Some aspects of best practice in numeracy in Tasmanian schools
Being Numerate in the Middle Years project

- Targeted, data-driven project
- Aimed at (in the case of 2006) rural district high school teachers of grades 5-8 (in two previous years high schools and feeder primary schools with high numbers of students not reaching benchmarks)
- Collaboration with University of Tasmania
- Evaluation of both teacher and student outcomes
• Planned by teachers for teachers
• Focussed 6 day residential program- benefits noted from 3 x 2 day sessions and networking opportunities
• Based on Schulman’s work highlighting dimensions of teacher knowledge (content knowledge, general knowledge, curriculum knowledge, pedagogical content knowledge, knowledge of learners and their characteristics, knowledge of educational contexts and knowledge of educational ends purposes and values)
• Focussed on key ideas which research shows students experience difficulty with mental computation, fractions, decimals and percentage, proportional reasoning and some focus on quantitative literacy through emphasis on mathematics in the media
Teacher focus

• Improving their own mathematical understandings of key ideas for middle schooling
• Focus on pedagogy
• Use of materials in all session and support to schools in terms of resources, readings etc
Teacher focus

• Use of teacher profile (Watson and Beswick, 2005) before and after to determine effectiveness of professional learning and changes in understanding and confidence
Findings

• Teacher confidence improved
• Teachers understanding of own maths improved
• Teacher pedagogy changes- more focus on finding out what students know and what students are likely to find difficult
Findings

• Statistically significant improvement in student results across the mathematical content tested

• Student attitudes improved as a result of changed teacher practices
Focus on mental computation

• Explicit focus on mental computation in new (2007) curriculum framework
• Focus on providing teachers with support materials and professional learning (based on research conducted by McIntosh and Dole in Tasmanian and ACT)
• Expectation that all school focus on explicit teaching and assessment of mental computation skills
‘Most countries, and in particular those which are most successful at teaching number, avoid the premature teaching of standard written methods in order not to jeopardise the development of mental calculation strategies. The bridge from recording part written, part mental methods to learning standard methods of written calculations begins only when children can add or subtract reliably any pair of two-digit numbers in their heads, usually when they are about 9 years old’

Our focus

• Building mental computation and number sense as a stepping stone to written calculation

• Focus on building a repertoire of strategies for both teachers and students

• Building the language of mental computation and number (for teachers and students) to enable effective mathematical communication
59 + 28

How did you do it?

I split 50 from 9 and 20 from 8 and I add it up and it is 70 and add 9 and it is 77 and it is 87.
4 + 5

How did you do it?

I looked at it in my head like this 82 - 30 which is 52 then I broke up the 7 into 5 & 2 then took two from 52 leaving me with 50 then I took 5 from 50 and it leaves you with the answer of 45
$\frac{1}{8}$ of 64 = 8

What thinking did you use?

and Half 64 is 32
Half a 64 is 32
Half a Quarter 32 is 16 so
64 / 16 is 4 so 64 is 16 and
64 / 8 is 8 is 16 of 8
Our focus

• Providing all teachers with a research-based support resource which assists them in planning for explicit teaching of mental computation strategies - giving all students access to the strategies that some students have used naturally
Key resources for all schools:
Our focus

• Ensuring that students are exposed to mental computation strategies to deal effectively with whole numbers, as well as fractions, decimals, percentage and ratio

• Building confidence and focusing on thinking strategies and processes, ensuring that students build networks of understandings about the number system which they can use strategically in solving problems
Summary

• The two aspects of our work in Tasmania which I have focused on today highlight some key aspects of best practice in teaching for numeracy
1. Explicit teaching of strategies and thinking is vital

2. Mental computation is a vital component of a numeracy program- it cannot be left to chance and teachers need support in planning for, explicitly teaching and assessing students progress.
3. The middle years present many challenges for all states and territories—focused, sector-specific professional learning in the issues around middle years mathematics can make a difference.

4. Helping teachers improve their practices involves more than teaching them more maths— a focus on pedagogic content knowledge is also vital.