Workshop 7

Thursday 5th October, 1040

Workshop summary

W7A-8A	Seeing the future: First Year Mathematics at University, the challenges faced by lecturers and students in an ever-changing landscape	Julia Novak, Cami Sawyer
W7B-8B	Introducing Coding into Mathematics Education	Benjamin Hilliam
W7C	A cure for fraction-angst?	Anthony Harradine **(S)**
W7D	Data science - a new frontier?	Pip Arnold **(S)**
W7E	What is this PAT information telling me about my own practice and my students?	Julie Roberts
W7F	How can I blend the graphic calculator with the teaching of curriculum content linked to NCEA external examinations.	Derek Smith
W7G-8G	What mathematicians do – encouraging engagement in Primary maths	Nicola Petty
W7H	Place value - a report on action research	Dan Green
W7I	Connecting Mathematical Learning Across ECE and Year 1 of School	Niki Stephenson, Kirsten Mackay, Jane McChesney, Becs Thomas
W7J	Keeping Up - how you can access the latest and most acknowledged research on the teaching of Maths, why you should and how many do	Jane Gray
W7K	Check the Clues: Cooperative Group Word Problem Solving	David Dunstan
W7L	Challenging Tasks: Multiplicative thinking	Sharyn Livy, Ann Downton
W7M	Teaching Math Effectively for Middle Schoolers.	Lakshmi Saravanan

W7A-8A (Double session)

Seeing the future: First Year Mathematics at University, the challenges faced by lecturers and students in an ever-changing landscape

Julia Novak, Cami Sawyer

First Year in Maths (FYiMaths) is a network of mathematicians teaching in universities in Australia and New Zealand. The network was established in Australia more than five years ago and this is the first gathering of the New Zealand sub-group. All interested parties are welcome to join us. The goal of the group is to improve outcomes for students in undergraduate mathematics courses by sharing and developing teaching practices and building connections between secondary schools and universities. In this session we will have presentations on innovative teaching of first year university students and have discussions exploring the issues faced by students and teachers. Key points that will be addressed: forming a community of undergraduate mathematics teachers, explorations of improved learning experiences in university mathematics, and encouraging the awareness of changes in NCEA to help the universities to prepare and respond appropriately.

Recommended Audience: Year 11 – 13 Teachers, Other

Julia Novak and Cami Sawyer are starting the NZ group of FYiMaths because they are interested in furthering conversations around teaching and learning. Julia is a professional teaching fellow at the University of Auckland and the Associate Dean (Teaching and Learning) for the Faculty of Science. Cami is a senior tutor at Massey University where she recently received the VC Teaching Excellence Award.

W7B-8B (Double session)

Introducing Coding into Mathematics Education

Benjamin Hilliam

The notion of coding or programming becoming the new "literacy" in the 21st century is gaining momentum within our society. How do we integrate this new skill into the classroom? I will be presenting on how I have attempted to integrate this into my maths classes. No previous knowledge of coding or programming is necessary. Having a computer with you may make involvement more fulfilling.

Recommended Audience: Year 9 – 10 Teachers, Year 11 – 13 Teachers

Ben is a Maths teacher from St Andrew's College, Christchurch, where he has been teaching for the last four years. His ongoing interest is technology has had him recognised by Microsoft as an Expert Educator and he participated in the E2 Global Educator conference at Microsoft HQ in Seattle, USA in 2015. He draws on this experience to develop innovative programs of learning within the Maths classroom.

W7C

A cure for fraction-angst?

Anthony Harradine

a) If asked how you think about the fraction three-quarters, what is your answer? Do you have more than one way to think about three-quarters?
b) If asked how you think about three-quarters multiplied by eight-elevenths, what is your answer? Do you have more than one way to think about three-quarters multiplied by eight-elevens?
c) If asked how you would calculate three-quarters multiplied by eight-elevenths, what is your answer?

Were your answers to b) and c) different?

It turns out there are a number of ways of thinking about fractions, all good, but one better than the others when it comes to moving one's think past the trivial starting points that young minds first meet. Come along and hear about a flow of ideas that can be developed with students that has the potential to change, dramatically, a student's success with fractions at school.
The flow of ideas has been developed into a set of uncomplicated, but engaging activities for students.

Recommended Audience: Year 1 – 6 Teachers, Year 7 – 8 Teachers, Year 9 – 10 Teachers, Year 11 – 13 Teachers

Anthony began teaching mathematics in 1984. Currently Director of the Potts-Baker Institute at Prince Alfred College, he has spent the last thirteen years trying to better understand his 'failures' of the previous twenty. His many mentors have taught him a lot about mathematics and statistics, doing mathematics and statistics, and research. He likes nothing better than sharing ideas with anyone silly enough to have a conversation with him. He really likes mathematics and statistics.

W7D

Data science - a new frontier?

Pip Arnold

In February this year Pip attended the Data Science Education Technology conference in San Francisco. Data science encompasses the broader fields of mathematics and statistics, content knowledge and computing and data skills. The conference was hosted by the Concord Consortium www.concord.org, the developers of the common online data analysis platform CODAP www.concord.org/projects/codap. This session will address Pip's latest thinking on data science seven and a bit months on. She will also give you a hitch hikers guide to CODAP and the other teaching and learning activities that the Concord Consortium have been working on. These are not restricted to statistics, but include mathematics and science learning activities.

Recommended Audience: Year 9 – 10 Teachers, Year 11 – 13 Teachers, Other

Pip was a project director for the primary mathematics contract for the North Island from 2012–2016. She led a team of 45 facilitators who collectively worked annually in over 100 schools providing in-depth tailored mathematics PLD. She has led the data collection and collation process to ensure accurate diagnosis of primary presenting needs and accurate and focused reporting of impact. Pip has previous experience in curriculum and assessment development. She was a member of the mathematics and statistics curriculum writing team and has been involved in achievement standard development. Pip led the development of the secondary senior guides for mathematics and statistics on TKI. Formerly Pip was head of mathematics at Auckland Girls Grammar School, followed by work as a secondary mathematics advisor before joining Cognition in 2010. Pip completed her PhD in statistics education in 2013, her thesis topic was posing and answering statistical investigative questions.

W7E

What is this PAT information telling me about my own practice and my students?

Julie Roberts

Do you wonder where to begin with the reports created from the PAT: Mathematics assessment? This workshop will explore how you can consider your own practice and your students' strengths and next learning steps. Included will be discussions on scale score vs stanines, differentiating assessments, conceptual progression through the tests and exploring the reports.
Key learning points from the workshop include:

- Understanding scale scores can give you a new perspective on thinking about progress
- Differentiating assessments enable finding where students are working at within the NZC
- Analysing reports will support inquiring into teaching practice

Bring a laptop of tablet to explore the NZCER demo site.

Recommended Audience: Year 1 – 6 Teachers, Year 7 – 8 Teachers, Year 9 – 10 Teachers

Julie joined NZCER as an Education Advisor / Researcher in 2017. Julie is an experienced mathematics facilitator and primary teacher. For the last nine years she has worked in a range of capacities delivering mathematics professional learning support in schools and clusters. She has strengths in mentoring and coaching leadership, effective assessment practices, and strategies to accelerate learning outcomes.

W7F

How can I blend the graphic calculator with the teaching of curriculum content linked to NCEA external examinations.

Derek Smith

Merging the GC into learning activities. Let's experiment and investigate with the graphic calculator. A range of activities to explore coordinate geometry, algebra, calculus, graphing and probability.

This workshop is presented to you by CASIO our Platinum Sponsor

Recommended Audience: Year 11 – 13 Teachers

Derek is currently on contract to the University of Otago as a Mathematics and Statistics (Central South) Facilitator (Secondary). He has taught mathematics and statistics at secondary schools in the Wellington region for 28 years holding HOD positions and a position as senior lecturer at VUWCE, in Mathematics Education.

W7G – 8G (Double session)

What mathematicians do – encouraging engagement in Primary maths
Nicola Petty

Teachers need to experience the fun and possibilities of being a mathematician. This workshop lets teachers participate in their version of an event for students aimed at increasing engagement in mathematics. Participants will practise being mathematicians and develop teaching practices for rich lessons.

Recommended Audience: Year 1 – 6 Teachers, Year 7 – 8 Teachers

Dr Nicola Petty (Dr Nic) is well known for her innovative and engaging approaches to teaching statistics and mathematics. She has spent the past 25 years developing online and physical learning resources for primary, secondary and university students. Nicola is a qualified high school mathematics teacher with additional experience teaching innovative primary school mathematics lessons and running mathematics events. Nicola writes a well-respected statistics learning and teaching blog and keeps current with thinking and research about mathematics education through reading and participating in the MathTwitterBlogosphere. She is co-director of Statistics Learning Centre, a social enterprise with a mission to invent, create and disseminate resources and ideas to enable people to learn and teach mathematics and statistics in a more enjoyable way.

W7H

Place value - a report on action research
Dan Green

* Reflections on my understanding of teaching place value* Cultural/social aspect of place value* Further study for improving teacher quality

Recommended Audience: Year 1 – 6 Teachers, Year 7 – 8 Teachers

Until recently Dan as been an Assistant Headteacher in the U.K. He has had responsibility for mathematics and provided training in his school, across a cluster of schools and to trainee teachers as part of his role. He completed the MAST Primary specialist teacher course and is going to share one of his projects. He has recently moved to NZ and intends to set up his own consultancy on Maths PD.

W7I

Connecting Mathematical Learning Across ECE and Year 1 of School
Niki Stephenson, Kirsten Mackay, Jane McChesney, Becs Thomas

Continuity of mathematical learning is important for children when they transition across the different educational settings in the early years. This paper reports on the first half of a Teacher-led Innovation Fund (TLIF) Project titled Connecting mathematical learning across ECE and Year 1 of school which is a collaboration between Kidsfirst Diamond Harbour Early Learning Centre and Diamond Harbour School. This project aims to expand the teaching focus of mathematical learning, with particular references to children's mathematical language, confidence in mathematics and mathematics to be found in play-based opportunities. Our focus on children's rich mathematical language assumes that language is a tool for expressing thinking, for naming mathematical entities and describing processes of action and reasoning. The teachers will present their interim findings, providing a set of criteria that will describe the connections we have between our school and kindergarten. We will share findings from data so far, including the materials and language we use in common that we have also presented to whānau to encourage consistent connections with childrens' mathematical learning and with the centre's and school's mathematics programmes.

Recommended Audience: Year 1 – 6 Teachers

Kirsten is the Acting Head Teacher at Kidsfirst Diamond Harbour Early Learning Centre, and Niki Stephenson is Junior Syndicate Leader at Diamond Harbour School, and both are teacher/researchers

involved in the TLIF project. Jane and Becs are also involved in the TLIF, and Becs and Niki have co-presented at the Canterbury Primary Mathematics Symposium.

W7J

Keeping Up - how you can access the latest and most acknowledged research on the teaching of Maths, why you should and how many do
Jane Gray

Are you keen to successfully extend your practice of the skills of teaching Maths? Do you have access to the latest research on what works? How to follow the national and international researchers via Google Scholar, and some data on how many of us do.

Recommended Audience: Year 7 – 8 Teachers, Year 9 – 10 Teachers

Jane is HOD Mathematics at Hillmorton High School

W7K

Check the Clues: Cooperative Group Word Problem Solving
David Dunstan

The Problem Solving and Reasoning proficiencies are key aspects of the mathematics curriculum. Polya's four step problem solving model is used for the "Check the Clues" tasks.
This session will highlight the role that mathematical language and reasoning play in solving word problems. Working in groups of four, participants will use Clue Cards, Solution Cards and tools such as number charts to solve problems for various mathematical content strands.
In each "Family" of tasks, there are eight similar problems that link to the curriculum. Teacher guidance is provided for the curriculum links, mathematical and contextual language, a "Prior to" and "Where to" section for teacher planning prompts and importantly, the answers.
Dr Paul Swan and David Dunstan, co-created the "Check the Clues" suite of resources, suitable for pre-primary to year 10 students. The booklet "Check the Clues: Find My Number", can be freely downloaded from drpaulswan.com.au

David has successfully presented this workshop at the AAMT, MAV and MAWA conferences in Australia. Three key features are:-

- Engaging cooperative learning pedagogy;
- Using problem solving tasks to promote understanding and reasoning through student dialogue;
- Developing graphical literacy fluency.

Recommended Audience: Year 1 – 6 Teachers

David Dunstan is a Numeracy Coordinator, who has worked for the Association of Independent Schools of Western Australia as a consultant for seven years. He taught mathematics to rural students in WA for 28 years. David regularly presents 'hands-on' workshops, which includes fractions and engaging with problem solving and reasoning tasks. In 2017, he co-presented the Principals as Numeracy Leaders Project in Perth, Darwin and Canberra. In collaboration with Dr Paul Swan, David is a co-author of the "Check the Clues" series and the Playing with Place Value Yearly Planner and resources.

W7L

Challenging Tasks: Multiplicative thinking
Sharyn Livy, Ann Downton

Challenging tasks can be adapted to a variety of levels and provide opportunities for all learners to engage in mathematical learning. Multiplicative thinking can be described as the relationship between multiplication and division and is a critical stage of children's mathematical development during their primary years of schooling. Our workshop will present some tasks on the topic of multiplicative thinking. We will share our experiences of how primary aged students apply themselves when solving these tasks and discuss the role of the teacher when facilitating these lessons.

Recommended Audience: Year 1 – 6 Teachers

Dr Sharyn Livy and Dr Ann Downton enjoy teaching primary mathematics teacher education at Monash University in Melbourne. Last year they worked together on a project, Encouraging Persistence, Maintaining Challenge. Today Sharyn and Ann will share the tasks they have trialled with teachers related to multiplicative thinking as part of this research project.

W7M

Teaching Math Effectively for Middle Schoolers.

Lakshmi Saravanan

Math is appreciated when students understand the concepts and math knowledge is attained when they apply what they have learnt. Students achieve a higher level of understanding when they have multiple approaches to solve a problem and that integrates more than one topic. When tasks have low threshold but high ceiling, students' interests are triggered. In this workshop, you will look at some tasks that will trigger the interest of students by connecting it to real life and that has multiple approaches to arrive at a solution. Participants will have opportunities to practice some of the tasks using different approaches and tools. By the end of this workshop, participants will have an idea of creating problems with multiple approaches and that connects to real life.

Recommended Audience: Year 1 – 6 Teachers, Year 7 – 8 Teachers

Lakshmi Saravanan is a middle school math teacher currently teaching in American Internationsl School, Chennai, India. Her experience includes 10 years of teaching in California, USA, Lecturer at Notre Dame University, Califronia, USA, Trainer for Santa Clara County teachers, California, USA. Lakshmi works towards the whys and hows of math in her teaching.