

- Engagement vs Entertainment: why we can't teach maths by YouTube
- Why most interactive software doesn't meet the Australian Curriculum requirements
- Timely thoughts on analogue time
- Some great results and ideas from our subscribers

The Insightful Classroom

Regular Insights, Tips and Pointers for Australian Maths Teachers

The Technology Issue: How the drive for interactive maths software is missing the mark

Part One: The problem with existing technology

Many of us are increasingly being pushed to use software in our classes, often with the assumption that technology must be good for student learning. Unfortunately in my experience most interactive software simply does not meet the requirements of the Australian Curriculum and actually compromises the learning experience. It has increasingly become imperative to make very careful choices in both what we choose to use and how we choose to use it.

Have you ever noticed that almost all available mathematics software programs are based on a model where the computer demonstrates or explains a concept to students to "teach" how the mathematics works and the student then answers questions routine practice questions, often through games?

Games-based or didactic software can be very effective for reducing the boredom factor, but that's really all that it achieves.

What every teacher should know before using technology

It certainly does not give students the capability to work out what they do not yet know, to develop their own connections and deep understanding of mathematics, to reason, deduce and prove their processes, nor even to choose their own strategies for approaching familiar questions.

These requirements for Problem Solving, Reasoning and Understanding are not only pivotal for student learning, but are an integral part of the Australian Curriculum. The achievement standards are based on the proficiency strands.

Professor Peter Sullivan, author of the *Mathematics Shaping Paper*, describes the proficiency strands as the "verbs" of the curriculum. They describe what students are meant to be doing all the time, what mathematics in our classrooms is meant to look like.

The reality is that while interactive software can be fun for kids, it doesn't encourage them to think like mathematicians.

Instead of exploring concepts to find principles and patterns, students are told how to get the answers. We all know to avoid doing this in our own teaching, so why do we accept it from our software?

Such a limited definition of learning does not fit with the Australian Curriculum requirements and should not be what we want for our students anyway.

The question needs to be asked,

If interactive software by its very nature fails to address the majority of the Australian Curriculum requirements, why are we spending so much time, effort and money investing in it?

Next Page: Addressing the problem

How the drive for interactive maths software is missing the mark: *continued from p1*

Part two: Addressing the problem – a new model for new requirements

In order to do its job properly, a software program must provide a problem-based learning experience, providing questions that are unfamiliar to diagnose the level of understanding and uncover any misconceptions.

It would need to use sophisticated reasoning to classify individual responses and appropriately challenge each student misconception until the student realises the illogicality of their thought process and develop new ways of thinking. These questions would both correct wrong understandings and lead the student to work out for themselves how mathematics works.

In short, the software would need to use a level of sophistication in input recognition and reasoning process which is currently not available. Except, of course, that it is available – in teachers.

Teachers can be effective questioning techniques, misconception diagnosis, and logical sequencing so that the Australian Curriculum is implemented properly and student results improve.

We believe that this is where the funding would be better spent – developing professional learning for teachers that focuses on problem-based mathematics in real classrooms. Invest in teachers now, because the future lies with us.

Part three: An effective solution

Rather than spending a small fortune on technology solutions with great marketing campaigns and minimal meaningful results, many schools are realising the importance of supporting their staff through improved training.

Participants in our two-day Facilitator Training course routinely rate it as one of the best training experiences of their careers and return to their schools equipped to not only teach maths incredibly effectively, but also to guide change in the rest of the school.

It is an approach that I believe in because it simply works - by enhancing rather than replacing the skills of teachers.

We have entered into discussions with a couple of state education departments to undertake a major project in making our professional development much more widely accessible and will keep you informed as these exciting plans develop.

Great ideas sent in by you!

Our thanks for these photos sent in by the Transition class at Bridgewater Primary, SA. These photos show how 5 year old children worked as a class to organise their smiles to make them easier to count them.

Multiplicative Thinking



>>> Your Stories...

This new section of *The Insightful Classroom* is dedicated to showcasing wonderful examples of teaching by schools and teachers. Thank you for sharing some of your amazing stories! This issue our congratulations go to...

Trebonne State School and their amazing PAT Maths results using our Small Schools Work program

Our warmest congratulations go to Anne Walsh and the students at Trebonne State School in northern QLD. Well done on your **phenomenal growth in PAT Maths scores** using the *Back-to-Front Maths* small-schools program!* It just goes to show what can be achieved by a dedicated teacher in a one-teacher school. It made our day to hear about the amazing growth by all of your students in only eight months, especially by the child who scored in the 95 percentile!

*See <http://goo.gl/8e4ap> for more details of this program

Engagement vs. Entertainment

>>> Maths and the YouTube Phenomenon

Is engagement really as simple as using technology or are we being tricked by the YouTube phenomenon?

"Engage Me! Engage Me!" was the main message of an education department video that I watched at a Professional Development session in SA recently. The video showed students of different ages using interactive technology and social media, interspersed with images of them holding up signs with "Engage Me" written on them. It was an interesting message, and one that has given me cause to think over the past couple of months.

From this video, the Idea11 conference and dealings with multiple Government bodies, it would appear that the official stance on how to engage students in mathematics is simply to use technology. This concerns me greatly. I believe that there has been a great deal of confusion between the term engagement and what is ultimately just entertainment.

It is the "cool textbook" phenomenon all over again, but this time using YouTube, Facebook and interactive software. I am sure you have seen it too – hoping to "engage" students textbook companies throughout the country have been putting images of dogs riding skateboards and wearing sunglasses on their pages. Let us get one thing straight, maths is not cool. It never has been and never will be, no matter how many cartoon characters we use. *But* it can be incredibly exciting and engaging for kids if done the right way.

Engagement is not about keeping kids busy, entertained or really even interested. Engagement is about turning on their brains - helping them to be so excited about solving a problem that the time just seems to slip away as they learn in a way that they have never before experienced. And that does not require fancy technology, it requires great teaching!

During that same trip to SA, I ran a Facilitator Training course with 30 teachers. I held an example lesson in a grade three class where we did an open number line between 1 and 1000. [Click here to download the problem.](#) We didn't have any technology, just a line across the floor, some MAB blocks and some paper. During this lesson two fairly amazing moments happened that I would like to share with you. Firstly, within 10 minutes of getting started one of the boys managed to split his shorts open. Now that was obviously not the amazing part... ***What was shocking was that none of the kids seemed to even notice. They were too busy working out where to put the numbers!***



Then, 20 minutes later one of the girls vomited all over the carpet in front of everyone. A number of the teachers jumped up to help with the clean-up then scatter antiseptic powder over the area. **Can you imagine what would have happened in a normal lesson at this point?** Bedlam, right? Well...no. None of the kids reacted, so we carried on. Ten minutes later one of the boys who had been less than two metres from her asked me why there was kitty litter on the ground!

Perhaps that should be our definition of engagement. Nothing to do with technology, but having kids who are so excited by maths that they don't notice when a kid vomits in front of them!



A word to HOCs

Timely Thoughts on Analogue Time

Tierney Kennedy - Education Consultant, Author and Editor



It is not very often these days that I meet someone in the course of running Professional Development who seriously challenges my thinking ...and I love it when it happens.

I crave that moment when my brain speeds up and everything around seems to come to a stand-still. I guess I like to feel engaged in learning as much as anyone else does!

A few weeks ago, having drinks with Val Westwell after running two days of training for the Adelaide Hills region was one such time...



Val challenged my thinking about how we teach reading analogue clocks. I have always taught by taking off the minute hand, leaving only the hour hand, but Val takes it one step further.

She takes off the numbers!

Now I realise how this sounds, but just go with it for a minute and see if the simple, elegance of this idea blows your mind like it did mine...

Val turns the clock into a giant spinner, and replaces the numbers with kids' names. Instead of telling the time, kids start with saying whose name the spinner lands on. When the spinner lands between two names, the kids decide if it is half-way between or closer to one of the names.

The next level progresses, with the names replaced by numbers. The kids simply decide which number the time is closest to.

Once this has been mastered, the minute hand is introduced as a way of working out which hour the time is closest to and increasing the accuracy level. Is it past half way? How close is it to the next number?

By making simple connections to what the students already know, Val has introduced time in a revolutionary way. I can't wait to see the photos!

Tierney

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In The Next Issue >>>Assessment

- *Simple principles for grading problem-solving, reasoning and understanding*
- *Moderation and Consistency in Moderation*
- *Keys to improving your results*
- *Downloadable student sample work to grade with your staff*

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Facebook Group!

Maths Matters is a Facebook group designed especially for teachers. We have discussion boards which offer tips as well as space to ask real questions from real teachers. Search for **Maths Matters** and choose "like" to be a part of it. Look for the picture of the year 7 kids building 1 million MAB.