Research Update

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Mathematics Education Centre · Loughborough University www.lboro.ac.uk/mec

Welcome!

Research Update is a newsletter sent out three times a year to schools by Loughborough University. We hope you find this newsletter useful and we welcome feedback and suggestions.

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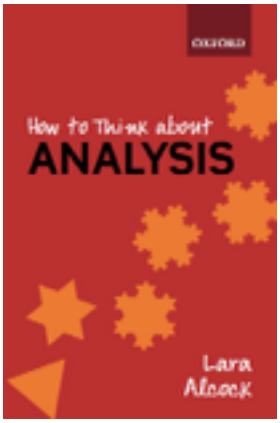
Dr Lara Alcock's Latest Book.

Do you teach students who might go on to study university mathematics? A new book by Loughborough's Dr Lara Alcock, *How to Think about Analysis,* has just been published by Oxford University Press. Like Lara's previous book, *How to Study for a Mathematics Degree*, this is based on research in undergraduate mathematics education. It aims to give new undergraduate students an introduction to Analysis that links with their existing understanding of key concepts including sequences, series, continuity, differentiability, integration and the real numbers. It also includes information on how an abstract subject like Analysis is structured, and how a student might study it effectively. Both of Lara's books are friendly and accessible enough to be studied independently, and would be ideal preparatory reading for high-achieving A-level students who are planning to go on to undergraduate study in mathematics. Contact Lara (L.J.Alcock@lboro.ac.uk) for further information.



Assessing a New Assessment.

Year 7 mathematics students from Castle Rock High School took part in a study comparing two different forms of assessments. One was a traditional test with multiple questions requiring short answers. The other, a novel method of assessing conceptual understanding of mathematics asked only one open-ended question. Although students were not used to answering open-ended questions in Maths, the results showed that the two assessment methods compared favourably. The advantage of the novel method over the more traditional one is that it takes only a few minutes to design. In comparison, traditional methods of measuring conceptual understanding can take years to refine. The open-ended question method, which is quick to design and administer, will therefore be really useful for studies in the field of mathematics education as a way of assessing the impact of different teaching interventions on conceptual understanding of various topics in mathematics. Contact Dr Marie-Josée Bisson (M.Bisson@lboro.ac.uk) for further information.

Noticeable Numbers.

We are surrounded by numbers in our day-to-day lives but we vary in the extent to which we notice (and use) these numbers. In a recent project we developed new ways of measuring children's tendency to notice numbers, and we looked at how this tendency relates to the development of formal numerical skills. We showed children a series of cartoon pictures and we asked them to describe what was in each of the pictures. We found that whilst some children focused on number (e.g. "a girl with three chicks"), others focused on the colours (e.g. "bright green grass") or the emotional aspects of the pictures (e.g. "she looks happy"). Children who noticed numbers on this picture task were more likely to use number words during naturalistic play. They also showed more advanced counting and arithmetic skills than those children who didn't notice numbers. These findings draw a link between children's informal use of numbers and their formal numerical development. Contact Dr Sophie Batchelor (S.M.Batchelor@lboro.ac.uk) for further information.

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New PGCE at Loughborough!
Course Director Dr Dave Hewitt Reports.

The Mathematics Education Centre is pleased to announce the start of a new mathematics PGCE course at Loughborough which started this September. We were allocated 15 places by the National College for Teaching and Leadership and filled the course with some excellently qualified trainees.

The course is being run by myself and **Alison Walker**, who is working part-time with the rest of her time as Faculty Head for Mathematics at Longslade Community College. I have come from running the mathematics teacher education course at the University of Birmingham for the past 24 years, having taught in schools for 11 years prior to that including five years as Head of Mathematics. The Loughborough course is assessed at Masters level and successful trainees will gain 90 credits towards a Masters degree. Completion of the Masters is done through an intensive week-long module on Research into Teaching and Learning immediately after their PGCE course. Finally, they return in the second year of teaching to work on a research project for their dissertation. The research expertise within the MEC guarantees the mathematics PGCE course is research led whilst being practically focused with 24 weeks in schools and practical issues having a strong emphasis during university sessions.

There is a lot of excitement about the course, both from the trainees as well as Alison and myself. The opportunity of designing a course from scratch allows it to be formed from a clear ethos and set of values, with sessions designed to reflect those beliefs. In Ofsted's (2008) report on the teaching of mathematics in schools, it was critical of a style of teaching which can be described as 'teaching to the test'. In their most recent report, Ofsted (2012, p.10) called for "teaching approaches and activities that foster pupils' deeper understanding". A basis of the Loughborough course is that students in schools deserve to understand mathematics as well as gaining a fluency in being able to do mathematics. This is essential for students to leave school with a positive view of mathematics as well as the best grade they can obtain. We work on challenging our trainees about their conceptions of what it means to work mathematically. We expect their views on teaching mathematics to shift significantly throughout the year; but this is far from an academic exercise, it is about them becoming aware of alternative ways of teaching mathematics and making informed choices about the way they go about their teaching.

Alison and I are now going into schools to observe the trainees teach and a significant part of the success of the course comes from the excellent mentors and ITT Co-ordinators in schools who work with our trainees whilst they are on teaching placements. Teachers from our partnership schools also help with interviewing some of the applicants for the next intake and also contribute to some sessions at university. We are establishing a strong link with these schools and look forward to widening school involvement in our course in the years to come.

If you would like to be involved in partnership with the Loughborough mathematics PGCE course, or want to work with us with School Direct, then please contact me.

Dr Dave Hewitt
Director of Mathematics PGCE

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References

Ofsted (2008) *Mathematics: Understanding the Score*. http://tinyurl.com/mzs9pt3 [pdf link]
Ofsted (2012) *Mathematics: Made to Measure*. http://tinyurl.com/kvjnyzm [pdf link]

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