FYiMaths 2022

Teaching, learning & assessing post COVID: lessons learnt during the pandemic

Monday July 18 2022	
Time	**Presentation**
10:00 – 10:15	Welcome and Introduction
10:15 – 10:45	Fostering a sense of belonging in first year maths at UQ, post COVID Poh Hillock, Sam Kault and Wenbo Li
10:45 – 11:15	Making maths accessible during and beyond COVID. Anita Frederiks
11:15 – 11:45	Break
11:45 – 12.15	How the pandemic forced changes in mathematics support delivery that enhanced and enlivened mathematical communication Deborah Jackson
12:15 – 12:45	From a large collaborative classroom to online delivery – lessons learned Mary Coupland on behalf of the Teaching Team of "Arguments, Evidence and Intuition"
12:45 – 13:45	Lunch
13:45 – 14:45	Senior Secondary Mathematics Participation – Crisis or Fake News? Michael Jennings
14:45 – 15:15	Computer adaptive practice implemented for essential skills in a foundation mathematics course Rosie Cameron
15:15 – 15:45	Showcasing the work of first-year undergraduates in our mathematics yearbook Simon James, Kerri Morgan and Julien Ugon
15:45 – 16:30	Break and general discussion
16:30 – 17:30	Online Maths & Stats - Lessons from Covid for the "New Normal" Mark Hodds

Tuesday July 19 2022	
Time	**Presentation**
09:45 - 10:15	**NUMBAS – More than just an e-assessment program** **Stephen Weissenhofer and Charles Zworestine**
10:15– 10:45	**Enhancing Student Learning using GeoGebra Integrated with NUMBAS** **Shatha Aziz**
10:45 - 11:15	**Break**
11:15 – 12:00	**Open Book Assessment: Changing the paradigm** **Online assessment: pros, cons and attitudes** **R. Nazim Khan**
12:00 – 13:00	**Mathematics Examinations – What will the New Normal look like and who gets to decide?** **Deb King, Michael Jennings and Don Shearman**
13:00 - 14:00+	**Lunch and Networking**

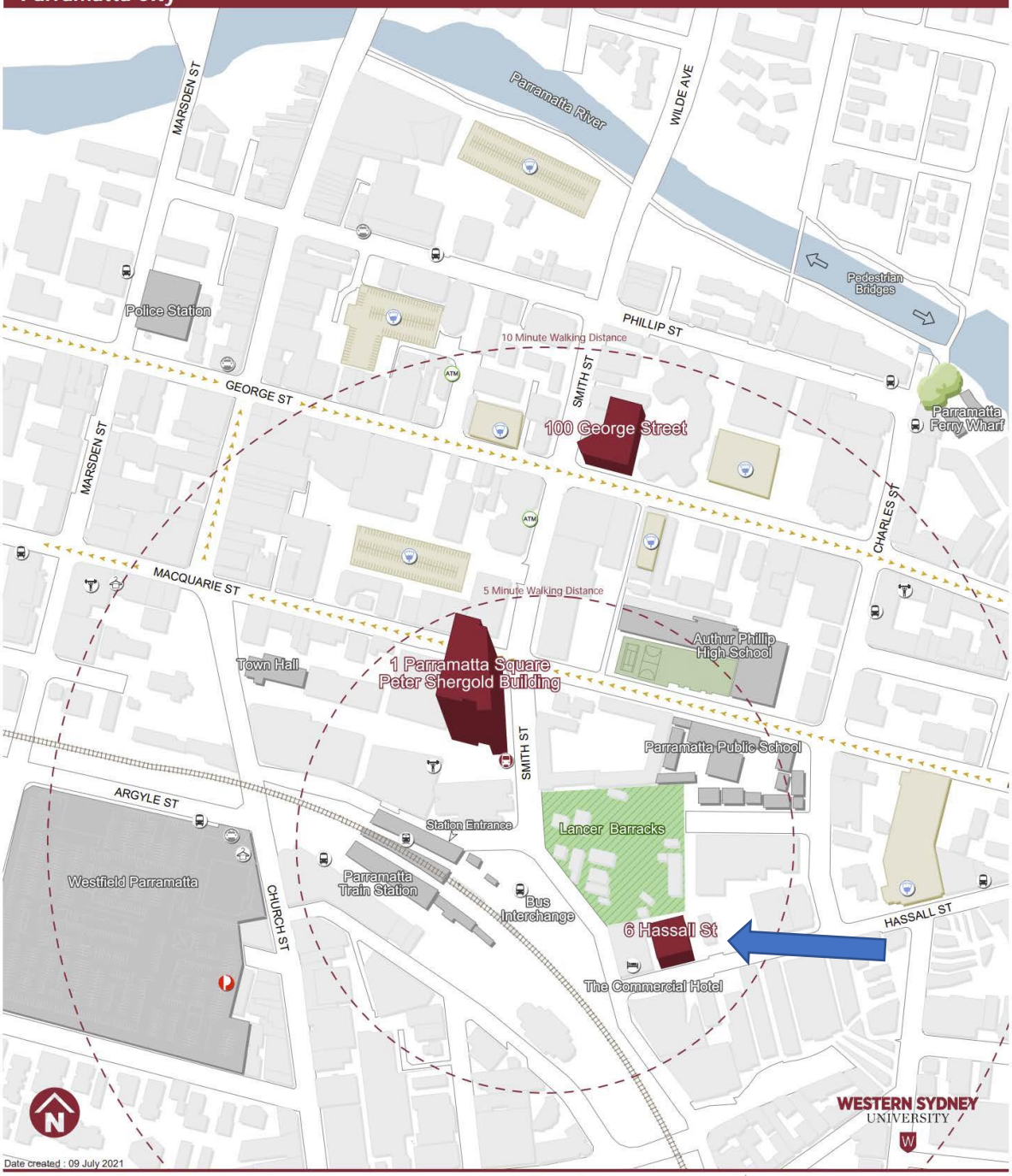
The workshop will be held at the **Engineering Innovation Hub, 6 Hassall St Parramatta in room 3.22** (level 3). This is part of the Parramatta City campus, map is attached. It's about a 3-minute walk from Parramatta station. Details for those who want to park close by are at https://www.westernsydney.edu.au/engineering-innovation-hub/eih/getting_there

The Zoom details for the workshop are:

Join Zoom Meeting
https://uws.zoom.us/j/88411499469?pwd=S2N6R2N4aFRjS1BPNm0zZkthTjNOZz09

Meeting ID: 884 1149 9469
Password: 420206

Parramatta City



Peter Shergold Building, Retail

- Chambers Fine Coffee
- Mikazuki Restaurant
- Optus
- Piccolo Me
- Sharetea

Peter Shergold Building, Student Services

- Badanami Centre
- Campus Life
- Disability Access Room
- Female Prayer Room
- Male Prayer Room
- Library
- Parent Room
- Queer Room
- Student Central
- Student Counselling

6 Hassall Street, Retail

- Naked Duck
- Soul Burger
- Sushi Sapporo
- The Little Duck

KEY

- ATM
- Australia Post
- Dry Cleaners
- Fittness Centre
- Hotel
- Oneway Street
- Parking
- Public Bus Stop
- Taxi Point
- Train Station
- Western Shuttle Bus

Abstracts (in presentation order)

Monday

Fostering a sense of belonging in first year maths at UQ, post COVID

Poh Hillock, Sam Kault and Wenbo Li

The rapid shutdown of campuses in 2020 due to COVID-19 was distressing for many undergraduates, particularly first year students negotiating the challenging transition from high school to university. Many reported a sense of isolation, anxiety and a lack of "belonging" with their institution, with hangover effects post-COVID. In this presentation, we share teaching tips and strategies which we employed in Semester 1, 2022, to promote engagement and to foster a sense of belonging amongst first year mathematics students at The University of Queensland.

Making maths accessible during and beyond COVID.

Anita Frederiks

During the peak of COVID in 2020, the Maths Learning Advisors, at a regional Queensland University, developed a weekly online workshop program. These maths sessions expanded the existing program facilitated by the Discipline Learning Advisors and Liaison Librarians (Derrington et al., 2021). This online program built on *transition pedagogy* (Kift et al., 2010), where sessions extended beyond the initial orientation period, were intentional, and student centred (just-in-time, just-for-me). The program was informed by Stone's (2016) national guidelines for online learning and addressed the need for early intervention, teacher presence, engaging and supportive content, and ongoing contact throughout the semester. Redmond et al.'s (2018) online engagement framework, which measures social, cognitive, behavioural, collaborative, and emotional engagement elements, has been used to review and evaluate the program. The one-hour Maths Online Study Support sessions were short presentations (approx. 15 minutes) with different topics each week. In the balance of the session, students had the opportunity to collaboratively work through additional problems based on the weekly content and ask other maths or study related questions. As these sessions were online, students and staff were able to practice with different technologies and learn from each other. This presentation will share the lessons learnt from the student feedback surveys and the experiences of session facilitators.

References:

Derrington, K., McGregor, R., & Bartlett, C. (2021). *Creating connections and building belonging: more than 'just another online library class'.* In: Students Transitions Achievement Retention Success (STARS 21), 5–9 July 2021, Perth, Australia.

Kift, S., Nelson, K., & Clarke, J. (2010). Transition pedagogy: A third generation approach to FYE -A case study of policy and practice for the higher education sector. *The International Journal of the First Year in Higher Education*, *1*(1), 1–20.

Redmond, P., Heffernan, A., Abawi, L., Brown, A., & Henderson, R. (2018). An online engagement framework for higher education. *Online Learning*, *22*(1). https://dx.doi.org\10.24059/olj.v22i1.1175

Stone, C. (2016). *Opportunity through online learning: Improving student access, participation and success in higher education: National guidelines*. National Centre for Student Equity in Higher Education. www.ncsehe.edu.au/wp-content/uploads/2017/03/CathyStone_NATIONAL-GUIDELINES.pdf

How the pandemic forced changes in mathematics support delivery that enhanced and enlivened mathematical communication.

Deborah Jackson

The Covid pandemic has transformed the way students learn and how they seek support with the forced transition to predominantly online learning. In some cases, that transition was a good thing waiting to happen, and accelerated things on the backburner for those contemplating future enhancements to their student learning practices. What many of us were thinking about doing in the future became what we were forced to do in the present, and sharp learning curves implemented change. This presentation discusses the changes in the delivery of mathematics support during the pandemic at La Trobe University's multi-disciplinary Maths Hub, and how those changes met the needs of students and the requests of discipline coordinators. We will discuss how the changes enhanced and enlivened mathematical communication and improved access for the student body. What were the advantages/disadvantages of the change? What did we do to fill the gaps between f2f and zoom deliveries? What did the student feedback tell us? What did the engagement/results data show us? As we now look to the future, contemplating what we have learned, what does the future hold and how can we shape it?

From a large collaborative classroom to online delivery – lessons learned

Mary Coupland on behalf of the Teaching Team of "Arguments, Evidence and Intuition"

At the beginning of 2020, the decision was made at UTS to move a large undergraduate quantitative literacy subject to completely online delivery. This was in the early days of the pandemic, when the need to be able to offer online subject to overseas students was given a high priority. The subject "Arguments Evidence and Intuition" attracts hundreds of students each session and the teaching team had already developed effective classroom activities delivered in large teaching spaces. The move to online brought particular challenges, which we met in collaborative fashion, and for our efforts the team was

awarded the UTS 2020 Learning and Teaching Team Award "For developing students' skills in quantitative literacy and critical thinking." In this presentation, elements of the successful transition will be outlined and discussed.

Senior Secondary Mathematics Participation – Crisis or Fake News?

Michael Jennings

In this talk, Michael will report on his research about national senior secondary advanced mathematics enrolment patterns. Are we facing an existential crisis or is it all just Fake News? In this talk Michael will address how the phenomena is reported in the press and how key stakeholders engage with the issue.

Much food for thought here so bring your best ideas about how FYiMaths can contribute to the national discussion around mathematics participation.

Computer adaptive practice implemented for essential skills in a foundation mathematics course.

Rosie Cameron

Students entering tertiary foundation mathematics courses often arrive with misconceptions or knowledge gaps in foundational topics. I will outline how we have used the Computer Adaptive Practice Quiz (CAP Quiz) plugin to set up a self-paced, co-requisite approach to achieving mastery in some identified core skills. I will also discuss some reflections on the success of the co-requisite model, in particular during the the most recent semester where we could not place any attendance requirements on students.

CAP Quiz is a moodle plugin that uses an Elo rating system to facilitate mastery of mathematical skills. The CAP Quiz presents students with one question at a time, selecting each question so that students have an estimated 75% chance of getting the question correct. By working through questions until their score reaches a desired threshold, students achieve mastery of the required mathematical skills while being exposed to questions of an appropriate difficulty. The CAP Quiz can be used with STACK questions to assess mathematical skills and has been especially useful for foundational skills such as fraction arithmetic and factorising.

Showcasing the work of first-year undergraduates in our mathematics yearbook

Simon James, Kerri Morgan and Julien Ugon

Several of our first-year mathematics units have been redeveloped over the last few years to provide a more active and engaging experience across our diverse learning cohorts. Key

to the new offerings has been the inclusion of assessments requiring article-like reports and investigations. These tasks are intended to provide students an opportunity to demonstrate a more holistic understanding of mathematics, and also allow them to progress beyond the view of mathematics as a set of solution methods to routine problems. In seeing some of the great work students were submitting, we were motivated to start a Mathematics Yearbook. Select students were invited to rework their submissions under the mentorship of their teachers for inclusion in the yearbook, the first edition of which was published at the end of 2021. This talk will share our experience in redeveloping our units and working with our student contributors – a rewarding and joyful experience amidst the challenges of the pandemic.

Online Maths & Stats - Lessons from Covid for the "New Normal"

Mark Hodds

Prior to the pandemic, many institutions were tentatively investigating new ways of teaching and supporting mathematics and statistics online but were forced into only using these methods when the pandemic struck. What did we learn from this? Is there a best practice? Can we assess students fairly and reliably online? In this talk I hope to begin to provide some answers to these questions, looking firstly from the perspective of mathematics and statistics support and then general mathematics teaching and assessment, exploring the use of various platforms that have been used across the world. Finally, I hope to provide some suggestions as to what may happen as we continue through the "new normal".

Bio:
Dr Mark Hodds completed his PhD in Mathematics Education at Loughborough University (UK) in 2014 and is an Assistant Professor in Mathematics and Statistics Support in the sigma Support Centre at Coventry University (UK). Recently he took up a secondment within the Research Centre for Global Learning (GLEA) at Coventry University, working in the Development, Engagement and Attainment theme. Mark is also Vice Chair (Operations) of the **sigma** National Network for Excellence in Mathematics and Statistics Support in England and Wales and works closely with the Institute of Mathematics and its Applications (IMA) Mathematics Teacher Training Scholarship scheme having completed a PGCE Mathematics teaching course in 2013. He is passionate about improving the understanding of mathematics at all levels but in particular of non-mathematics undergraduates, namely nurses, and secondary school children.

Tuesday

NUMBAS – More than just an e-assessment program

Stephen Weissenhofer and Charles Zworestine

Many academics have used online assessment before – multiple choice quizzes in particular being a feature of many subjects. These are usually worth only 10% of the total assessment mark – meaning not too much focus has previously been placed on online assessment in mathematics. But the global pandemic has changed all that…
NUMBAS is one of the best tools for online assessment; and it has become widely used at Western Sydney University (WSU). A year ago, your speakers knew literally nothing about it – but after a very steep learning curve, we are now huge fans. And then the thought occurred to us – could it be used for more than just e-assessment?
This talk focuses on a new Advanced Engineering Maths unit, and how we used Numbas not only for assessment but also as a teaching and learning tool. We will show you how we interwove questions with notes in NUMBAS, as well as writing quizzes in NUMBAS as part of student assessment. This is the first time any subject has been taught at WSU in this format; we hope that it can become a template for future online teaching, learning and assessment.

Enhancing Student Learning using GeoGebra Integrated with NUMBAS

Shatha Aziz

GeoGebra is an interactive, visual and dynamic teaching and learning tool. Many studies have supported the use of GeoGebra, and shown the positive effects of GeoGebra on student learning and on teaching topics related to science, technology, engineering and mathematics. On the other hand, Numbas is a powerful tool when it comes to creating many versions of each question for online assessments; but many gaps which allow cheating need to be filled, such as the use of online calculators.
Therefore, since Spring 2021, I integrated GeoGebra with Numbas to create a more powerful, interactive and visual teaching/learning and online assessment tool. GeoGebra adds an extra layer to Numbas, which supports student learning and helps maintain academic integrity for online assessments.
The use of multi-version practice questions and exams using Numbas, including multi-version GeoGebra graphs embedded within Numbas, and the use of the GeoGebra graphing calculator in teaching to enhance student engagement and learning will be discussed in this talk. This teaching pedagogy is based on student feedback and/or evidenced-based published research. These strategies aim to develop deep learning experiences which can be achieved by mental engagement and deep thinking.

Open Book Assessment: Changing the paradigm

R. Nazim Khan

COVID has disrupted higher education, and in particular assessments. Online examinations were no longer an option but mandated in many institutions. Many such examinations were supervised. Regardless, many examinations were open book. One issue with these is what format the examination should take. What questions should we ask and how should we ask them to avoid simple copying and grade inflation?

In this talk I will review literature in this area. I will also present my experience in open book examination is a first year introductory calculus unit and take-home examinations in higher level statistics units.

Online assessment: pros, cons and attitudes

R. Nazim Khan

COVID has changed the higher education environment and forced a re-think on teaching and assessment regimes. In particular, the online platform has been implemented for both. Online teaching and learning is at least a decade old, assessments have still largely been conducted as traditional invigilated examinations. Over the last two years, online assessment regimes in various forms have been implemented out of necessity. In this paper we discuss the pros and cons of online assessment from our experience. We describe the various options that we implemented in Mathematics and Statistics. We also report on surveys of students and staff towards online assessments. This research is relevant since online assessments are expected to be important over the next few years. We also discuss whether the online assessments should be an option of choice and not an imposition by circumstances.

Mathematics Examinations – What will the New Normal look like and who gets to decide?

Deb King, Michael Jennings and Don Shearman

In this session, your FYiMaths team will present the findings of a recent survey on the future of mathematics examinations.

The presentation will include early analysis of a survey that captured opinions from Australia, New Zealand, the UK and North America, about the challenges and opportunities afforded by online assessment, how tertiary examinations will be conducted in the future, and who might be making those decisions.

We haven’t seen the results yet, but this session is bound to be a doozy!