
Recent activities and future plans

Calculus Refresher: A copy of this new publication has been sent to all our departmental contacts, and a full list of publications is shown below. These can be ordered at any time; there is no charge for the leaflets or for individual copies of the others.

Facts and Formulae leaflet: Bulk copies available free of charge for distribution to students

Algebra Refresher, and Calculus Refresher: Bulk copies can be purchased for distribution to students. The current cost is £125 for 100 copies, payable in advance.

Learning and Teaching in Mathematics, Statistics and Operational Research

Occasional series ISSN 1476-1378. Individual copies available free of charge:

- 1/01 Post-sixteen mathematics within Curriculum 2000 (only a few copies left)
- 2/01 Guidelines for Introducing Groupwork in Undergraduate Mathematics
- 3/01 Good Practice in the Provision of Mathematics Support Centres

Learning and Teaching Projects - two proposals to the LTSN development programme have been accepted. The first will lay the foundations for a UK Mathematics Learning Support Centre which will deliver mathematics support materials, free of charge, to academics for use in supporting students, and directly to students themselves. The second will investigate the idea of Mathematicians as Educational Co-Researchers. More details of both projects can be found opposite. An outline proposal for an educational research project on the transition from mathematics learning to scientific-technical practice in work/HE has been shortlisted for further development by the ESRC-funded Teaching and Learning Research Programme (TLRP) Phase III.

Three projects relating to our disciplines have been successful in obtaining substantial funding through the

Fund for the Development of Teaching and Learning:

- mainstream funding for the UK Mathematics Learning Support Centre described above. This project will be led by Mike Savage at the University of Leeds
- Open Learning Support for the Mathematical Education of non-specialists, led by David Green at Loughborough University
- Creating of Statistical Resources from Real Datasets, led by Colin James at De Montfort University

Staff development events were held for statisticians at the universities of Northumbria and the West of England, a one-day short course on Teaching Statistics in Finance at Nottingham Trent, a workshop on Assessment for a Purpose at Sheffield Hallam and a Maths Support workshop at Bell College, Hamilton. We also contributed to an Open University workshop on computer-aided and distance learning. Most of these events are described elsewhere in this issue.

The 3rd International Conference on Mathematics Enrichment with Communication Technology took place in Cambridge in July. Organised by the Millennium Mathematics Project, it was targeted specifically at school teachers on the use of ICT in mathematical

education. Chris Budd, chair of the Network's Advisory Committee gave a keynote speech on 'Visions of Maths and Science', and Chris Sangwin reported on recent research work on the computer aided assessment (CAA) system AIM. This system uses Maple to automatically perform marking by algebraically comparing students' answers with those supplied by the teacher. The sophistication of Maple allows intelligent feedback and great flexibility, and takes CAA beyond the limitations of multiple choice or other "objective tests". The system is described at <http://ltsn.mathstore.ac.uk/articles/maths-caa-series/may2002>. Elsewhere in this issue you will find reports from the annual conference of the Institute for Learning and Teaching and the international Computer-Assisted Assessment conference at Loughborough.

Presentations were made at various overseas conferences. Joe Kyle gave a paper at the second International Conference on the Teaching of Mathematics at the Undergraduate Level held in Crete. Neville Davies, Peter Holmes and Ewan Crawford all spoke at the sixth International Conference on Teaching Statistics in Cape Town. Additionally we supported the attendance of Trevor Hawkes at the second MathML conference in Chicago; his report can be found in this issue, and he will be helping us to provide a FAQ page and other resources relating to this particular technology.

A workshop on **Teaching Operational Research within Business and Management** will be held during the Autumn Term. This will cover the situation for OR teachers, problems and issues; the QAA benchmark; the OR Curriculum; teaching using Simulations and Case Studies; teaching OR to large groups.

A further workshop for subject librarians is planned for November. This will be a joint event with the LTSN Centres for Engineering and Computer Science.

Details of both workshops will be published shortly at http://www.ltsn.gla.ac.uk/events_diary/index.asp

Projects funded by the LTSN Maths, Stats & OR Network

In each issue of *MSOR Connections* there are contributions from our funded projects. There are now almost twenty such projects, listed at <http://ltsn.mathstore.ac.uk/projects>. Here are short reports from seven that will be looking for feedback of some kind from the MSOR community over the next few months. If you are interested in any of these topics, contact the relevant project leader.

1 VLEs and the Teaching of Mathematics: Bill Foster, w.h.foster@newcastle.ac.uk

Virtual Learning Environments (VLEs) and their big brothers, Managed Learning Environments (MLEs), are now the focus of much discussion and some work as their use grows in HE and FE Institutions. A recent JISC report sheds some light on this activity in the FE sector (and importantly, defines VLE and MLE) http://www.jisc.ac.uk/pub02/interop_final_main.pdf

We are now looking at the use of VLEs in the teaching of Mathematics and Statistics in HE. This project is funded for one year by the LTSN Maths, Stats & OR Network and is based at the University of Newcastle, with a Project Team from Heriot-Watt, Birmingham, Newcastle and Brunel Universities, all with extensive experience in the use of IT techniques in teaching and assessment. One of our major objectives is to test expectations, perhaps dispel some prejudices and inform HE institutions and in particular HE teachers of the capabilities of VLEs in the teaching of Mathematics and Statistics.

As a first step we will survey the use and planned use of server based systems or tools (including VLEs) throughout the HE sector in MSOR and related disciplines. These systems/tools are at least distributed across an Intranet and have been chosen as, in theory, they can be integrated into VLEs and/or extend VLE functionality in important areas such as content, feedback and assessment. The survey will be held during October and November 2002 and will be an on-line questionnaire on the Mathstore web-site. The results of this survey will be discussed, consolidated and disseminated in a Workshop planned for March/April in 2003.

Following this, a further objective is then to elicit a Requirements Document for the use of VLEs from the MSOR community. The emphasis will be on establishing good and effective practice in assessment methods in VLEs for the MSOR community and will build on the good practice established in the first phase and inform ongoing developments in this area. Note that it is a common perception in this community that the standard techniques such as multiple choice questions are not sufficient to test the full range of taught skills. This

perception also needs to be tested and alternatives sought and/or specified. A network of users and potential users will be established as this work progresses.

<http://www.lboro.ac.uk/service/ltd/flicaa/jisc/> is an example of a university wide "MLE" assessment project.

We would welcome any suggestions or statements of interest from the MSOR community. In particular, the survey is being designed during July and August 2002 and any constructive comments would be welcome.

2 Mathematicians as educational co-researchers developing educational theory and teaching practice: Chris Sangwin, c.j.sangwin@bham.ac.uk

In mathematics there has traditionally been a gulf between mathematicians and educationalists. This lack of dialogue has resulted in contemporary educational research being perceived as inaccessible or irrelevant to practising mathematicians in Higher Education. There is an equal need for educational research to be developed from and influenced by the problems faced by these staff.

This project will engage practising mathematicians as educational co-researchers to develop educational theory and teaching practice alongside experienced colleagues from mathematics education. This will be achieved by commissioning teams of mathematicians and mathematics educators to examine and then comment upon students' work, both in writing and as part of a group discussion; to read and discuss relevant literature; and, to draw from and reflect upon their current educational practices. This process will help to develop theory as to why student difficulties arise and suggest strategies to ameliorate these. The project will begin in September 2002 and will continue during the forthcoming academic year. If you are interested in participating please contact Dr Elena Nardi, email e.nardi@uea.ac.uk, or Dr Chris Sangwin, email c.j.sangwin@bham.ac.uk

3 UK Mathematics Learning Support Centre: Tony Croft, a.c.croft@lboro.ac.uk

The UK Mathematics Learning Support Centre will help universities to address a key recommendations in the report *Measuring the Mathematics Problem*, namely that prompt and effective support should be available to all students arriving at university inadequately prepared for the mathematical demands of their chosen programme. The Centre will use a mix of modern and traditional techniques to allow both students and university professionals free access to samples of high quality learning materials aimed at addressing the interface problem.

A related FDTL4 bid will provide funding to develop this base into a substantial and coherent body of essential mathematics support materials. The LTSN Maths, Stats & OR Network and the subject centres for Engineering, Physical Sciences and Materials will be working in a consortium with the Universities of Loughborough, Leeds and Coventry, together with distance- and e-learning specialists EBS Trust and Media Inc. As the Centre develops the community will have access to wide-ranging mathematics help leaflets, refresher booklets, on-line practice exercises, digital video tutorials linked to printable text and exercises. Resources will be available from a dedicated web-site, on paper and on CD/DVD.

Together these two projects will make available, once and for-all, a mechanism for delivering resources to alleviate the school/university interface problem. They will provide a cost-effective means to enable any institution to develop or enhance local supporting mechanisms.

4 Supporting good Practice in Assessment in Maths, Stats and OR: Neil Challis, n.challis@shu.ac.uk

The mini-project "Supporting Good Practice in Assessment in Maths, Stats and OR" will be co-ordinated by Neil Challis (Sheffield Hallam) with support from Ken Houston (Ulster) and David Stirling (Reading). The team will take the booklets of the LTSN Generic Centre Assessment Series, and interpret those ideas in the context of MSOR, creating a corresponding set of MSOR assessment booklets for widespread distribution in the MSOR community. Contributions to the booklets in the form of case studies will be invited from across the community.

The project runs from September 2002 to September 2003. Outcomes include the MSOR assessment booklets, and their dissemination through workshops, web site, articles and conferences. These booklets should be useful both for individuals and in support of Professional Development activity.

5 LTSN MathsTEAM Project: Christine Hirst, c.hirst@bham.ac.uk

The LTSN MathsTEAM has had an excellent response to the first information pack by academics. We would like to take this opportunity to thank all those who replied and contributed to the final 24 case studies. Each provides informative details for academics from the execution of the student support to the pre-requisites for implementation. Overall, they reveal the growing need and the increasing diversity of support-based initiatives.

Commissioning for the second information pack "Teaching maths within an engineering or scientific context" has begun.

If your maths teaching is directed at any of the following topics: Analytical Chemistry, Circuit Theory, Control Theory, Dynamics, Fluid Mechanics, Mechanics, Modelling, Physical Chemistry, Quantum Theory, Signal or Digital Processing, Structural Analysis, Thermodynamics then please go to the form at <http://ltsn.mathstore.ac.uk/mathsteam/form2.htm>. By filling in this form you will be providing the MathsTEAM with a brief description of the resources and teaching methods being used. If you are interested in developing the description into a case study, please indicate on the form. The LTSN MathsTEAM will provide guidelines and we would expect payment to be in the range of £150 - £250 to thank you for your contribution.

The MathsTEAM would also like to hear from those who are interested in the concept of the project and would like to be kept informed of the project's development. For information about the LTSN MathsTEAM project, please go to <http://ltsn.mathstore.ac.uk/mathsteam>. For further details, please contact Christine Hirst, MathsTEAM Co-ordinator, LTSN Maths, Stats & OR Network, University of Birmingham, phone 0121 414 3945, email c.hirst@bham.ac.uk

A study of all the resources gathered throughout the MathsTEAM project will be presented at the IMA conference Mathematical Education of Engineers IV (1-3 April 2003) at Loughborough University. In addition, a MathsTEAM workshop will run on the morning of 1 April before the start of the conference. This will offer all those academics that have participated or shown an interest in the project to learn and to share their knowledge and ideas.

The LTSN MathsTEAM would also like to take this opportunity to welcome LTSN Physical Sciences to the project. Their contribution will be invaluable and will add to the diversity of topics and wealth of knowledge.



OR mini-projects

We are delighted to announce that two mini-projects on OR topics have been agreed. Both projects intend to make use of surveys and so effort on this will be co-ordinated across the two activities. The results of the work will be reported in a future issue of *MSOR Connections*.

6 *Evaluation of the impact of OR case studies on the employability of graduates*

Jeremy Garnett, Mario Hair, Anne Cockroft and Adrian Lavercombe, Department of Mathematics & Statistics, The University of Paisley

Case studies have long played an important role in OR courses. The aims are usually to improve the motivation of students, to increase the effectiveness of learning and to develop skills relevant to the workplace. There is substantial evidence to show that this form of teaching address the first two of these aims effectively. The aim of this project is to investigate the extent to which the third aim is addressed effectively.

7 *The teaching and learning of performance measurement in UK undergraduate OR degrees*

Mik Wisniewski & Farhad Shafti, Department of Management Science, University of Strathclyde

Over the last ten years or so there has been a revolution in the way organisations measure their performance. The aim of this project is to identify the extent to which this important area is covered in undergraduate degrees in OR in the UK and to identify both the topics which are covered and the approaches to assessment which are being adopted. The views of both practitioners and teachers on what should be taught will also be sought.

Have You Seen This?

Title: Statistics Education Research Journal (SERJ)
URL: <http://fehps.une.edu.au/serj>

Review Author: Flavia Jolliffe
email: f.r.jolliffe@gre.ac.uk

The first issue of the Statistics Education Research Journal (SERJ) is now finished and available at the SERJ web site <http://fehps.une.edu.au/serj>

This is the electronic journal of the International Association of Statistical Education (IASE). Its aims include the encouragement of research activity in statistics education, and the advancement of knowledge about students' attitudes, conceptions and difficulties, and about improved statistical pedagogy.

Access to the first two issues is free to everyone, but in future only IASE members will be able to access current issues.

We hope that you will support this new project. We look forward to your reactions, suggestions and contributions.

The editors: Carmen Batanero, Flavia Jolliffe, Annie Morin, Maria Gabriella Ottaviani, Chris Reading and Chris Wild

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