Report on MSOR Network workshop: Resources for Teaching Statistics

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As indicated by its name, this one-day workshop was based around four well received talks on a variety of different resources for teaching statistics, including animated graphics, use of quizzes, individualised assessment and marking, and the benefits of students collecting their own data.

This one-day event organised by the Glasgow site of The Higher Education Academy Maths, Stats and OR Network (HEA MSOR Network) brought together delegates from a wide range of different disciplines. The attendance of colleagues from disciplines such as psychology, sociology and veterinary medicine emphasized the importance or need for further development of specific tools for teaching statistics to even non-specialist students.

Michael Grove introduced the HEA MSOR Network Subject Centre and described ways to assist institutions, discipline groups and individual staff to provide the best possible learning experience to their students.

The workshop continued with four sessions which are summarized below.

1. Statistical cartoons: the role of graphics in understanding statistics
   Adrian Bowman, University of Glasgow

Adrian demonstrated how statistical concepts can often be taught and learned in a visual manner, using the appropriate graphics. Dynamic graphics, or animation, can be of fundamental help (see Fig 1).

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Fig 1 – Example of rpanel statistical animations
The `rpanel` package was introduced and a further description of the "statistical cartoons" followed.

`rpanel` provides a set of simple interactive controls for R functions which are particularly useful for creating dynamic graphics. Indeed the "statistical cartoons", developed using and then incorporated into `rpanel`, have proved to be very useful tools in a teaching context.

2. Quiz software for introductory teaching

*John McColl, University of Glasgow*

A web-based system for creating multiple-choice statistics quizzes was presented by John (see Fig 2). The talk was mainly focused on: a) describing the quizzes that have been created using the system by the Department of Statistics, Glasgow; b) exploring the general features of the system and c) clear descriptions and explanations of the specific features that distinguish the system from other available systems. This computer-aided assessment system provides immediate tailored feedback to the learners in statistics courses. The system is publicly available.

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**Fig 2 – Web-based systems for creating multiple-choice questions**

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3. Individualised assessment and marking in R and Latex

*Paul Hewson, University of Plymouth*

Paul introduced the idea of using R with AcroTeX to generate unique self-marking problem sheets. As he stated, R is established as a major tool for statistical education as well as research. At the same time LaTeX is very widely used, while the integration between the two (especially with Sweave) is very good, leading to dynamic report creation and automatic updates. Therefore, the use of R function Sweave() and the LaTeX package AcroTeX enable the user to prepare electronic quizzes. Paul described the process of generating a unique set of data for each student (along with the associated questions) in a self-marking PDF document rather than generating randomly selected questions from a bank.

**Fig 3 - Using R with AcroTeX to generate self-marking problem sheets**

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4. Students talking! Problem solved!

*John Marriott, Nottingham Trent University*

The question tackled by John, was "How to engage effectively with our students using a problem solving approach".

Is it possible to make our students talk? Is it possible to make them talk about statistics? John demonstrated how, by using real data that is relevant to the students and by using a problem solving approach, we can make a big step towards getting our students to learn introductory statistics. A question such as "How safe is the area you live in?" can be the beginning of a process where the students will experience how to collect, process the data and finally develop constructive discussion on the results (see Fig 4).

During the workshop, the participants twice had the opportunity to experiment in an open access lab setting with the material already discussed. Moreover, fruitful conversations took place with the delegates who had the chance to ask the speakers about certain practical issues.

The four speakers kindly offered plenty of material for the delegates to take away with their welcome packs.

The feedback received from the delegates indicates that the event was very well received and we would like to thank all the presenters as well as attendees.