Integrated Literacy and Numeracy groupings
• Cross-age and abilities years 3 to 5 (currently 3 to 7)
• Looking for a way of understanding what we were doing
• Initially thought we were focussing on increasing engagement levels – but it was much deeper than that
# First theoretical framework

(an adaptation of Dowling’s domains of practice)

<table>
<thead>
<tr>
<th>Content</th>
<th>Expression</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Everyday</strong></td>
<td><strong>Mathematical</strong></td>
</tr>
<tr>
<td><strong>Mathematisation:</strong> taking everyday content and thinking about it mathematically.</td>
<td><strong>Mathematics:</strong> developing mathematical skills and understanding using maths as the actual context</td>
</tr>
<tr>
<td><strong>Numeracy:</strong> everyday content using everyday language.</td>
<td><strong>Contextualisation:</strong> foregrounding maths in something that students can relate to.</td>
</tr>
</tbody>
</table>
Some early observations  
Diane

<table>
<thead>
<tr>
<th>Looked like:</th>
<th>Sounded like:</th>
<th>Felt like:</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Head on the desk, book on the floor</td>
<td>● “I need help” before beginning or even sitting down</td>
<td>● No risk taking</td>
</tr>
<tr>
<td>● Tears</td>
<td>● “I need to go to the toilet”</td>
<td>● Safe zone</td>
</tr>
<tr>
<td>● Sometimes removing self from group</td>
<td>● “I can’t do this”</td>
<td>● Confused</td>
</tr>
<tr>
<td>● Refusal to participate in certain tasks</td>
<td>● “I don’t know what to do”</td>
<td>● Low resilience</td>
</tr>
<tr>
<td>● Face in hands</td>
<td>● <em>crying</em></td>
<td>● Fear of making a mistake</td>
</tr>
<tr>
<td>● Crawling into a corner</td>
<td></td>
<td>● Giving up before beginning</td>
</tr>
<tr>
<td>● Only chose to learn with the teacher</td>
<td></td>
<td>● Avoidance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Did not enjoy learning</td>
</tr>
</tbody>
</table>
### Recent observations

**Diane**

<table>
<thead>
<tr>
<th>Looks like:</th>
<th>Sounds like:</th>
<th>Felt like:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting up</td>
<td>“Don’t help me yet, I want to try by myself”</td>
<td>Risk taking</td>
</tr>
<tr>
<td>Focused on learning</td>
<td>“Hey Laura, I didn’t go to the toilet at all today. I’m getting good at that aren’t I!”</td>
<td>Having a go</td>
</tr>
<tr>
<td>Smiling, happy</td>
<td>“What are we learning about today” before Numeracy time begins</td>
<td>Proud</td>
</tr>
<tr>
<td>Excited</td>
<td>“Come and look what I did”</td>
<td>Excited</td>
</tr>
<tr>
<td>Participating</td>
<td>“Can I share this with Mr. Plastow or Vicki”</td>
<td>Eager to learn</td>
</tr>
<tr>
<td>Learning in a variety of ways: independently, collaboratively (group or partner), with the teacher</td>
<td>Talking about her learning with the teacher and other students</td>
<td>Enjoys learning</td>
</tr>
<tr>
<td>Laughing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Alberton cluster question

What is the role of mathematisation and contextualisation in developing mathematical resilience and promoting transfer of learning for Aboriginal students?
5 main indicators of resilience

- Growth mindset
- Meta-cognition
- Adaptability
- Sense of purpose
- Inter personal
Transfer
Still developing a way to collect and monitor this.
The Alberton model

Mathematics

Mathematisation

Context

Contextualisation

Resilience

Transfer
Consulting the Alberton student community to find out its needs and ideas/thoughts on the Anzac memorial garden.

Constructing a communication consultation booth to investigate the design needs of the project

Communicating their findings to the garden committee

Making a map
Collating and organising data
Deciding whether a column, bar or line graph best communicates the results

Understanding of x, y axis (algebra)
Horizontal and vertical lines
Graph construction using equal intervals
Percentages

Formulating questions where maths might be useful
Interpreting a table to understand the context
What do percentages mean?
Creating the garden using the map

A planning model – Sophie and Danielle Alberton Primary School
Community Garden

EVERYDAY

MATHEMATICAL
Most significant changes

2009-2011

- Teaching and learning through passions and expertise
- Student choice and voice
- Linking research and practice
- Risk taking
- Positive attitudes
- Shared practice
- Increased engagement
- Development of mathematical resilience

Pre 2009

- Teaching and planning in isolation
- Scripted teaching
- Teacher directed
- Little progress
- No connections
- Little to no planning
- Fear and avoidance
  - ‘Maths Sucks’
The Block

Students were given a design brief
They designed their floor plans
They looked at ratio and scale
They made a scale model from their floor plan
Hands on learning and student choice and voice was a key feature
The Block Brainstorm

- Design a house
- Landscape backyard
- Interest rates
- Budget
- Career expo
- Feature wall
- Floor coverings
- Construct model of house
- Episodes of the block
- Perimeter & Area
- Auction
- Real estate brochure
- Excursion to display homes
Abstract Sculptures
Bridge Design
Enterprise
Mother’s Day Stall

- Profit and loss
- Reading a receipt
- Graphing
- Calculating change
- Advertising
- Surveying
- Adding money
- Counting money
- Measuring
- Calendar/timelines
- Rosters
Maths in Bridge Design

- Right angles
- Measurement
- Symmetry
- Angles
- Shapes
- Vertical
- Lines
- Horizontal
- Diagonal
- Perpendicular
- Parallel Lines
Other Learning Areas across the Cluster

- Junior Master Chef
- Pirate Maths
- Bubbles and Science
- Car Science
- Body Maths
- Maths in the Media
- Environmental Maths
- Maths in sport