This short article is a teaser for consideration of what we teach, how we teach, and how we enrich a subject which is fundamentally a cultural artefact. It is based upon personal experiences working with Indigenous adults and kids in the NT, where it seems important to have a positive relationship with respected people from the community.

Dr Ian Roberts, University Fellow at Charles Darwin University, Member of MCYA Challenge Problem Committee and AMOC Director, Northern Territory

The Australian Mathematics Trust (AMT) provides several types and levels of enrichment experience for kids. There are also many other sources of good material with a range of content and emphasis.

As with any material, these are all prepared under certain assumptions about the user. There is the obvious assumption of competence in the English language. But there are more subtle assumptions about cultural understanding and interpretation, as well as our special use of language in mathematics, which often does not conform to its usual English meaning.

Miscommunication can occur at any level. For example, in my research with German colleagues I happily use the technical words ‘shadow’ and ‘shade’ (of collection of sets), derived from our slightly ambiguous English understanding of them. In German they have the single noun ‘Schatten’ and do not distinguish between shadow and shade, so they prefer to use the (strange to us) terms ‘up-shadow’ and ‘down-shadow’.

Traditional Aboriginal culture often provides deeper examples of even more important misunderstanding. This leads to consideration of how one undertakes/adapts enrichment activities in the Indigenous

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**FUN CELEBRATIONS ON INTERNATIONAL PI DAY**

The Australian Mathematics Trust marked international Pi Day for the first time this year. The Trust joined forces with the prestigious Australian Museum, which hosted a special event for school students on Friday 14 March to honour one of mathematics’ most ancient concepts.

Pi Day was invented by the San Francisco Exploratorium where the first Pi Day celebration was held in 1988. Today Pi Day is celebrated in educational institutions around the world. It is also the birthday of Albert Einstein.

To increase the probability of fun on International Pi Day, the Trust invited students and teachers to embrace the day and shared free worksheets with Pi inspired problems created for

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Above, students working on the graph colouring problem at the middle school weekend maths camp at Ti Tree (200 km north of Alice Springs) in August 2013. There were 60 students half of whom were Indigenous students from remote communities, and the other half were from Alice Springs and Tennant Creek.

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Above, students working on the graph colouring problem at the middle school weekend maths camp at Ti Tree (200 km north of Alice Springs) in August 2013. There were 60 students half of whom were Indigenous students from remote communities, and the other half were from Alice Springs and Tennant Creek.
DEVELOPMENTS IN INFORMATICS
As I am sure most teachers are aware, the Australian Curriculum has included Digital Technologies as a core element of the Technology curriculum (now available for use and waiting final endorsement). This focuses from Foundation year on the development of computational thinking and by years 3 and 4 expects students to be able to construct and use simple algorithmic procedures. In years 5 and 6, this includes iterative procedures and concepts such as data validation. By the end of year 8, students are expected to ‘implement and modify programs with user interfaces involving branching, iteration and functions in a general-purpose programming language’.

I find this quite exciting but realistically, I know that teachers will not necessarily be confident or well-resourced to implement this curriculum. Furthermore, in my opinion, this is as much a component of mathematics as it is of technology and I suspect that the burden of implementation may well fall on maths teachers.

There would be an argument for maths teachers to say that they do not have the time because they are busy with their own curriculum, but there is also an opportunity here, because algorithmic and computational thinking provides a window for students onto real applications of mathematics with many potential career pathways. Our experience with Informatics is that it often provides a pathway to students seeing the possibilities in mathematics.

The Australian Informatics Competition (AIC) will be one of the few sources of relevant materials for teachers in meeting the challenge of digital technologies and has the advantage that it does not require any initial programming knowledge. This year, we had a 20% increase in numbers entering this competition, and I have no doubt that awareness of the impact of digital technologies is a part of the reason for this increase.

In 2015, the AIC will be available online and we will also be introducing a Year 5-6 division. Questions in the AIC are algorithmically based in contexts which should appeal to most students. You can see samples of these questions on the AMT website (www.amt.edu.au) and a book of past questions is also available, which will give teachers a significant repository of algorithmic and computational problems (with solutions) which they can use to introduce students to this type of thinking. For students (or teachers!) who wish to take this further, there are also training programs available through the website which will allow them to learn a programming language and prepare for competitions like the Australian Informatics Olympiad (AIO).

Results of the 2014 AIC will be going out to schools shortly and we will post the competition papers and solutions on the website until the end of May so that teachers can see exactly what the competition involves.

MCYA CHALLENGE STAGE
The MCYA Challenge Stage is now underway for 2014 and there is now a new level of this program for Middle Primary (Years 3 and 4). We have been supporting this new level with a number of teacher workshops, and have now run (or will soon run) workshops in every state and territory except WA over the last 12 months. I offer my sincere thanks to those teachers who have contributed to these presentations. The feedback is very positive and we hope to see more teachers using Challenge and Enrichment materials.

The final part of the MCYA program is the Australian Intermediate Mathematics Olympiad (AIMO). This is a challenging four hour exam for able students in Years 7 to 10, based on material in the Enrichment series (particularly Gauss and Noether). However, we are also encouraging students who perform well in the Australian Mathematics Competition (AMC) to consider trying the AIMO and, in particular, are offering free entry to prize winners. A sample AIMO paper is available on the website and a book of past papers is in preparation and will be available soon through the bookshop. This year, the AIMO has been moved to September to enable us to identify AMC prize winners who will receive a reminder about the free entry. Production has begun to include the AIMO in the online registration process to make it easier for teachers to enter. We encourage you to enter students early by contacting the AMT at mcya@amt.edu.au.

VOLUNTEERS
The AMT is largely a volunteer organisation and we have received great support from hundreds of volunteers over many years. These volunteers form our problem committees for the various competitions, act as moderators, or help us with enrichment workshops, teacher workshops and other activities. If any teachers have an interest in our volunteer program, please feel free to contact me at the Trust.

Amongst our most critical volunteers are the State and National Directors. In most states and territories, we have a director for the AMC and a different director for AMOC (the Maths Olympiad program). Most states also have a director for AIOC (the Informatics program). Names and contact details of all State Directors are available on the website and they are a very good first point of contact if you have any questions about competitions or activities. In particular, I would like to bring to your attention some new State Directors:

- Rachel Theunissen, new AMC State Director for WA
- David Martin, new AMOC Director for WA
- Chris Wetherell, new AMOC Director for ACT
- Ian Roberts, new AMOC Director for NT

Ian has done a lot of work in remote communities in the Northern Territory and you will find an article by Ian elsewhere in this edition giving some of his reflections on the challenges associated with cultural difference.

Adjunct Professor Mike Clapper
The Commonwealth Bank Foundation is currently accepting applications for the 2014 Teaching Awards, providing teachers with an opportunity to be recognised and awarded $10,000 to fund an existing or new financial education program, or to develop a business plan. These programs are open to kindergarten to year 12 teachers from schools in Australia, with $10,000 each to further develop their financial learning program, as well as $2,000 for each winning teacher. Applications are due by Friday 16 May 2014, and the awards will be announced in July 2014.

Applications are invited from teachers in: primary, secondary, and special education settings who are working in the area of financial education for students. Applications should include a description of the financial education program, its impact on students, and how it will be continued. Teachers should outline how they would use the funding to further develop their program, and how they plan to share their success with other teachers.

Applications will be assessed on the following criteria: the quality of the program, its impact on students, and the potential for replication in other schools. Teachers should also outline how they plan to share their success with other teachers. Applications should be submitted online at www.teachingawards.com.au.
continued from page 1

primary and secondary students. The Trust also encouraged schools to hold Pi memorisation competitions or bake a sweet or savoury Pi pie to share.

In partnership with the Australian Museum, the Trust held two 90 minute sessions, one for primary school students and one tailored to secondary school students, providing Pi related fun activities, such as the dissection and reassembly of large apple pies donated by Australia’s market leading brand, Pie Face, to demonstrate the theory of Pi. Schools from across the country linked up with the Australian Museum to participate via video conference.

Activities included a Year 9 maths whiz from Sydney Grammar reciting digits of Pi in an exhibition of memory and learning strategy. Current and former mathematics Olympians shared their experiences and discovery of maths to inspire the audience of students. There was also symbolic eating of Pie Face mini-pies and other fun activities! At precisely 1.59 pm the audience captured and shared a #PiDaySelfie on Twitter.

The video conferences and onsite activities were presented by Ivan Guo, a former AMC medallist who attended Sydney Boys High School. Ivan was selected for the International Mathematical Olympiad (IMO) team to compete in Tokyo in 2003, where he obtained a Bronze medal. The following year, he was again selected to compete in Athens, this time winning a Gold medal.

Ivan was supported by Adjunct Professor Mike Clapper, Executive Director of the Australian Mathematics Trust. Mr Clapper said, ‘We know that students learn best if they enjoy what they are doing, so it is important to bring the fun element into mathematics. We are committed to providing competitions and enrichment activities which are both challenging and enjoyable for all students and Pi Day is a perfect opportunity to demonstrate this.’

Based on the success of this year’s event, the Trust and the Museum and are looking forward to Pi Day 2015 and partnering on other maths enrichment activities.

Students Riley Martin, Max Goodwin, Caitlin Galeano, Sarah Cartens at Weetangera Primary School, Canberra, celebrate Pi Day with a Pi pie.