Workshop 1

Tuesday 3rd October, 1300

Workshop summary

W1A-2A	Great Math Lessons on Digital Devices (double workshop)	Dan Meyer
W1B-2B	Developing Statistical Thinking: Theory and Practice (double workshop: theory and practice)	Christopher Niles
W1C	Statistical Literacy - what is it at NCEA, Level 3?	Derek Smith
W1D	Engineering Education to Employment and Secondary Tertiary Partnership (Removing invisible walls on a Journey Back to the Future Ka Mua Ka Muri)	Nigel Studdart, Mirko Wojnowski & Haggis Henderson
W1E	Math with a Road Safety Message	Beverley Sue-Tang
W1F	Using Presentations to Assess L3 Statistics Internals	David Lear
W1G	Using software to help students learn to solve equations	Daphne Robson
W1H	Assessing using multi-standard projects (Level 1)	Katy Thorne
W1I	Musings on engaging 2E (twice exceptional) and struggling students in a maths classroom, a symphony of thoughts collected during my European adventure	Sue Scott
W1J	Using the Eikosogram to teach conditional and joint probability	Malia Puloka
W1K	Google Suite and Electronic Assessments	James Bowater

W1A-2A (double session)

Great Math Lessons on Digital Devices

Dan Meyer **Dbl workshop**

The free Desmos Activity Builder allows teachers to create interesting and educational math experiences for secondary students on digital devices. We'll learn how to use existing lessons from the Desmos user community, how to adapt your existing worksheets, and how to create our own lessons from scratch.

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

Dan Meyer taught high school math to students who didn't like high school math. He has advocated for better math instruction on CNN, Good Morning America, Everyday with Rachel Ray, and TED.com. He earned his doctorate from Stanford University in math education and is the Chief Academic Officer at Desmos where he explores the future of math textbooks. He speaks internationally and was named one of Tech & Learning's 30 Leaders of the Future. He lives in Mountain View, CA.

W1B- 2B (double session)

Developing Statistical Thinking: Theory and Practice (2 part workshop: theory and practice)

Christopher Niles **Dbl workshop**

Part 1: The classroom theory for developing statistical thinking

Have you ever thought that teaching statistics and mathematics are not that similar but haven't clearly developed why? In this workshop we will explore some key distinctions between statistical and mathematical thinking. Additionally, theories and practices in mathematics will be critically reviewed to identify a few deep issues that could result in practices that serve to inhibit the development of statistical thinking. Drawing from general theories of learning (such as self regulated learning, assessment for Learning and feedback) may serve to illuminate ways in which teachers can promote the development of deep thinking in statistics. The second workshop looks at practical strategies for the 'what next' part. (I am currently working on a masters thesis at Auckland University on this topic).

Part 2: Some strategies for developing statistical thinking

After several years of enculturation in school mathematics, developing statistical thinking at NCEA L2 and L3 is indeed a huge task. Applying classroom practices associated with self-regulated learning (SRL) support the investigative cycle of statistical thinking (PPDAC), so how do we embed these practices in statistics classrooms? In this workshop we will look at a theory for embedding SRL in the statistics

programme and some explicit strategies that may cultivate a theory necessary for efficient and effective development of statistical thinking.

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

Christopher Niles has been a teacher in Mathematics and Statistics for five years and has been in charge of NCEA Level 2 statistics for three of those years. He has presented at various Auckland Mathematical Association workshops and also at Conference in 2015. As part of the Auckland Central Community of Schools last year, he co-lead a cross-curricular professional learning group on Assessment for Learning and student agency. This year he has won a study award to research the influence of peer feedback on self-regulated learning in Statistics for the purpose of developing more efficient and effective learning programmes for all students in mathematics generally and statistics specifically. His case study delves into student experience of peer feedback in classrooms and some of the results of this study may be discussed during the workshop.

W1C

Statistical Literacy - what is it at NCEA, Level 3?
Derek Smith

Unpacking Achievement Standard: 91584 Evaluate statistically based reports. Why is it not a popular external Achievement Standard? What is it all about?

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.

W1D

Engineering Education to Employment and Secondary Tertiary Partnership (Removing invisible walls on a Journey Back to the Future Ka Mua Ka Muri)
Nigel Studdart, Mirko Wojnowski, Haggis Henderson

NorthTec and others are engaged and funded by TEC in an Engineering to Employment Programme as part of a Secondary Tertiary Partnership (STP), integrating subjects across silos and secondary and tertiary learning.
Engineering is the science of the possible, building solutions to the challenges of today while solving the problems of the future. By its very nature that means engineers think outside the box. Solutions to problems cannot simply be applied in a mechanistic fashion. Much of past learning was taught by transmission, which does not engender transformation. This produces students who can solve yesterday's problems well. Tomorrows' dilemmas in an increasingly complex world require a deep understanding of the foundations and tools of mathematics so that our students can apply them with confidence across silos and fields in an environment of constant change.
Fixed mind-sets in mathematics and subject silos in education disrupt thought integration in engineering and may not provide innovative solutions we need. As we consider this we reflect that we walk in the steps of our ancestors who adapted to change from cultivation to industrialisation, building solutions from the ground up. Ka Mua, Ka Muri.

Key Points;

- The Engineering Education to Employment (EE2E) initiative "Making the World" and overview of projects in scope and underway
- The impact of developing a growth mind-set on removing invisible walls and inspiring the students journey
- STP, Tertiary working collaboratively with the school sector across subject boundaries.
- Increasing relevance for mathematics by contextualisation and experimentation

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

Nigel Studdart leads innovative solutions with a passion for transformational technology, problem solving, and making the world a better place to live. In 2016 Nigel received the CITRENZ award for Best Educational Innovation & Northland DHB award for Best innovation creating social wellbeing for MĀori. Mirko Wojnowski is NorthTec Project lead for engineering Secondary Tertiary Partnerships. A maths foundation specialist his passion is to break through superficiality to a deeper understanding of principles. He engages students' logic and reasoning as intelligent people, motivating them to mastery of the foundations of mathematics.
Born on an army base, Haggis trained and worked as a Civil Engineer and found visiting teenagers at schools during Engineering Outreach such fun that he became a Physics Teacher. He teaches teens for a living and lives on a life-sentence block which necessitates him to use creative engineering solutions to make the place work. He finds life fun.

W1E
Math with a Road Safety Message
Beverley Sue-Tang

Want to teach Mathematics that is real and relevant now and in the future? Want to use some FREE resources and also have a ready answer to that age old question "When am I ever gonna use this?" There are some great online editable Mathematics and Statistics resources developed for NZTA and busy teachers by Dr Sarah Howell. The benefit is to help develop a student's sense of community while doing some real maths for the real world. In this workshop we will explore these online resources, consider how to adapt them for use in your classroom as well as look at some other ideas for sharing the important Road safety message.

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

Bev Sue-Tang is passionate about Mathematics Education. Currently HOF Mathematics and Statistics at Rangiora High School, she has over 20 years of teaching experience in Canterbury, Central Otago and overseas.

W1F
Using Presentations to Assess L3 Statistics Internals
David Lear

1 Why use presentations to assess L3 Internals
Marking reports, students clearly use phrases they have been given or follow a template to tick the required creteria but do they understand the content?
2 My presentation of a Level 3 Internal
This showed me the problems students have and the problems we, as teachers, have in persuading students to do a presentation
3 How to get students to do a presentation properly
This involved a change in teaching from practising skills and doing a report as a class and fitting it to the PPDAC to using the PPDAC to produce a presentation.

Recommended Audience: Year 11 – 13 Teachers

David has taught in and been Head of Faculty in England and New Zealand in a variety of schools and is at present Head of Faculty at Diocesan in Auckland
He has been trying to develop different ways in which to use and assess standards in the NZ curriculum and has shared many of his resources with other schools

W1G
Using software to help students learn to solve equations
Daphne Robson

Although many teachers love equation solving, students can find it difficult. Some students just want to find a correct solution but other students are ready to learn several strategies and hence deepen their understanding of algebra and equations. In this session, I will summarise the research into how students learn equation solving and how I applied this to the design of new mobile software. The software is available to you and your students to use for free.

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

Daphne Robson is a maths teacher who likes to use technology in innovative ways to help students learn. Her philosophy and research interests are to use the features of technology to enhance the use of well-known pedagogies. Daphne is Programme Leader of Mathematics at Ara Institute of Canterbury and has a Master's degree in Educational Technology. Her research combines her interest in technology with her interest in how students learn.

W1H

Assessing using multi-standard projects (Level 1)
Katy Thorne

How can a single relatable context provide the mathematics for six plus Level 1 Maths Standards as well as providing links to cross-curricular subjects and beyond?
How can that same context engage and cater for a range of abilities, creative strengths and future pathways?
After our second year working on extended Year 11 projects, hear about the positives and the pitfalls of our Level 1 Mathematics design journey, as well as some of the fabulous outcomes

Recommended Audience: Year 11 – 13 Teachers

Katy is a Mathematics Teacher at Papamoa College

W1I

Musings on engaging 2E (twice exceptional) and struggling students in a maths classroom, a symphony of thoughts collected during my European adventure.
Sue Scott

When awarded a Woolf Fisher fellowship for 2017 I saw it as my opportunity to attend conferences and visit schools overseas, with the aim of finding out how teachers in other countries work with their 2E (twice exceptional) students - those who are gifted but also have learning difficulties, and how they motivate and achieve success with students who come to high school struggling with mathematics.
The schools I visited included an American School for gifted students, and a high-achieving school in England who have a specialist Asperger's unit, and also successfully integrate their students into regular classrooms. I will share the ideas I gained from the conferences I attended while in Europe, which covered a wide range of topics, including promoting student's creativity and motivation.

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

Sue Scott is a maths teacher from Dunedin, who has been the organiser of the Senior Mathematics competition for the past two years. Her two main areas of interest are struggling learners and gifted students, and how to give them the best experience at school. She was awarded a Woolf Fisher fellowship for 2017 which enabled her to travel to America and Europe to attend conferences and visit some schools, to investigate how other teachers maximise the potential of these students, with a focus on 2E students. Sue teaches year 9-13, and in recent years has worked with the struggling students, taking the same students in both year 9 and 10, giving them continuity. She often sees students who have ability, but it is masked by a learning disability, and her challenge is to help them to succeed.

W1J

Using the Eikosogram to teach conditional and joint probability.
Malia Puloka

In this workshop we will learn how we can teach the concepts of conditional and joint probability using the Eikosogram. Equally important is the interpretation and verbalisation of proportion and probability statements and the posing of questions, which we will also look at. This session is based on my research with some Year 13 students. The Eikosogram is a new computer visualisation tool for displaying two-way table information. This session is ideal for the two Probability Externals AS 91267 and AS 91585. The Eikosogram will be accessed online in this workshop, so please bring a laptop.

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

My name is Malia Puloka. I am originally from Tonga but moved here ten years ago. Since then I have been teaching mathematics at secondary school until recently when I joined the Mathematics Department at the University of Auckland as a one-on-one mathematics tutor for Maori and Pasifika students.

W1K

Google Suite and Electronic Assessments

James Bowater

My experience using Google's platform to electronically assess and grade assessements. Google Classroom, Doctopus, AutoCrat, Goobrics and OneNote. I will be discussing the merits and pitfalls, possible policies and issues around NZQA rules and regs, authenticity and more.

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

James Bowater has been teaching for fourteen years now. Prior to this he was in a variety of industries including IT. James brings these skills to his classroom practice and today he will bring this experience to share how he makes it all happen.