Assessment for Sustainable Learning

FYiMaths 6 (2018)

Thursday 28th June	
9:30 – 10:00	Registration and tea/coffee
10:00 – 10:15	Welcome
10:15 – 11:15	**Key Note Presentation** Impact of mentoring on female participation in mathematics Janine McIntosh (AMSI)
11:15 – 11:45	Morning Tea
11:45 – 1:00	**Key Note Workshop** Where are we with Maths Assessment? Cristina Varsavsky, Monash University
1:00 – 1:45	Lunch
1:45 – 2:30	Individualised summative assignments that can be scaled sustainably Ant Edwards, Swinburne University of technology
2:30 - 3:00	**Discussion:** The New Year 12 Curriculum: How is your university dealing with changes to the curriculum? Facilitator: Deborah King
3:00 – 3:30	Afternoon Tea

3:30 – 4:00	Assessing a written statistics assignment using a rubric Anthony Morphett, University of Melbourne
4:00 – 4:30	Using Moodle quizzes as a marking tool: Beyond Multiple Choice Jo-ann Larkins, Federation University
4:30 – 5:00	Block teaching at Victoria University - Assessment strategy for Business Statistics Sidney Lung and Elizabeth Thomas, Victoria University
	Dinner (to be determined)

Friday 29th June

9:30 – 10:00	Tea/coffee
10:00 – 11:00	**Key Note Presentation** ComPAIR: The use of comparative judgement between peers as assessment Mark MacLean, UBC
11:00 – 11:30	Morning Tea
11:30 – 12:00	Diverse assessments to encourage diverse outcomes Heather Lonsdale, Curtin University
12:00 – 12:30	Nature or Nurture? Predictors for student success. Don Shearman and Leanne Rylands
12:30 – 1:00	Assessments: What do students think? Nazim Khan, University of Western Australia
1:00 – 2:30	Lunch and open forum discussion space

Abstracts

Assessments: What do students think?
Nazim Khan

Teachers of mathematics and statistics in higher education conduct assessments for various reasons. First and foremost is the testing of what are deemed core concepts, methods and procedures in the discipline. The form the assessment takes is also determined by the teacher. But what do students think? Do they concur with the assessments that we design and conduct? To investigate this we conducted surveys of first year mathematics and statistics classes at the University of Western Australia. The survey included all first year level mathematics and statistics units.

In this talk I will present preliminary findings from the surveys. In particular, it will be interesting to compare the perspectives of students in bridging courses with those in the mainstream mathematics units. Also of interest is any differences between students in the business statistics units and statistics for science.

This is work in progress.

Using Moodle quizzes as a marking tool: Beyond Multiple Choice
Jo-ann Larkins, Scholarly Teaching Fellow (Statistics), Federation University Australia

There are many factors to consider when designing quality assessment. It should be **valid** in that it accurately measures what it is intended to measure, **fair** so that it gives all students an equal opportunity to demonstrate what they know, **reliable** so it gives the same, consistent result regardless of when or where the assessment occurs or who does the marking and **manageable** or appropriate in size and cognitive load for the students being assessed. Two other aspects of assessment also motivate academic choices. Marking complexity and its effect on workload is a time and economic constraint within the modern university and we are being asked to mark more efficiently. There is a strong argument for authenticity in assessment scenarios, both as a way of engaging students but also as way of incorporating work-integrated tasks within courses.

Technology such as Learning Management Systems seem to offer solutions for minimising the marking workload whilst still creating tailored authentic assessment. For example, Moodle's quiz capabilities can creatively applied to auto-mark complex scenarios. Three different examples from first year courses in essential mathematics for science and statistics are showcased to illustrate some of the ways tailored quizzes can be used to reduce the marking workload for academics, allow the construction of authentic assessment tasks and provide timely structured feedback for students.

Nature or Nurture? Predictors for Student Success

Don Shearman[a], Leanne Rylands[a,b]
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Many papers report on the effectiveness of mathematics support workshops on student outcomes for mathematics subjects at tertiary institutions. How are these effects moderated by students' background ability in mathematics, attendance at classes and online activity in subject based tasks? We have gathered data on mathematics background, tutorial attendance, interaction with the learning management system, use of mathematics support, and final marks for a cohort of students taking a foundation level unit in engineering mathematics. Using statistical modelling techniques we examine the relative effects of each of the predictor variables on the final mark and come to some unexpected conclusions. Amongst these is the prediction that if higher use was made of mathematics support by all students, failure rates in the unit could drop by an order of magnitude.

Individualised summative assignments that can be scaled sustainably

Ant Edwards, Swinburne University of Technology

Delivering authentic assessment within first-year finance, statistics or applied mathematics courses can bring many difficulties for an educator. Such assessment activities require a substantial investment of student time to complete, and so cannot be delivered in time-pressured setting such as a test or exam. First-year students typically haven't met the mathematics that would be used in many authentic settings, and so there are limits to the sophistication of what can be asked of them. There is therefore a narrow scope to set problems that encourage varied mathematical treatments. Putting all this together with the pressures on staff workload to mark such projects, it might seem that the only option is to give students identical projects. This in turn can result in difficulties detecting academic misconduct and plagiarism.

In this talk I discuss a number of ways to use technology to both auto-generate individualised assignments and to either auto-mark or assist with marking in some way. These include mail-merging between R, Excel and Word (in the sense of Hunt, 2005), the LaTeX assessment macro "auto-multiple-choice" (described by Pérez-Benedito et al., 2014), and the online question engine Numbas (developed by Foster, Perfect & Youd, 2012). The first of these approaches has been used successfully in a variety of first-year Units at Swinburne for assessments worth around 10%-15% of students' total grade.

Foster, B., Perfect, C., & Youd, A. (2012). A completely client-side approach to e-assessment and e-learning of mathematics and statistics. International Journal of e-Assessment, 2(2).

Hunt, Neville. (2005). Using Microsoft Office to Generate Individualized Tasks for Students. Teaching Statistics. 27. 45 - 48.

Pérez-Benedito, J. L., Aragón, E. Q., Alriols, J. A., & Medic, L. (2014). Optical mark recognition in student continuous assessment. IEEE Revista Iberoamericana de Tecnologias del Aprendizaje, 9(4), 133-138.

Diverse assessments to encourage diverse outcomes
Heather Lonsdale

As well as being a tool for measuring achievement of learning outcomes, assessment can be seen as an important signal of what we value. Often we assess what is easy to measure, rather than what we want to develop and grow, and we fall into the trap of only using "assessment OF learning" rather than "assessment AS learning". Inspired by the MathsAssess project, we have been working on diversifying our assessments to ensure we assess and develop a broader range of outcomes in our students, and to make use of the assessment process as a learning experience in itself.

I will outline some of the diverse approaches to assessment that we have been employing at Curtin University. These include oral assessment of problem-solving in a whiteboard tutorial setting, as well as nested assignments with multiple submission phases using individualised student-provided data, and individualised student assessment contracts or "choose-your-own-assessments". Each of these has been employed in a range of mathematics units, mainly at first and second year, of varying sizes. Some of these scale better than others to larger classes - in particular, the oral assessment was chosen in some units precisely because it ends up being more efficient for marking time and aligns well with the teaching style.

I will aim to give an outline of some of these different approaches and allow ample time for questions and discussion of different assessment practice.

Assessing a written statistics assignment using a rubric

Anthony Morphett, Vasileos Giagos, Sharon Gunn, Jackie Reid

The *mathsassess* project has stimulated much discussion and reflection on mathematics and statistics assessment practices in Australia. Inspired by *mathsassess*, we trialled a criterion-based rubric for assessing a written assignment in an introductory statistics subject. As part of the trial, we compared the rubric-based assessment approach with the traditional, marking scheme-based approach, in terms of consistency of marking, clarity of expectations and quality of feedback for students, and ease of use for markers. In this presentation, I will report on the development of the rubric and on our research comparing the two assessment approaches, and reflect on the role of resources such as mathsassess in assessment.

Block teaching at Victoria University - Assessment strategy for Business Statistics
Sidney Lung and Elizabeth Thomas

Victoria University (VU) Melbourne commenced an Australian-first, First Year Model in 2018. The First Year Model presents a unique block mode delivery of which four blocks have been completed so far. This change presented an opportunity to unpack, redesign and redevelop first year units to innovatively and effectively meet the new opportunity, requirements and constraints.

Business Statistics is a first year unit for business courses offered by the College of Business at VU. The redesigned Business Statistics unit is the first, First Year statistics unit taught in a block teaching mode in Australia. The process of redeveloping this unit challenged our thinking and expanded our knowledge and skills, particularly around assessments and the use of online features within our existing learning management system (LMS). We would like to invite a discussion, attract your suggestions and share our experience with you about the online assessments (beyond multiple choice) and the resultant benefits and gains in efficiency for staff and students, such as:

- Improves efficiency of marking for academics
- Allows students to access instant feedback on assessment results (with educator moderation)
- Allows academics to have instant access to assessment completion data base and results statistics
- Provides an online platform for students to practice questions with feedback
- Eliminates assessment paper handling time
- Discourages assessment cheating behaviour (almost making cheating impossible)
- Tailors to younger generation's technology appetite and expectation

It is evidenced that the combination of the block teaching model and online assessment system for VU Business Statistics channelled students to grow a stronger learning culture by engaging in work away from class including practicing online questions, even multiple times. This learning culture resulted in higher marks for both online and paper base assessment components and it is expected that these benefits will continue across their studies in other units thereafter. The overall fail rate for Business Statistics has significantly dropped from an average of 31.5% and 34% in Semesters 1 & 2, 2017 respectively to only 13% in Blocks 1-3, Semester 1, 2018. HD and D grades make up a higher proportion in 2018 with average 57% of all grades vs. 23.6% and 34% in Semesters 1 & 2, 2017 respectively. Student Evaluation of Unit (SEU) is up with all ratings 71-100% and student comments are increasingly positive. A further benefit of restructuring this unit for both students and academics is seeing a significant reduction in processing special consideration applications.