Computer Assisted Assessment of Mathematics
10 May, 2.00–4.30 pm
Glynn Rooms 1 and 2, Watson Building
(R15 on campus map)

The e-assessment of mathematics, statistics and numeracy is currently being used within a range of disciplines in higher education and many more academic colleagues are interested in utilising such systems to aid assessment practices and provide immediate feedback to learners. Implementing such e-assessment systems from 'scratch' can prove challenging, but there are many examples of the successful use of e-assessment in higher education and this seminar will highlight some of the existing systems and the range of supporting resources and materials that are available for those that wish to implement them. Although focused around the assessment of mathematics, many of the ideas discussed will be applicable for the use of e-assessment within any STEM discipline.

2–2.30pm  The STACK CAA system
Dr Chris Sangwin, Birmingham

2.30–3pm   Embedding Maths and Stats CAA by Degrees
Dr Martin Greenhow, Brunel

3–3.30pm   Formative Assessment of Maths with Numbas
Christian Perfect, Newcastle

3.30–4pm   Algorithmic e-Assessment with DEWIS
Dr Rhys Gwynnllw, UWE
Networking (with tea and cakes)

Abstracts

The STACK CAA system

Dr Chris Sangwin (School of Mathematics, University of Birmingham)

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In this talk we explain how computer aided assessment (CAA) can make use of computer algebra to automatically assess answers which consist of mathematical content. Using the STACK computer aided assessment system we will illustrate how exercises can assess a range of different competencies and how randomly generated structured exercises can provide valuable practice, and encourage collaborative working and higher level thinking. The talk will also review the freely available demonstration materials on http://stack.bham.ac.uk/moodle.

Embedding Maths and Stats CAA by Degrees

Dr Martin Greenhow (Mathematical Sciences, Brunel University)

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Mathematics at GCSE to first-year undergraduate level is often, but not exclusively, objective in nature. Consequently maths is probably ahead of most other subjects and there are now several excellent CAA systems that can be used in a blended fashion to enhance assessment and learning across a wide range of courses in STEM and beyond (notably social and human sciences). Rather than compare these, this talk will focus on how one can embed the use of CAA and how one can measure its effect. This ranges from informal use (for example simply pointing students at systems like 'maths e.g.'http://www.mathcentre.ac.uk:8081/mathseg/) to individual staff setting up their own tests (http://www.mathcentre.ac.uk:8081/mathsegteacher/) for diagnostic, formative or even summative use. I will present results of two long-term studies at Brunel where the effects on introducing a large component of summative CAA has proved beneficial.
Formative Assessment of Maths with Numbas

Christian Perfect (Mathematics & Statistics, Newcastle University)

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Numbas is an open-source e-assessment system for numerate disciplines developed at Newcastle University. Because of its unique stand-alone architecture, it's particularly well-suited for formative use, as part of diagnostic or revision material. As well as integrating with VLEs such as Blackboard and Moodle, we've been using Numbas in revision material on our maths support centre's website, and we give each incoming first-year a USB key containing a copy of the diagnostic test they're required to sit when they arrive. We'll demonstrate how the publicly available editor at http://numbas.mathcentre.ac.uk can be used to create personalised tests, then demonstrate a few different ways of using those tests.

Algorithmic e-Assessment with DEWIS

Dr Rhys Gwynllw (Mathematics, University of the West of England)

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This talk discusses the algorithmic aspect of the DEWIS e-Assessment system. We present examples of how these features have been implemented in, mostly, summative assessments at UWE and other institutions. Further, we discuss how the features have enhanced the students' and staff's experience of e-Assessment.

The algorithmic specific features of DEWIS include the following:

1. Question parameters are generated randomly with constraints. This includes the option of reverse engineering the parameters based on preferred solutions.

2. Algorithmic marking and feedback features include 'partial marking', 'continuation marking', 'validation marking' and 're-marking'.

3. The opportunity of creating large 'compound' questions with multiple, coupled, inputs.


More details of the DEWIS system are available at http://www.cems.uwe.ac.uk/CAA