

MAV Wangaratta conference F-12

WHAT'S THE GLUE THAT BINDS OUR MATHEMATICS CURRICULUM TOGETHER?
PROFICIENCIES, DISPOSITIONS, CONTENT?

Date: Monday 12 July 2021, 8.30 - 3.30pm

Venue: Charles Sturt University, Wangaratta

Session	Presenter	Title	Level
Registration: 8.30am-9am			
Session 1 9am-10am	Dr Paul Swan	A1: Keynote: Reasoning the glue that holds the curriculum together (Virtual)	F-12
Session 2 10.05am-11am	Dr Paul Swan	B1: Fluency: Face the facts (Virtual)	F-4
	Andrea O'Connor	B2: Mindsets in mathematics	F-6
	Stacey Hedderman	B3: Cross curricular communication to embed mathematics learning using 'Snot Plots'	F-6
	Janine Sprakel	B4: What's the problem with mathematical problem solving?	4-9
	Andrew Lorimer-Derham	B5: Boring, pointless and scary!	4-10
	Brian Lannen	B6: Creating notes pages to store as Widgets for VCE exams	VCE
Morning tea and networking: 11am-11.30am			
Session 3 11.30am-12.25pm	Dr Paul Swan	C1: Fluency: Face the facts (Virtual)	F-6
	Emma Jensen	C2: Making mathematical connections through contextual imagery	3-6
	Stacey Lamb	C3: Student voice and agency in the mathematics classroom	F-6
	Jonas Anderberg	C4: Drones and mathematics	5-10
	Dr Steve Murphy	C5: Strengths approaches to maths success in rural schools	F-12
	Brian Lannen	C6: Basic algorithmic thinking to writing program code for TI-Innovator™	7-10
Session 4 12.30pm-1.25pm	Amanda Cassidy	D1: Engaging families in your mathematics program	F-6
	Jen Bowden	D2: Creating engaging enabling and extending prompts	F-6
	Stacey Lamb	D3: Student voice and agency in the mathematics classroom	F-6
	Dr Paul Swan	D4: The literacies of mathematics: the missing link (Virtual)	F-6
	Andrew Lorimer-Derham	D5: Weapons of math instruction	5-10
	Jessica Mount	D6: Creating and using open-ended investigation tasks	7-10
Lunch and networking: 1.25pm-2.15pm			
Session 5 2.15pm-3.10pm	Amanda Cassidy	E1: A picture tells...	F-3
	Emma Jensen	E2: Challenging Tasks - What are they? How do I use them efficiently? How do I get my peers onboard?	F-6
	Janine Sprakel	E3: What's the problem with mathematical problem solving?	4-9
	Brett Webber	E4: VEX robotics	7-10
	Dr Steve Murphy	E5: Strengths approaches to maths success in rural schools	F-12
	Jessica Mount	E6: Writing, implementing and assessing VCE SACs	VCE
Closing: 3.15pm-3.30pm			

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Wangaratta mathematics education conference 202 - Session abstracts

Monday 12 July, 2021

Session	Title/abstract
Session 1: 9am-10am	
<p>1A Keynote: Reasoning the glue that holds the curriculum together (Virtual)</p> <p>F - 12</p>	<p>Kilpatrick et al (2001: 129) speak of reasoning as the glue that holds the curriculum together. In this keynote Paul will use examples from the different content areas and different year levels to illustrate the key features of Reasoning proficiency that glue the curriculum together. He will also address the arguments that we don't have enough time to teach reasoning and that reasoning is only for the 'smart' students.</p>
Session 2: 10.05am-11am	
<p>B1 Fluency: Face the facts (Virtual)</p> <p>F - 4</p>	<p>Fluency is one of the four proficiency strands. In this session Paul will examine one part of fluency - basic number facts. There are around 400 basic number facts that students need to learn. Paul will provide a succinct plan for teaching these facts. The link between the understanding proficiency strand will be made clear as well as the role of a basic set of mental strategies. It should be noted that in Years 3 and 4, students should be developing recall of basic number facts and a few simple games will be shared to help develop recall.</p>
<p>B2 Mindsets in mathematics</p> <p>F - 6</p>	<p>How can mathematics develop a Growth Mindset? To ensure our learners are able to reach their potential in mathematics they need to be resilient, risk takers who enjoy the 'the struggle', rich maths challenges can provide. In this workshop Andrea will introduce open ended maths tasks which enable students to visualise their thinking, share their ideas and enjoy the 'struggle' of problem solving. To develop a Growth Mindset students must see their mistakes as learning opportunities and realise that all great mathematicians had setbacks, but through effort and persistence succeeded.</p>
<p>B3 Cross curricular communication to embed mathematics learning using 'Snot Plots'</p> <p>F - 6</p>	<p>The collaboration of specialist and generalist teachers at Wang West ensures that the timing of teaching skills in Mathematics coincides with development of the same skills in Science. This initiative is developing into a whole school project to consider cross curricular planning and using creative and critical thinking in numeracy across the curriculum. Our professional learning communities ensure accountability, critical reflection and show we are committed to embedding these skills in our work. Participants will create data through a snotty science experiment 'The Big Sneeze'. This experiment demonstrates developing 'real' data and also, how far a sneeze can travel using spray bottles as a simulator using different viscosities of snot. Be ready to create some great discussions on your snot plot using variable data and seeing just how far snot can take your student's learning.</p>
<p>B4 What's the problem with mathematical problem solving?</p> <p>4-9</p>	<p>The art of mathematical problem solving can be taught, and it is more than doing the worded problems in a textbook. Problem solving cultivates mathematical grit, it promotes communication and collaboration and gives purpose to mathematics. Looking at strategies that work and the role of classroom teachers, we will explore sources of good problems and discuss problem solving and problem posing with students of all ages.</p>
<p>B5 Boring, pointless and scary!</p> <p>4-10</p>	<p>Sadly, these are some of the most common words our students associate with maths. This mindset (often inherited) creates enormous barriers to learning and enjoying mathematics. It's time to shift this thinking. This hands-on workshop will showcase a range of engaging games and activities to increase your capacity to engage learners of any ability, build skills and confidence in your weaker learners, get students working together and thinking out loud, encourage curiosity and creative thinking, provide rich, challenging tasks and foster a love of maths.</p>

<p>B6 Creating Notes Pages to store as Widgets for VCE Exams</p> <p>VCE</p>	<p>Do you know how to write, store and recall Widget pages? Widgets are single pages (of any type) that can be called up and inserted into any TI-Nspire™ document without needing to close that document. This is especially helpful for students in exams, but firstly they need to have an appropriate package of widgets on their handheld. The Notes application especially lends itself to this purpose, so this workshop is a double bonus of learning to use the Notes application and learning to utilise Widgets. It's also a 'make & take' workshop with the aim for participants to take away course-targeted Notes application Widgets to share with their students.</p>
<p>Session 3: 11.30am-12.25pm</p>	
<p>C1 Fluency: Face the facts (Virtual)</p> <p>F - 6</p>	<p>Fluency is one of the four proficiency strands. In this session Paul will examine one part of fluency - basic number facts. There are around 400 basic number facts that students need to learn. Paul will provide a succinct plan for teaching these facts. The link between the understanding proficiency strand will be made clear as well as the role of a basic set of mental strategies. It should be noted that in Years 3 and 4, students should be developing recall of basic number facts and a few simple games will be shared to help develop recall.</p>
<p>C2 Making mathematical connections through contextual imagery</p> <p>3 - 6</p>	<p>There is the saying a picture says 1000 words. Can it say this in mathematical language also? A Math Investigator finds the Math, does the Math and shares the Math. Contextual rich photographs give students the opportunity to do all of these processes. It allows students to learn and collaborate in an inquiring space to deepen their skills as Math Investigators. By using context rich photographs, a student has improved purpose, engagement, opportunities for collaboration, deeper critical and creative thinking and experience Upside-Down Teaching. In this workshop we will develop understandings about what makes a contextual image work, how you may use such imagery to deepen mathematical connections in a lesson and why it is worth investing in.</p>
<p>C3 Student Voice and Agency in the Mathematics Classroom</p> <p>F-6</p>	<p>Student voice and agency allows students to have a level of autonomy and power in a learning environment. Learning and teaching beliefs, classroom environment and the choice of Mathematical tasks are paramount. Through the use of Challenging Maths Tasks and open ended tasks, learn how students have become independent self regulated learners in a primary setting. This hands-on workshop will offer tasks, look at student work samples and videos, as well as provide guides and protocols to assist in setting up a classroom that honours student voice and agency.</p>
<p>C4 Drones and mathematics</p> <p>5-10</p>	<p>How do we cater for an ever-changing future and still keep our students interested in mathematics? One way is to expose them to avenues of mathematics which they may not have thought about. In this unit we use drones and allow students explore aerial photography, mapping and scale drawing. We are land surveyors, preparing a draft for the council. We use technology, like drones, Ipads and laptops as well as hand drawing skills. We are working on problem-solving, teamwork, coding, scale drawing, area and perimeter problems (simple and composite shapes). It is all integrated as we live in an integrated world.</p>
<p>C5 Strengths approaches to maths success in rural schools</p> <p>5-10</p>	<p>On average, rural students are a year behind their city cousins in mathematics. Rural students tend to have lower self confidence and lower expectations in mathematics, while rural staff often have fewer qualified maths teachers and poorer access to professional learning. However, rural schools have strengths that can be used to enhance maths learning. This workshop explores a strengths approach to improving mathematics education in your school and introduces some proven strength-based strategies including HEaPS (High Expectations and Proactive Support) and Place Based Education.</p>

<p>C6 Basic Algorithmic Thinking to Writing Program Code for TI-Innovator™ Rover</p> <p>7-12</p>	<p>Coding is a helpful tool for problem solving but algorithmic thinking is where it all begins. Participants will consider algorithmic procedures then learn some simple coding syntax to write and execute TI-Basic programs. Application levels will extend from a simple problem-solving program, to using a program to control actuators and sensors and finally to driving the TI-Innovator™ Rover. No previous coding experience is necessary, though even experienced programmers may appreciate the pedagogy of this approach.</p>
<p>Session 4: 12.30am-1.25pm</p>	
<p>D1 Engaging families in your mathematics program</p> <p>F-6</p>	<p>Strong connections between home and school have a profound impact on students' ongoing learning. In this workshop we will identify the essential elements in creating strong bonds between schools and their families. Ideas around creating effective and engaging programs including; family information nights and how best to support families, including support resources available will be identified. Teachers will walk away from this session with practical ideas, activities and resources that they can take back and use in their schools with their families.</p>
<p>D2 Creating engaging enabling and extending prompts</p> <p>F-6</p>	<p>Enabling and extending prompts have become a popular way to effectively differentiate tasks across classrooms. Prompts allow students to become including in tasks, supporting them by reducing the complexity of the task or extending and challenging their thinking. In this workshops we will investigate some challenging and engaging tasks and explore how to create prompts to ensure all students are including and tasks are differentiated. We will explore a range of activities that utilize estimation in creative and critical ways, connecting estimation with various elements of the Victorian Curriculum.</p>
<p>D3 Student voice and agency in the mathematics classroom</p> <p>F-6</p>	<p>Student voice and agency allows students to have a level of autonomy and power in a learning environment. Learning and teaching beliefs, classroom environment and the choice of Mathematical tasks are paramount. Through the use of Challenging Maths Tasks and open ended tasks, learn how students have become independent self regulated learners in a primary setting. This hands-on workshop will offer tasks, look at student work samples and videos, as well as provide guides and protocols to assist in setting up a classroom that honours student voice and agency.</p>
<p>D4 The literacies of mathematics: the missing link (Virtual)</p> <p>F-6</p>	<p>Paul will share how three different literacies; vocabulary, graphics and symbols combine to assist students to think mathematically. Practical suggestions for improving student use of mathematical language will be provided. Ideas for incorporating a whole school approach to the development of mathematical literacies will be shared.</p>
<p>D5 Weapons of math instruction</p> <p>5-10</p>	<p>In the right hands, a deck of cards is an incredibly powerful 'weapon of math instruction'. This workshop will be packed with engaging games to develop number skills, reasoning and metacognition. Learn how to use a deck of cards to build a better understanding of almost any number concept (proportional reasoning, multiplication, negative numbers, powers, place value, mathematical vocabulary and more) and motivate your learners to practise these skills...by choice! Number skills are only worthwhile when they are used to solve problems. The activities in this workshop will use logic, reasoning and creative thinking to bring number skills to life and provide meaningful opportunities to work like a mathematician. All with a deck of cards.</p>
<p>D6 Creating and using open-ended investigation tasks</p> <p>7-10</p>	<p>Open ended investigations are a great way to promote problem solving and reasoning skills. However, they can be daunting for teachers to use in a lesson as they can take some preparation and planning. Equally students can become overwhelmed by open ended tasks as they require some free thinking! In this workshop we will look at some open ended investigations, how previous tasks can be opened up and how these investigations will work in a lesson.</p>

Session 5: 2.15pm-3.10pm	
E1 A picture tells... F-3	Maths is a language that we are asking our students to learn and understand. Picture books contain both imagery and dialogue that can ignite curiosity and assist students to develop mathematical skills and understandings. In this workshop, we will investigate how good quality picture books can develop deep mathematical understandings for our students. In addition, we will look at a range of tasks that utilise the mathematical proficiencies, focusing on enabling and extending prompts and how to differentiate learning for each and every one of our students.
E2 Challenging Tasks - What are they? How do I use them efficiently? How do I get my peers onboard? F-6	This workshop is designed to help teachers unpack the key foundational principles about how children learn mathematics and how the use of Challenging Tasks (CT) enhances relational learning. CT is a student-centred approach to teaching mathematical problems that promotes lifelong problem solvers. Children work like mathematicians not like calculators. The pedagogical practices to challenging tasks will be unpacked and educators will explore what a CT and how they might go about implementing their use within their units and schools.
E3 What's the problem with mathematical problem solving? 4-9	The art of mathematical problem solving can be taught, and it is more than doing the worded problems in a textbook. Problem solving cultivates mathematical grit, it promotes communication and collaboration and gives purpose to mathematics. Looking at strategies that work and the role of classroom teachers, we will explore sources of good problems and discuss problem solving and problem posing with students of all ages.
E4 VEX robotics 7-10	Brett and the Galen VEX students will introduce you to the world of competitive Robotics, and how students apply mathematical techniques to create autonomous robots. Join us for a hands on lesson where you will learn how to program your own robot and experience the world of angles, distance, speed and ratios using VEX Robotics.
E5 Strengths approaches to maths success in rural schools F-12	On average, rural students are a year behind their city cousins in mathematics. Rural students tend to have lower self confidence and lower expectations in mathematics, while rural staff often have fewer qualified maths teachers and poorer access to professional learning. However, rural schools have strengths that can be used to enhance maths learning. This workshop explores a strengths approach to improving mathematics education in your school and introduces some proven strength-based strategies including HEaPS (High Expectations and Proactive Support) and Place Based Education.
E6 Writing, implementing and assessing VCE SACs VCE	This workshop looks at creating VCE Mathematics SACs, writing rubrics and how SACs can be implemented within the classroom. The investigative style of SAC writing that was introduced with the change of study design in 2016 will be explored as well as how previous SACs can be adapted to suit VCAA requirements. Part of the session will also focus on how to prepare tasks for Years 9 & 10 students to get them ready for VCE SACs.
Closing: 3.15pm-3.30pm	

Wangaratta mathematics education conference 2021 - Presenter biographies

Monday 12 July, 2021

Dr Paul Swan

Dr Paul Swan is an award winning author, acclaimed speaker and workshop presenter and developer of games and materials to support students to learn mathematics. He is an Honorary Life member of the Mathematical Association of WA and an Honorary Fellow of the Australian College of Educational Leaders (ACEL). He was awarded his PhD for his work identifying the Computational Choices of upper primary and lower secondary students. As Dr Paul Swan lives in Perth, he will be streamed virtually to this event.

Jen Bowden, The Mathematical Association of Victoria

Jen enjoys inspiring teachers to become more critical and creative in their teaching. As an education consultant for the Mathematical Association of Victoria, she works with teachers and leaders to build teacher capacity, increase knowledge of curriculum content, develop pedagogies and establish school-wide improvement plans. Jennifer's current interest is in developing challenging tasks with teachers to ensure all students are engaged and challenged in their learning. She is interested in utilising inquiry to strengthen students' mathematical understanding and cognitive engagement.

Brian Lannen, Murray Mathematics Curriculum Services

Brian Lannen began his schooling at Horsham North Primary School at a time when Harold Holt was Prime Minister, our music charts were dominated by The Beatles and The Seekers and the world's first handheld calculator (Cal-Tech) was developed by Texas Instruments. Brian has subsequently embraced educational technology as fundamental to his teaching for over 35 years in Victoria and NSW. He has taught Physics, Maths and Science in schools, university and TAFE colleges, was a curriculum consultant in NSW and New York and has contributed to a range of text-book writing projects. He helped establish T-Cubed (Teachers Teaching with Technology) in Australia in the 1990s and is now a Senior Mentor to that association and Principal Host of the Texas Instruments Australia webinar program.

Emma Jensen, St Francis of the Fields

Emma Jensen has taught in a mixture of both the primary and secondary sectors. Currently, she is a primary school teacher at St Francis of the Fields, who teaches part-time in Year 4. Emma completed her Masters of Leadership in Curriculum and Pedagogy at Monash University last year. Her speciality within this post-graduate study is Primary Mathematics. Emma is also employed as a sessional educator at Swinburne University.

Janine Sprakel, Australian Mathematics Trust

A respected and experienced teacher, teacher educator and author of mathematics teaching and learning materials. Well known for leadership and project management skills, Janine has developed relationships with funding partners that have resulted in highly successful ongoing partnerships. In her role at the Australian Mathematics Trust, Janine works with stakeholders including school jurisdictions, government, teachers, parents and students to grow the understanding of the value of mathematical skills and dispositions.

Andrew Lorimer-Derham, Think Square

Andrew is a passionate educator and inventor who relentlessly creates unique ways to spread a love of mathematics. Andrew's desire to build skills and confidence in his students has seen him develop Think Square (a suite of hands-on maths games), Mirrogram (the world's first reflective clothing line) and Skillhouettes (an app to track and record motor skill development). His creative ideas have been featured on LightFM and *The Age*; he is a puzzle writer for *COSMOS* magazine and has been contracted to develop innovative solutions for Cricket Australia's junior programs. Andrew currently spends most of his time running student workshops and staff PD around the idea of 'Intentional Fun' where he takes great pleasure in demonstrating what a joyful, imaginative and playful pursuit maths can (and should) be.

Jonas Anderberg, Galen College

Jonas has taught maths and science in secondary schools in both government and non-government sectors for 10 years. A passion for engagement through technology and having 'fun' in the classroom brought him to develop a course that goes under the banner 'Integrated Studies'. He believes students need to see the real life applications of their work in school so that they can maintain their motivation and improve their results.

Andrea O'Connor, St Patrick's Primary School

Andrea has taught Mathematics in secondary and primary school in both Australia and the UK. She is currently studying her Masters in Education at Melbourne University in the specialisation areas of maths education and leadership and management. Andrea is passionate about ensuring all regional and rural students are provided high quality maths education.

Dr Steve Murphy, LaTrobe University

Steve was a maths and science teacher and leader in primary and secondary schools in both government and non-government sectors for 25 years. He now educates preservice teachers at LaTrobe University and research maths, science, and STEM education. He is passionate about student engagement in maths and science from early childhood through to secondary school, and he is strongly interested in rural school success. He has published extensively in these areas, presented at national and international conferences, and has co-edited the book *STEM education across the learning continuum*.

Amanda Cassidy, St Patrick's Primary School

An established primary school teacher, Amanda has taught a range of year levels across different schools across Victoria in both government and Catholic sectors. Amanda was the recipient of the 2017 Choose Maths Teachers award in Australia. She has worked as a classroom teacher, Curriculum Coordinator and Leader, Intervention Specialist and has worked for the VCAA reviewing On Demand material and a presenter for the MAV.

Wangaratta mathematics education conference 2021 - Presenter biographies (cont.)

Monday 12 July, 2021

Stacey Hedderman, Wangaratta West Primary School

Stacey Hedderman likes to blow things up. She is also a primary school teacher working at Wangaratta West Primary. She is currently working on her juggling skills, holding a Learning Specialist role, teaching science to 500 Foundation to Year Six students and is busy mentoring seven graduates into super teachers. Stacey has held leadership roles in independent, Catholic and government schools and taught in primary and secondary settings for the past 20 years. She is particularly excited about engaging everyone around her in STEAM and encouraging creativity anywhere she can.

Brett Webber, Galen College

Brett is an ICT and VEX Robotics teacher with experience teaching in the Catholic and government sectors. Through VEX Robotics he has developed a passion for student led learning and has seen first hand the success that students can achieve when given the right opportunities. This desire for student success has led to him now teaching a VEX Robotics 'Integrated Studies' unit where all Year 7 students at Galen Catholic College are helped to develop the skills necessary to succeed in the workplace of tomorrow.

Stacey Lamb, St Bernard's Primary School

Stacey is a primary school teacher who is passionate about teaching Mathematics. She has presented at a number of MAV conferences and has led numeracy development in her school. Stacey has completed her Masters of Education (Numeracy) and continues to conduct research at her school. She has worked with Monash University on the Challenging Maths Tasks projects and is keen to share her learning. She is currently leading a STEAM research project at her school.

Jessica Mount, The Mathematical Association of Victoria

Jessica has taught secondary mathematics for over 10 years and was Head of Mathematics at a private girls school in Melbourne before taking maternity leave. Since 2013 she has been involved with MAV VCE revision programs, SAC writing and in school consultations as well as working with various publishers for textbook publications. Jessica has also been a VCE Further Mathematics assessor since 2011. Currently she is working at MAV as a secondary education consultant.