

MATHSTALK by AMSI Schools (Series 3, Episode 5):

‘Teaching Maths in Challenging Times: Keep Calm, Remain Critical’

Speaker Key:

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CA Catherine Attard

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MG Welcome to MATHSTALK by AMSI, the podcast where conversations in maths become part of your professional learning practice. My name’s Marcus Garrett...

LM And I’m Leanne McMahon, and we’re AMSI Schools outreach officers. We’re starting to hear the familiar sound of the school yard as our primary and secondary schools edge back towards re-gaining some sort of normality. This is our fifth episode in series three for MATHSTALKS in term two of 2020. And today we’re going to focus on both the benefits and the pitfalls of the explosion of online mathematics teaching and learning content that we’ve seen over such an incredibly short period of time.

MG So, well-known maths education expert, advocate and professional educator, Catherine Attard, recently wrote on her blog what we thought was a really important article, both for teachers and for parents working with kids at home. We’ll talk in more detail about the article and where to find it a bit later but suffice it to say that we thought it held a sufficiently important message to reach out to Dr Attard and ask her onto the show. And we named the title of this podcast after her article.

00:01:16

LM Catherine Attard is an Associate Professor in Primary Mathematics education and Deputy Director of research within the School of Education at the University of Western Sydney. She’s a multiple award-winning educator who presents frequently at state, national and international mathematics education conferences, and is President of the Mathematics Education Research Group of Australasia.

A past President of the Mathematical Association of New South Wales and has taught and transformed teacher education in primary mathematics in Western Sydney and across Australia for over ten years. We could go on, but we feel extremely honoured to have her on MATHSTALK, and so, welcome Catherine.

CA Thanks very much Leanne and Marcus, it's a real pleasure to be here.

MG Catherine, would you like to tell us briefly what you've been up to lately, especially how the faculty of education at the Uni of Western Sydney has dealt with pre-service teacher education during the last few months? And what the focus of your work in maths education has been since the start of 2020?

CA Thanks Marcus. I'll give you one else I've had to deal with working within a lockdown situation, so all of my research and teaching has had to shift to online mode. Now Western Sydney university, all of our teacher education programs are currently being delivered online and for the remainder of 2020. So, you can imagine the challenges we face knowing that teaching is a profession built on relationships, and relationships are so much more challenging to develop and build in the online space.

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In terms of my research focus in 2020 I've been really, really busy. I recently published a book with my colleague, Professor Kath Holmes, called Technology Enabled Mathematics Education. The book explores the effective use of technology in maths classrooms all the way from early childhood education through to senior secondary. In the book we present ten case studies of teachers who are regarded by their peers and colleagues as effective users of technology in their maths classrooms.

The most exciting thing about the book is that we present a new framework for technology integration, that should be useful to all teachers and researchers of technology in education. The framework is called the technology integration pyramid, and it's really special I think, because it's base, which is a square, takes into account the internal and external factors that influence technology integration.

The four sides of the pyramid represent the four essential considerations for teachers when planning to use technology and those are engagement, mathematics, pedagogy and of course the digital tools that you have at hand. This research has led to a couple more projects that we're conducting at the moment to test the tool itself and to explore how the current Covid-19 situation has and will influence teaching with technology into the future.

MG It sounds like some really timely research, though I suppose you had no idea when you were doing the research that Covid was about to knock on your doorstep?

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CA Absolutely not, but it is timely, I mean it is sad that it is timely, but this whole podcast today is all about what happens when you're not prepared and that's why we wrote the book. Teachers need to be future proof, I guess, in terms of technology whether it's having to go completely online or whether it's knowing how to use the latest technological tools that come into play.

MG Yes, there's no hiding anymore is there? I say that with a great deal of humility too because there's bits of technology that I've been avoiding for a good part of my career that I've now gone, well no choice now.

LM Let's go back to your article, which you published on your blog Engaging Maths. We read and passed the article around our virtual office and my response was, oh my God she's one of us. Suffice to say there was enthusiastic agreement in the AMSI Schools unit with your message. The article is called Teaching Maths in Challenging Times. Keep Calm and Remain Critical. In a way, the title speaks for itself, but without mentioning specific names or details, what led you to write the article?

00:05:17

CA Well, to be honest, the article was written out of frustration. There was a sense of panic amongst teachers and other educators because of the need to shift very quickly to online learning and as you know, panic doesn't always end in good results. Hence my call for teachers to keep calms. As you know, much of my research has been focused on student engagement in mathematics and in particular engagement through the use of digital technology.

Like many educators I often spend time in social media for the purpose of finding out what's going on in education and what teachers are up to and what resources they're using. So, at the very start of the lockdown I noticed quite a lot of sharing of resources, more than usual, via social media, like Twitter and Facebook. And out of curiosity, I checked out some video resources that one particular person had offered to share.

I viewed one or two just randomly and unfortunately, I found that the teaching strategies that were recorded and being shared around were not very good. They were very teacher centric and promoted memorisation rather than understanding. Even worse, my fear was that they could lead to some serious misconceptions amongst students which at a time of lockdown is quite critical. So, that along with the many recommendations for resources that aren't high quality, are a real concern to me particularly at this time and the duration of the lockdown was really uncertain.

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I've always advised teacher that they need to be highly critical of any resources they use, digital or not. What might work for some teachers may not necessarily be appropriate for others. Similarly, not all resources are created by qualified educators. And take for example the many apps available. Now there are some very popular maths apps at the moment that in my mind do not represent good practice.

Teachers and parents need to ensure that any resources are going to align first of all, with our student's needs, with the curriculum. They need to be able to be differentiated for specific students, and they also need to retain the focus on the learning of mathematics rather than a game or anything like that. We must remember that just because something is popular, that doesn't mean it's good.

So, whatever we do, must be in the best interests of the students that we teach. It has to meet their specific needs and it has to be relevant to them, has to be pedagogically robust, and also engaging.

MG Yes that's a hard thing for teachers to get their head around, but for parents to also be absorbing some of that message is... It must be very difficult. You mentioned teaching is fundamentally a personal or a social experience in our chat just earlier Catherine, so what sort of maths teaching content do you think does lend itself well to an online format or media?

CA Well I think content that's flexible and also allows students to engage in mathematical thinking and problem solving and not just answering questions all the time. So, content that provides assessment data for the teacher is really good. Also, content that provides opportunity for learning rather than simply regurgitating facts. Teachers really need to consider how they want their students to interact with the content as well. Are they simply going to be consumers or are they going to be producers?

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Technologies that provide students with opportunities to show their understanding in multiple ways are excellent. But we also have to now consider technologies that assist in developing conceptual understanding of mathematics in the first place. For example, teachers often use videos to assist in explaining new concepts, but this is fine however we do need to make sure that the explanation is appropriate for your particular students. Often it's better for teachers to record their own content because they know their students best rather than using somebody else's created content.

LM I went to a PD with Joel Speranza once, and he does his own and he is absolutely clear that it doesn't have to be MGM quality. And he does it specifically for his own kids. And he actually made it very clear to us that, sure you can have my videos, but it's much more valuable if you do your own.

CA Yes, actually Joel is one of the star teachers in my book.

LM Ah there you go.

CA So, his work is amazing and he's a brilliant role model.

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MG Well there's our first link for the podcast notes I think Leanne, to pop some of Joel's resources on our podcast links.

LM It was really good because he actually forced us to make our own videos with our phones right there with our hair not done, and it was a Friday afternoon, and all of that, and we did it and we came up with these videos, these three four minute videos that were really, really valuable.

CA Yes look and if you're talking about developing relationships in online learning then Joel's a perfect example. Because of the way that he communicates with his students, one of the examples of his that I talk about quite often with other teachers is the fact that he records individualised feedback by making a quick and dirty video. But it's personalised to each specific student and so the student feels as though their getting this high-quality feedback that's aimed at them and what's

really lovely is that they can see Joel's face in the video.

That makes a huge difference as well. They don't care about bells and whistles and fancy videos. They want to see their teacher and they want to know that their teacher cares about them and that's one of the beautiful affordances I guess of digital technology. Not the apps and everything else, but the way that we can actually have communication beyond the classroom walls.

MG Yes, what a lovely way of giving assessment feedback to students. Even where face to face is possible, because a lot of our marking of course is done after hours when we don't have the children in front of us, and being able to record a quick message and say, this is what I thought was great, this is where I thought you could do a bit of work. That's a great idea.

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So, Catherine, what do you think are the limitations then of delivering maths content online? You've talked about some of the ways that we can use, for example, video effectively. What are some of the limitations of delivering maths content online?

CA Yes, like with anything there are limitations. It's challenging and sometimes impossible to be able to provide differentiated work for every single student. Particularly when you're working under pressure like teachers have been doing at the moment. We also can't guarantee that students are going to actively engage in online work because of their home situations. I know of many teachers who have found that they have students who are online and engaging all the time, but then they have others who appear to completely disengage, so they disappear basically.

And this is where communication with parents as well is really vital. I guess another limitation is the fact that there are so many choices out there that it makes it really difficult. And so, teachers have to spend a lot of time trawling through apps and software applications and platforms that may not necessarily lead to anything that they can use. So, developing communities of practice and networks where teachers share is really, really important.

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LM Can you describe some of the really good things you've seen online in terms of maths teaching content during this time?

CA Well, it's been a bit of a challenge to find out what teachers are actually doing because more often than not they're locked within the confines of password protected platforms. So, I only know what they're doing through, I guess through personal networks and social media again. But I know that from my research I've seen excellent uses of learning management systems like Google Classroom, Canvas, Echo or One Note, and they seem to make technology shine.

Now while they aren't actually going to teach content, they act as repositories for a whole range of digital teaching resources and more importantly, provide lots of opportunities for interactions between their teacher and his or her students, as well as parents. So, again, providing individual feedback, providing multiple pathways for students and choices of activities and all sorts of things. I guess that's probably the best thing that I've seen, and the fact that children can become creators, they can produce things rather than just consume.

And the best things are usually the most simple things, taking digital photographs, annotating them, doing the voiceover, and explaining, working, screen casting, all of those sorts of things.

LM You did mention social media, can we just touch on that a little bit? It's something that's accessible to all of us, and I think that's of course where we've seen such, shall we say dodgy examples of resources, is there a way that we can make it useful?

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CA Again, it can be useful. I use Twitter a lot myself, for my own professional development, as well as to share things with other teachers. Again, it comes back to that message of remaining critical. Be very critical of anything you come across. If you notice a pattern of poor-quality interactions, either step away or somehow find a way of intervening without obviously offending anybody. It's a very funny space, social media, but it can be used for good.

So, it can be positive and negative, but I think my main message is be critical. Look for the source of information. Is it research based, for example? It's easiest enough to find out. Don't just take things as they are, take them, think about your own context, think about the needs of your students and adapt them. It's okay to borrow to adopt and adapt, as we say.

MG Education is often a microcosm of the wider world isn't it. We look at what's happened with social media and misinformation that is so quickly spread via social media and the need for the general population to be critical about what they're reading and consuming online. And exactly that same message applies to teachers when they're curating materials for their students.

So, you're working a lot with pre-service teachers and I'm sure that a lot of that is preparing them and giving them steps and guidance on how to be critical. What sort of advice would you give parents and caregivers to ensure the online content that they're using is actually going to be helpful and promote understanding?

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CA Look, my first piece of advice would be if you're going to use something, whether it's a video or an app, and whether you're a teacher or a parent, is to actually make sure you work through it yourself first from beginning to end. So, if it's a video for example, watch it from beginning to end. If it's an app or a game, work through it. Because sometimes what you think they're about, is very different to what they are about. Sometimes the content doesn't match the way that we teach or the content that we teach.

So, on the surface it might be something around building multiplicative skills or whatever, but it might end up being something different. Because it hasn't been created with your intentions in mind, it's been created with somebody else's intentions. And often that somebody else isn't even an educator. So, work through things. Parents, if you come across something that you think is really great, it's not going to hurt to run it by the teacher.

So, have that open communication. If in doubt, flick an email to the teacher and ask them, is this okay? And then the teacher will make that decision for you. It's best to work in partnership with teachers, and teachers seriously don't mind because if parents come across something really good, they could use it with other students.

LM At the end of your article, you present a great activity you've called the toilet paper investigation. People can check this out later when they go to your blog, but can you tell us about how this approach to maths investigations in the family home promotes engagements in maths and why that's so critical?

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CA Look it's critical because student engagement with maths has been a problem for a long time. And one of the reasons that it's been a problem is because students first of all, can't see a connection between the maths at school and maths beyond school. So, they don't make those connections, they think maths is something that belongs within the four walls of the classroom. There's maths everywhere.

The toilet paper one is a really good example, and not just because all kids know what toilet paper is, they use it, it's funny, but at that point in time, toilet paper was on all the headlines because people were going crazy buying toilet paper and hoarding it okay. So, it's something that they're very aware of, and something that's fun to investigate. My point is, find things that are in students' homes, in their everyday context, that you can actually draw the mathematics out and engage them in some good mathematics.

Maths can't always be related to real life activities or real-life things or objects, but where it can, we should be talking advantage of that and making sure kids are enjoying maths as well as thinking really hard about maths. The toilet paper is an example of everyday investigations. You're limited to your own imagination. There's lots of stuff you can do with cooking for example, and with young kids, sorting out the pantry cupboards and you know what I mean. Matching lids to containers, those types of things. It's stuff that's in our everyday context that could be used for really nice mathematics.

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LM On that, a question without notice, this actually came from my niece who gets straight a's when she does the assignments, and then she gets into a test or exam and has no idea what to do. She says, I do everything the teacher tells me to, and when I say, oh why don't you think about this? No, we don't have to do that, the teacher didn't tell me to do that. How do we get over this?

CA The way that we get over that is that we actually need to make sure that we teach our students to be thinkers and not followers. Our curriculum is set up in a way that's perfect for this because we have the proficiencies and problem solving is one of those proficiencies. So, if we teach through a problem-solving approach, so through problem solving not about problem solving or for problem solving, right, we're going to teach our students to be critical thinkers as well.

They need to be able to make decisions about mathematics themselves rather than being given step by step approach. And there's research around, there's very old research by Jo Boaler when she did her PHD, she looked at a school that taught through a traditional approach and a school that taught through a problem solving, investigation-based approach. And the students at the school that learnt through problem solving, did better in formal, pen and paper exams because they knew how to think.

They knew how to choose the right strategies, they knew how to solve problems in a fluent way and that's where our curriculum is there and we need to think about the proficiencies as the umbrella over all the content in our curriculum. And if we teach through the proficiencies rather than just use them as an add-on, then our students will be thinkers. So, not just handing them tasks and questions that don't require that thinking.

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LM Yes, that idea of learning maths rather than performing.

CA Yes, most definitely.

MG So Catherine, what happens when students and their families don't have unfettered access to computers or the internet or they've got dodgy bandwidth or the NBN is not connected? How can teachers and parents ensure these children are still getting a positive and rich maths learning experience particularly where they're still having to confront learning away from the classroom?

CA Look, again I think you need some minimum technology to have that communication when teachers are working online and away from face to face, but look, there's lots of rich maths around the house as I said. And teachers can provide tasks that aren't necessarily technology based and I would say that just because it's there it doesn't mean you have to use it. So, yes, they're being forced to teach at a distance, but it doesn't mean that they've been forced to teach online for a 6-hour school day.

It's great to set the task but the task shouldn't necessarily be tied to the computer. There are lots of things that teachers can set, and I think parents need to, again, communicate with teachers about their situation because we can't assume that everybody has the same access to technology, and we should never assume that. So, tasks need to be very flexible. Often you can give students choice about how they complete a task, so it doesn't always have to be reliant on digital technology but there's so much rich mathematics.

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Play an old-fashioned card game, get a set of dominos, play Monopoly. There's lots of mathematics in all those sorts of games. 'Guess Who' is another really simple one. Just pull the faces out and put numbers in instead. Lots of different things that you can do that don't rely on digital technology and really, it's a responsibility of the classroom teacher to not make assumptions about the access that students have.

LM Going forward from the crisis, as most schools eventually get back to something resembling normal classroom teaching and learning, what's important for teachers to remember with regard to the remain critical message?

CA That message holds regardless of whether we're teaching face to face. It's our responsibility as professionals to always have a critical eye when we're looking at any resources, whether it's using concrete materials or whether it's a digital resource. Whether its seeking professional development, teachers should always be critical.

For example, if you get a brochure at your school about a professional development session run by whoever, find out who that whoever is and what makes them the expert and where are they coming from in terms of their philosophy around mathematics education. So, be critical about everything. That's part of being a reflective practitioner. It's our professional responsibility to have that critical stance.

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MG Catherine, we will most certainly put links to your website and your blog on to our podcast show notes so that people can pick that up and have a look there. Is there anything that you'd like to tell people about your site and how it might be useful to them with their teaching and learning practice?

CA There's a lot of individual blog posts that would be really good, not just for individual teachers but you could use them in staff meetings as professional development. There are links to some resources, there's links to some academic papers. There's all sorts of things. Also, my Twitter (account) is something that teachers might be interested in following because I often retweet good things that I find. So, yes, apart from that, have a really good look at the blog because there are quite a few pages there and lots of information. And interact with me through the blog, that's always nice.

LM It's always nice to know there's someone on the other end isn't it?

MG You're not speaking into an empty well. Yes...

CA And look if there are any teachers, sorry, who want to do my survey for my current research around teaching online through the Covid crisis, I'm happy to share that link as well.

00:24:05

MG Oh, that'd be great thank you. Yes, we'll put that one up as well.

LM One of our little bug bears during the Covid 19 crisis, has been the fast and loose use of the term 'home-schooling'.

CA Don't get me started.

LM In your experience and understanding, what's the difference between home-schooling and home-based learning?

CA I think there's a vast difference actually. Home-schooling is traditionally when parents decide that their children are not going to be schooled in the traditional way and so the parent takes the responsibility of delivering the curriculum to their students. Whereas home-based learning is students who can't get to school for whatever reason, be it Covid 19 or whatever is coming up in the future that will cause that to happen again. But with home-based learning, which is what we've seen happen, the responsibility is still with the school and the teacher.

Yes, the parents have to assume a larger role than normal in terms of supervision, perhaps lending more of a hand than they normally would, but they're not home-schooling their children in any way, the teachers are still the educators here.

MG Yes, our previous guest, Michael Minas said that he felt that the term home-schooling leant an enormous sense of pressure to parents because they felt that they had to replicate what was going on in the classroom and that they were ill-equipped to do that.

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CA Yes, yes and look, I've got academic colleagues who had to home-school, and they were doing the same thing, they were almost trying to replicate what would happen in a school. Which... That wasn't their role. It's not fair to put that on parents anyway.

MG Well I think that's probably a good place to leave it. You've been listening to MATHSTALK by AMSI. My name's Marcus Garrett. I have with me my colleague, Leanne McMahon, and today we've been talking with renowned maths educator and leader Dr Catherine Attard. Thanks for 'MathsTalking' with us today Catherine!

CA My pleasure, thank you.

LM Podcast notes from today's episode can be found on the AMSI Schools teacher support website, calculate.org.au. We'll include some useful links and resources for teachers so you can explore the ideas we've discussed today in more detail. Also be sure to check out Catherine's website, engagingmaths.com for further terrific ideas on engaging children in mathematics learning.

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MG You can also follow us on Twitter, @AMSISchools, or on Facebook by searching for, Choose Maths. Tell us, how have you managed to make sure that the maths resources and content you've accessed for your students, has passed the keep calm and remain critical test? And what are some great ideas you've had or seen for maths learning in the home, that haven't necessitated the use of online content at all?

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