SIGMA – Developing
a statistical edge

SIGMA, the Centre for Excellence in Teaching and Learning at the Universities of Coventry and Loughborough, has now had a statistical presence for a year. In a previous article [1], the aims of the CETL were described and the various initiatives it was hoped would be explored, in relation to statistical support, were outlined. This is an update on progress made with these initiatives.

Initiatives targeted
A number of areas for support and development in statistics were initially identified by the two institutions. These included

- Drop-in facilities
- Consultancy
- Diagnostic testing
- Support for targeted non-specialists
- Training courses/workshops
- Short courses
- Research methods support
- Teaching and learning methods
- Pedagogic research
- Dissemination of SIGMA’s activities

This is what we have (and haven’t) achieved so far.

Drop-in facilities
Both institutions provide drop-in facilities aimed at statistical support. At Coventry, the Mathematics Support Centre provides help with any aspect of mathematics or statistics and is open to all students of the University irrespective of the mathematical or statistical content of their course of study. The centre is open from 10am to 5pm on most days (it closes at 7pm on Tuesday and 4pm on Friday), with tutors available from 11am daily. With the exception of Friday, there is a specialist statistics tutor available for at least 2 hours each day, although the actual times vary from day to day.

At Loughborough, a new centre has been opened to complement its existing provision. This new centre is predominantly for offering statistical support and advice. It is open Monday to Thursday 9–5 and Friday 9–4. One-to-one statistics support is
offered Tuesday – Thursday from 2-5. Basic mathematics support is offered Tuesday – Thursday from 10-12. At other times students are able to access handouts, textbooks, videos and computer-based materials, as well as making use of quiet individual spaces and group working spaces.

Consultancy

Both universities have made great strides in providing an internal consultancy service. In each case the service is primarily focussed on final year and postgraduate project students, and research students. However, advice is also given occasionally to members of staff. There is a fuller report on SIGMA's progress in this area in [2], but uptake has been such that we have been making appointments up to three weeks in advance to cope with demand.

Diagnostic testing

Diagnostic tests are now being provided for first year undergraduates in economics and for some business studies courses. We are also offering diagnostic tests for postgraduate taught economics students. The tests are mainly intended to ensure basic mathematical concepts and techniques are in place (e.g. algebraic manipulation, calculus etc), but part of our work has been to develop questions to assess ability in statistical reasoning (see more in pedagogic research). Tests have been used this October and the results will be used to offer advice and, if necessary, personalised support. At Coventry, test results are being used to identify a small group of around 20 business studies students who will be taught separately from the main group, using a more integrated approach. Student reaction to diagnostic testing has been very positive. However, this was only after students established that the results had no bearing on their module or year assessment and that the results would be confidential as far as their base department was concerned!!!

Support for targeted non-specialists

The two universities have taken differing approaches. At Loughborough the areas of economics and human sciences have been particularly targeted for support as well as continuing with the support given to engineering. Special drop-in sessions, follow-up lectures and workshops have been put in place.

As previously mentioned at Coventry small group teaching is being used with business studies students. We are also targeting particular courses in which traditionally statistics would not be covered, such as journalism and media studies. The focus here is on delivering specific sessions introducing students to methods of data collection, data summary and presentation, interpretation, and critical appraisal skills.

It is early days, but at both universities we are receiving grateful thanks for the aid we are providing to students in these targeted areas. One indication of the value placed on these sessions is that we are now being asked to run them much earlier in the course than we did last year. We are now starting to collaborate more proactively with other departments to identify their needs and relevant support that we can offer.

Training courses and workshops

We have been expanding the range of training courses and workshops we offer. At Coventry a programme of ten workshops for research students will be delivered for the first time this term, with the intention of repeating them termly. These will be organised directly by SIGMA, and staff will be able to attend, although priority will be given to students. The programme is similar to that offered at Loughborough, with the addition of sessions introducing students to SPSS and Minitab.

At Loughborough, the courses for research students and staff have been expanded to nine, with the addition of a stand-alone course on experimental design. This is in response to demand especially from engineers. These will be offered, as before, through the Professional Development Unit, and will be repeated twice, once in each semester. Last academic year the eight sessions were fully subscribed.

Short courses

We have made the distinction of short courses meaning a course with more than one session. At present, whilst departments at both institutions have expressed an interest in short course provision, no direct requests have been received from staff. However, first year students have already identified their own group’s needs (e.g. students with GCSE grade C, intermediate route, have identified a lack of knowledge in algebraic manipulation, basic calculus and logarithms) and requested formal help through a structured set of support lectures. These are to be put in place shortly through a series of lunchtime workshops.

Research methods

Much of our work on research methods has been subsumed in the training courses and consultancy we do. However, we are ensuring that our own CETL research students have a mandatory research methods session as part of their induction. This involves inductive and deductive reasoning, types of data, statistical inference and statistical modelling.

Teaching and learning methods

As the new academic year begins, both institutions have invested in electronic classrooms. At Coventry these facilities are in use, while at Loughborough the final stage of fitting out the room is taking place. Throughout the year, we will be experimenting with different forms of delivery, including one institution delivering learning to the other.
We will also be investigating online learning, particularly the work of Everson [3].

A different aspect of our work has been to start a Statistics Teaching Forum. Its aim is to identify the support requirements of non-statisticians who teach statistics within their own discipline.

**Pedagogic research**

A PhD research student has started on the investigation of pedagogic approaches to statistics education, as outlined in [1]. The work will concentrate on the transition from school/college to university, in the first instance. The researcher is Marijn Waaijer, (m.p.waaijer@lboro.ac.uk) and she will be supervised at Loughborough, with support from the Royal Statistical Society Centre for Statistical Education.

We will also be investigating ways to improve diagnostic testing, with the emphasis on establishing ability at statistical reasoning. Some work has already been done for human biology students. This and other diagnostic tests will be developed through collaborative work with Professor MacGillivray and colleagues at Queensland University of Technology [4].

A further project involves an investigation of the help that economics students perceive they need with mathematics and statistics and how this can be delivered.

**Dissemination of SIGMA’s activities**

Reference has already been made to papers given at the CETL/MSOR conference in September 2006. We will continue to report regularly through conferences, seminars and workshops. Our website provides updates on the work we are doing and an electronic newsletter will shortly be circulated.

**Summary**

As can be seen, we have concentrated on providing services for non-specialist students of statistics. There is a long way to go, but there are a number of indications that this work is appreciated by students (and staff). More importantly, though, students are reporting a positive change to their awareness of and confidence with statistical methodology. Whilst we will continue to extend the support we offer students, emphasis will move in the next phase of our work to research aspects with anticipated progress in the investigation of the pedagogy that underlies successful teaching and learning of statistics.

More to come!!

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**References**