Mike Barry and Michael Grove

Mathematics education at BAMC 2007: a report on a higher education mini-symposium

Introduction

The eight short papers below were presented by their authors at a two-hour mini-symposium at the British Applied Mathematics Conference (BAMC) held at Bristol in April 2007. Their aim was to give a current overview of the main and emerging issues facing university degrees in which mathematics forms a key part. Topics include the curriculum in engineering mathematics, the work of the Société Européenne pour la Formation des Ingenieurs (SEFI) Mathematics Working Group, how the curriculum in schools is being developed, poor knowledge of mechanics among Year One students, widening participation and need to form more graduates, support for specialist mathematics students on the later years of their programmes of study, and the training of academic staff and postgraduates who will be teaching mathematics. The briefing is intended to be short and easily read. We hope you find it so.

The evolution of the curriculum in engineering mathematics, 1960 - 2010

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Before the year 1650, the concept of the Nation State did not really exist, and the modern interpretation of human rights perhaps only came into being in about 1780. Likewise, the notion of a common core curriculum between universities did not acquire significance until the post-war period was well established. Mathematics is a subject learned in school by everyone until midway through secondary school, at least, and onwards from there by those who need it in their professional lives. In 1960, universities offered quite diverse programmes in mathematics to those deeply specialising in the subject. Such students would study some applications relating to the physical sciences and some would take newer and emerging options in statistics and perhaps numerical methods. Engineering and physical science students would be offered more tailored and focused units in mathematics, but then as now, would study such options apart from the specialist mathematicians. The Organisation for Economic Co-operative and Development (OECD), in the broader context of improving the quality of scientific manpower across the member countries, convened a series of seminars in the early 1960s, which eventually led to the publication in 1965 of the report “Mathematical Education of Engineers”[1]. This stipulated a very detailed and fully illustrated mathematical curriculum for professional engineers and provided splendid exemplars of material to be taught. The curriculum was aimed principally at students in Western Europe and North
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It appears that the expansion of choice and the squeezing of Europe has had similar experiences of decline and it to national educational policies. Now most of continental UK and was thought by some to be largely attributable of Core Zero in school was first seriously observed in the tighter focus and even omission. The non-achievement One with a knock-on effect upwards, some compression, to the encroachment of Core Zero material into Core of the nation's best students. This decline has led, generally, the University of Bristol: they are acknowledged to be some algebraic drill and skill of engineering undergraduates at the mini-symposium. This investigated the decline in the students has generated several reports. One of these, diminishing mathematical background of engineering published, the concern in the UK over the changing and in a number of contexts. In the 15 years since [1] was come to represent pre-curriculum school mathematics following the Bologna agreement. The term Core Zero has been established in 1982 as one of the first working groups in SEFI. One of its main aims is to promote fuller understanding of the role of mathematics in the engineering curriculum, and its relevance to industrial needs. In 1992, the SEFI-MWG published a report called “A Core Curriculum in Mathematics for the European Engineer” [2], bringing together the necessary mathematical concepts and topics which every engineer should know. Later, following the important changes that subsequently took place, especially the increased number of university students and the involvement of computers in education, meant that the curriculum needed updating. So, the SEFI-MWG produced, in 2002, a report “Mathematics for the European Engineer: A Curriculum for the 21st Century” [3]. This document reflected current changes and emphasis was put more on learning outcomes than on the topics to be covered.

The current challenge for the SEFI-MWG is to reconfigure the curriculum for both Bachelor and Masters Degrees following the Bologna agreement. The term Core Zero has come to represent pre-curriculum school mathematics in a number of contexts. In the 15 years since [1] was published, the concern in the UK over the changing and diminishing mathematical background of engineering students has generated several reports. One of these, “Achieving Core Zero” [4], was produced in 1998 by the author and Rosamund Sutherland, who spoke third at the mini-symposium. This investigated the decline in the algebraic drill and skill of engineering undergraduates at the University of Bristol: they are acknowledged to be some of the nation’s best students. This decline has led, generally, to the encroachment of Core Zero material into Core One with a knock-on effect upwards, some compression, tighter focus and even omission. The non-achievement of Core Zero in school was first seriously observed in the UK and was thought by some to be largely attributable to national educational policies. Now most of continental Europe has had similar experiences of decline and it appears that the expansion of choice and the squeezing of traditional subjects like mathematics in the wider school curriculum might have a part to play, notwithstanding widening horizons in the lives of young people. The decline manifested itself in the UK earlier than elsewhere, but many of its universities have taken an important lead in diagnostic testing, focused study, assessment and the interface between mathematics and the physical sciences. They are also active, as later contributors to the mini-symposium describe, with wider ventures such as the establishment of the more maths grads initiative, the Sigma project, and support for university teachers at all levels.

The Work of the SEFI Mathematics Working Group

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The SEFI Mathematics Working Group (SEFI-MWG) was established in 1982 as one of the first working groups in SEFI. One of its main aims is to promote fuller understanding of the role of mathematics in the engineering curriculum, and its relevance to industrial needs. In 1992, the SEFI-MWG published a report called “A Core Curriculum in Mathematics for the European Engineer” [2], bringing together the necessary mathematical concepts and topics which every engineer should know. Later, following the important changes that subsequently took place, especially the increased number of university students and the involvement of computers in education, meant that the curriculum needed updating. So, the SEFI-MWG produced, in 2002, a report “Mathematics for the European Engineer: A Curriculum for the 21st Century” [3]. This document reflected current changes and emphasis was put more on learning outcomes than on the topics to be covered.

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As a natural continuation to the Curriculum for the 21st Century, the SEFI-MWG started up the Assessment Project, based upon the principle that once the learning objectives are known, we should be able to find out whether the
teaching has had the desired effect. A questionnaire was produced and distributed to the members of the SEFI-MWG. Responses were obtained from 12 European countries, usually one or two per country. The types of assessments (closed book written tests, open book written tests, oral examinations, course work, and/or combinations of them) were studied for their usage in assessment. It showed that differences existed, not only between different countries, but even within individual institutions. Assessment methods could be different for first year courses (BA, BSc, BEng) and advanced courses (MA etc). Also, in first year courses, the assessment is usually in the form of a closed book written test, the main difference being in the length of the test (in Nordic countries they can be as long as 5 hours, but in other countries shorter tests are usually used, from 1.5 hours up to 3 hours). In later years, more emphasis appears to be put on coursework and oral presentations. Differences were also noticed between smaller HE institutions and larger ones, and the methods of assessment in both institutions and countries also strongly depend on the assessment methods used in school mathematics. For more details see [5].

Another topic closely related to the curriculum is the introduction of the Bologna process into the education of engineers. The change from longer programs leading to a professional engineering degree to a two-tier system of BA (Bachelor’s) programme (usually 3 or 4 years) followed by MA (Master’s) programme (usually 1.5 or 2 years) influences the mathematical content of the curriculum to a considerable extent. In most cases, this has led to a decrease of the amount of time devoted to that subject. This means that, in some institutions, the mathematical capabilities of those directly entering Master’s degree programs is worryingly insufficient. The SEFI-MWG is working on a strategy that will advise upon how to deal with this problem.

An enduring issue is the use of technology in mathematical education. Every European HE institution now uses computers in teaching. What varies is the depth to which computers are used. Whilst such use may be desirable, there is evidence that the use of technology does not automatically lead to better understanding of mathematical notions and concepts, so care needs to be taken in its introduction. Streaming has been considered as a way forward, in ensuring that weaker students progress as well as good ones, but evidence that this works has yet to be found.

Curriculum reform in mathematics

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In 2002, the government set out its vision for greater coherence in the 14-19 phase of education, together with the aim of encouraging more young people to gain the qualifications they need to progress into further and higher education or employment. At a similar time, the Smith Inquiry ‘Making Mathematics Count’ was set up to “make recommendations on changes to the curriculum, qualifications and pedagogy for those aged 14 and over in schools, colleges and higher education institutions to enable those students to acquire the mathematical knowledge and skills necessary to meet the requirements of employees and higher educators” [6]. The report identified the key issues of major concern: 1) the shortage of specialist mathematics teachers; 2) the failure of the curriculum, assessment and qualifications framework to meet the needs of many learners and to satisfy the requirements and expectations of employers and higher education institutions; 3) the lack of a sustained continuing professional development culture for teachers of mathematics. This report has been important in ensuring that policy makers are aware of the ‘special case’ of mathematics within the general context of curriculum reform.

At this stage of the evolving reforms, it is not easy to disentangle the likely effects of curriculum changes on Engineering Mathematics in Higher Education. For example, the new Engineering Diploma, which starts in 2008 as part of a renewed emphasis on vocational education within the 14-19 phase of education, should play an important role in preparing young people for Higher Education. Diplomas will be available at three levels, with level 3 being designed for sixth-formers and college students who would like an industry related alternative to A-level which is recognized by Universities and employers. To ensure that the Level 3 Diploma meets the requirements of university admission tutors, students completing an Engineering Diploma will spend the same amount of time studying mathematics and science as A-level students. Whereas it is important for university Engineering and Engineering Mathematics Departments to understand and influence this new diploma course, there will undoubtedly be some scepticism about whether the vocational pathway can be considered to be as valuable as the more traditional academic pathway to Higher Education.

Together with a strengthening of the vocational pathways, there will be a new emphasis on what has been called ‘functional mathematics’ in the 14-19 phase of education. Currently assessment bodies are trialing stand-alone functional skills qualifications, which will have a relationship to both the vocational and academic pathways. Functional mathematics must include problem solving, reasoning, modelling skills and conceptual understanding of mathematics and should enable students to see how mathematics connects to other subjects. The introduction of functional mathematics into the curriculum would appear to be an excellent opportunity for introducing school students to relevant engineering mathematics applications.
At the same time as a strengthening of the vocational pathways, there are proposed changes to the academic pathways. From September 2008, there will be a new secondary national curriculum, aimed at giving teachers a more flexible (and less prescriptive) framework for teaching. The new Mathematics Curriculum explicitly states that “Mathematical thinking is important for all members of a modern society as a habit for its use in the workplace, business and finance, and for personal decision making”. From 2008, there will be two GCSE qualifications in mathematics, with the new second GCSE being aimed at challenging students to engage with the why as well as the how of mathematics. There is a strong lobby from the Advisory Committee on Mathematics Education (ACME) that “The Government should send a strong signal to schools, teachers and parents that most pupils should expect to study both of the maths GCSEs. We will be failing young people if we do not give them the opportunity to come to grips with the more challenging aspects of the subject. ACME believes that both GCSEs can be taught to the majority of pupils without a significant increase in timetabled teaching” [6].

Within this context of change, it is relatively difficult to get a sense of the big-picture, in terms of the potential impact of curriculum change on Engineering Mathematics at University level. Therefore, it is important for the relevant professional bodies to become actively engaged in the reform process, through their representation on the UK's Joint Mathematics Council (JMC) (http://www.jmcuk.org.uk/). In turn, the JMC works closely with ACME (http://www.royalsoc.ac.uk/acme/index.htm) to ensure that the mathematics community is increasingly acting with one voice when communicating with policy makers and practitioners.

Prior knowledge of mechanics amongst first year engineering students

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In recent years, the syllabus of A-level Mathematics has steadily broadened from a base, in the 1960s, of ‘pure’ mathematics plus classical mechanics. Topics in probability and statistics and in decision mathematics (or operations research) have been introduced. At the same time, the examination of the subject has been increasingly modularised and the choice of optional modules has been greatly increased. As a result, the level of knowledge of classical mechanics demonstrated by students, who have a mathematics A-level qualification, has declined markedly.

Some university disciplines, notably Physics and most varieties of Engineering, have traditionally relied on a students arriving at university with a good level of knowledge of classical mechanics. Lecturers in these areas have noticed a steadily declining familiarity with the standard models and methods of classical mechanics. This trend is set to continue, with the introduction of the 2004 changes to the structure of A-level mathematics under which students opting for single subject mathematics will study no more than two modules of mechanics (out of 5 modules available in the specification). Further, there is no requirement for students to study any mechanics at all; a single or double subject A-level in mathematics can be obtained by following application modules in statistics and decision mathematics only.

As the first stage of a project to respond to this issue, a survey was undertaken to establish a baseline. All students entering engineering degree courses at Bristol University in September 2005 (377 students) were asked to complete a computer mediated survey during their induction process. Of those students whose entry qualification was based on A-levels, 11% reported that they had taken no mechanics modules at all. Then 89%, 72%, 23%, 10% and 3% respectively had taken M1, M2, M3, M4 and M5 or higher. The dataset was also broken down by A-level board and by engineering discipline. No significant differences were found between the students who had taken A-levels from different boards, nor between students of the different major disciplines.

In a parallel study [7], Robinson et al surveyed first year engineering students at Loughborough, Nottingham and Leicester Universities. Across the three universities surveyed, 9% had studied no mechanics modules and 23% had studied one module only. The results of Robinson et al suggest that the data from the Bristol survey are typical of many universities, at least amongst the pre-1992, “civic university” cohort.

Increasing & widening participation in the mathematics sciences: the more maths grads initiative

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In August 2006, the Higher Education Funding Council for England (HEFCE) approved funding for a £3.3 million pilot programme of activity designed to increase and widen participation within the mathematical sciences. The need for such a programme of activity is demonstrated by data, obtained from the Higher Education Statistics Agency (HESA), that shows the overall number of full-time UK and EU starters studying the mathematical sciences has fallen from 9196 in 1998 to 7985 in 2004, a drop of approximately 13% [8]. The decline is also evidenced by the 2005 HEFCE report of the Chief Executive’s Advisory Group on Strategically Important and Vulnerable Subjects [9] which noted a fall in activity of 9.3%, or 1800 FTEs, as measured from 1999-2000 to 2003-2004. In addition, the
Mathematical sciences appear to be particularly unpopular with female students, with certain ethnic groups, with mature learners, with part-time students and with those from certain socio-economic groups [10].

“This decline in the popularity of mathematics has important implications for other subjects in Science and Technology, as mathematics underpins disciplines such as Engineering, Physics and Chemistry. Indeed, those involved in the teaching of Physics and Engineering within HE have spoken of a ‘mathematics problem’ for some time.”

There has also been a noticeable decline in the number of students studying mathematics at A-level. The number of entries to A-level mathematics has shrunk from nearly 85,000 in 1989 to around 53,000 in 2004. This decline has occurred at a time when the total number of A-level entries has increased significantly. Consequently, the percentage of mathematics entries compared to the total A-level entries has fallen over this time from 12.8% to 6.9% [10].

This decline in the popularity of mathematics has important implications for other subjects in Science and Technology, as mathematics underpins disciplines such as Engineering, Physics and Chemistry. Indeed, those involved in the teaching of Physics and Engineering within HE have spoken of a ‘mathematics problem’ for some time, particularly at the transition to university study [11], [12].

In order to meet its overall aims of increasing and widening participation, the project has four objectives and these may be conveniently expressed as four themes:

1. **Careers Theme:** Improve understanding of the wide-ranging applicability of mathematics and the breadth of career opportunities open to graduates from the mathematical sciences;

2. **Student Theme:** Help school and college students to understand the purpose of mathematical study, to enjoy mathematics, to be confident about meeting challenges in the subject, to realise their potential in mathematics and to raise their aspirations about further study of mathematics;

3. **Teaching Theme:** Contribute to the development of teachers’ enjoyment, confidence and knowledge of mathematics and its applications so that they can help stimulate interest in further study of mathematics in their students; and,

4. **HE Curriculum Theme:** Increase the scope of the mathematics curriculum for HE nationally in order to allow real choices for a wide range of students.

A range of activities will take place within each of these themes and will focus upon various ways in which school and college students may be helped to gain, and then sustain, their interest in the mathematical sciences and to encourage them to pursue further study within higher education. To do this, the project will develop and expand links between schools, colleges, careers organisations, universities and employers. Further detail on these specific activities can be found in [10].

The activities of the more maths grads initiative will take place over an initial period of three years within three regions: the West Midlands, Yorkshire and Humber, and London. Three lead universities are involved from each region, and these are: Coventry University, the University of Leeds, and Queen Mary, University of London. Sheffield-Hallam University will lead the HE Curriculum Development theme. The project will work with 7 schools and colleges within each region. Although activities are based in three regions, resources produced by the project will be made available nationally on the two project websites: http://www.moremathsgrads.org.uk and http://www.mathscareers.org.uk.

**Developing mathematics support for the specialist mathematician at year 2 and beyond**

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The case for providing mathematics support at the transition to university has been well-documented [e.g.12]. There is a wealth of resources available to assist students of many disciplines who find this transition difficult [e.g. 13]. Recently, attention has turned to later years of study, as there is evidence of problems amongst cohorts of specialist mathematicians at year 2 and beyond [e.g. 14]. Brown et al [14], in an ESRC funded study, reports: “for many of those staying [on the course] attainment was average and below, the problems of coping with the work were accompanied by growing disillusionment with mathematics; generally, although with some exceptions, students enjoyment of the subject declined over time… Such students became mildly depressed in the second year and seemed to lack immediate sources of support and the motivation to seek these out”. An international review of UK Research in Mathematics undertaken on behalf of the EPSRC in 2004 [15] concluded: “The system of three-year PhDs can only work if there is excellent A level education at the
school level. Our perception is that A levels are weaker than they used to be. The result then is that this produces many students who cannot compete with graduates from abroad.” So, there are clearly issues of concern regarding mainstream undergraduate mathematicians and even amongst those who are sufficiently successful that they can embark upon postgraduate study.

The Maths, Stats & OR (MSOR) Network has responded by introducing a new ‘theme’ of mathematics support beyond the transition; so far, initiatives have included a round of mini-projects, announced in May 2006, and the development of a Statistics Facts and Formulae Leaflet to supplement the existing mathematics leaflet. The two mini-project awards were made to Lara Alcock (Essex), for her work on producing a DVD How do students think about proof? and Keith Parramore and John Taylor (Brighton), for the development of individualised study modules on Number Theory, Topology and Complex Analysis. Sigma (Centre for Excellence in Teaching and Learning) is funding an action research project which aims to explore, implement and evaluate supporting mechanisms at year 2 and beyond, particularly for the more-able. Emerging themes from preliminary focus groups are: students want and appreciate peer support; students are quite ignorant and are poorly informed about career and postgraduate opportunities; they would welcome more information; students want more help to become independent learners. In response to these findings, and as part of our action research project, we will open, in October 2007, a resource and activity centre explicitly focusing on 2nd & 3rd year mathematicians. Within this centre, a range of resources and activities will be developed and evaluated throughout the year. We believe that the student experience at this level can be further developed through additional funding from the Network for more mini-projects, improvement of co-ordination of existing Network activities, and for increasing the level of uptake of the Network’s CPD activity, so that many more academics can take advantage of the resources, expertise and experience available. A new call for bids for mini-projects was announced in the Spring of 2007. For further details contact the MSOR Network or visit the website.

Supporting new academic staff: the development of dedicated mathematics provision

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The question of the training of HE teachers has assumed increasing importance in the last few years. From 2006, there are Government requirements for the training of HE teachers, and the formal protocol for such training has been spelt out in the UK Professional Standards Framework [16]. Training for teaching in HE comes from three main sources:

• Generic principles and practice of teaching, which most teachers need to study;
• Subject/discipline-based teacher training, which delivers the special skills relating to a specific discipline; and,
• On the job/in service/apprenticeship training provided within the appropriate workplace or collegial environment.

The developments described here are aimed at the discipline-based aspects and focus on the specific teacher training needs of the mathematics lecturer. The role of Mathematics Education in the pedagogical underpinning of CPD provision and teacher training for mathematics teaching in UK HE is also important [17].

The range of models of CPD provision for mathematics lecturers is as broad as the HE Mathematics sector itself. Some departments rely entirely on their institutional staff development provision, possibly in liaison with the department. Some send their staff on the MSOR Network Induction Course. Some staff opt for membership of the Higher Education Academy (HEA) by individual membership route. Some departments have even designed their own departmental Mathematics Teaching Certificate. Any model developed by the Network must be flexible enough to accommodate such wide ranging models.

The MSOR Network is the Mathematics/Statistics/Operational Research discipline-based arm of the HEA. It disseminates and promotes teaching and learning of mathematics in HE through events, publications, small grants, participation in national projects, liaison with mathematics-based CETLs, etc. It has nationwide links with all MSOR providers and access to nationwide expertise in teaching and learning of mathematics in HE. It produces a comprehensive range of resources accumulated over many years, both web and paper-based. The Network is thus ideally placed to offer mathematics-based teacher training support.

The MSOR two-day Induction Course for new mathematics lecturers has now run for seven years. In the past few years, it has steadily evolved towards the establishment of the UK’s first dedicated mathematics teaching certificate module, available to anyone teaching mathematics in HE in the UK. This development has involved extensive consultation with professional bodies, staff development departments and mathematics practitioners in universities. A joint project with Warwick’s Mathematics Institute on a departmentally-based Mathematics Teaching Certificate is working on the development of a mathematics mentoring guide to support the third component of training referred to above. Lessons have been learnt from the highly successful programme of workshops for postgraduates who teach mathematics. Extensive materials have been developed to support the Network’s CPD provision. All these developments have been disseminated at national
The Mathematics Associate Module (MSS013) recently developed by the Network in partnership with the University of Birmingham Staff Development Unit, is based on an expanded programme for the MSOR Induction Course, and is aligned with the HEA Professional Standards Framework. It has a web-based elements/distance learning facility, Network support to delegates and a formal assessed component. It can, by arrangement, contribute towards institutional staff development (SD) programmes and is accredited by HEA within the context of University of Birmingham provision. So far, there have been discussions with five other HEIs about embedding of module within their current provision and the first course intake will be in September 2007.

The module is a 20 credit M-level module, providing the opportunity of up to 20 credits towards a PGCertHE. It is designed to address issues that arise when teaching Mathematics in HE, while providing an underpinning knowledge of pedagogic issues. It builds on activities new lecturers naturally undertake as part of their teaching duties. It has a taught element of MSOR Network and Staff Development Unit workshops, online development activities and a tutor assessed component of mini-portfolio of development and reflection. Departmental mentoring and peer observation of teaching are included for feedback and support. The taught element includes attendance at the MSOR induction course for new lecturers (2 days) and one follow-up day (1 day) along with a selection of SDU courses (3 days). The total taught component is approximately 30-35 hours and may include optional SDU and MSOR courses/events. Delegates build up a learning journal to feed into the mini-portfolio, along with a number of ‘courseworks’, details of teaching observations, and evidence of interaction with the wider MSOR community. The mini-portfolio includes an element of reflection and reference to appropriate literature.

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The Mathematics Associate Module may be accessed by any HE staff in 2007 by registration as a University of Birmingham part-time student for the full 20-credit module. There are also flexible opportunities available combining attendance at the MSOR Network’s Induction Course and follow-up day, with follow-up engagement to claim APL, or the embedding of Network’s provision within other Higher Education Institution Continuing Professional Development (HEI CPD) programmes.

The weakest link? 
Supporting the postgraduate teaching assistant

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In October 2005, the Maths, Stats & OR (MSOR) Network, a Subject Centre of the United Kingdom Higher Education Academy (HEA), initiated a series of workshops for postgraduate students who teach Mathematics and Statistics in universities and other Higher Education (HE) institutions [18].

The initial programme for the workshops consisted of four sessions that covered a wide range of teaching topics that it was anticipated postgraduate students would be involved with: Planning and delivering small group teaching; Facilitating problem solving classes; Encouraging participation: Motivating and sustaining student interest; and, Assessing student work and providing feedback. An interactive question and answer session concluded each workshop and provided participants with the opportunity to seek advice and share advice, and discuss their individual concerns.

Almost immediately, other departments of mathematics were requesting similar workshops for their own postgraduates, and further events were scheduled for individual institutions in 2006 with others planned for subsequent years. Feedback from participants and other evaluation mechanisms in 2005/2006 suggested a few changes to the structure of the workshops which now consist of a greater number of shorter, more diverse sessions: The first lesson; Planning and delivering small group teaching; Facilitating problem solving classes; Presenting & communicating mathematics; Assessing student work and providing feedback; and, an interactive session for sharing advice.

A survey was undertaken during the first phase of workshops of the teaching related duties performed by the postgraduates, and an audit of their needs was conducted, giving a useful insight into the sort of provision required, and pointers for future events. Roughly 70% were involved in running seminars or tutorials. 55% run problem classes of some kind in mathematics or statistics. About 50% were involved in other types of small group teaching, in some capacity. 20% provide 1-1 tutoring or mentoring. 40% are involved in marking exams and about half marked coursework. 10% gave occasional lectures. About 20% assist in computer labs. A small number, no more than 5% were responsible for a whole course and actually set exams. However, these were usually exceptional cases of people who already had substantial experience of teaching in HE, perhaps in other countries.

During the first phase of the workshops (2005/2006), a total of 88 postgraduates attended the regional events. For the second phase, a total of 106 delegates attended
the workshops in Nottingham, Birmingham, Leeds, Bristol, Glasgow and Sheffield. An analysis of the feedback from the initial phase of workshops saw 74 delegates, from the 80 who responded, rate these events as either valuable or very valuable, and of these, 59 indicated that they would re-think how they plan, organise, and/or present their teaching sessions in response to these events.

In our view, the message is clear: no matter how much lecturers and colleagues think about courses they are delivering, for as long as a significant amount of teaching is left in the hands of postgraduate students, they must be appropriately supported and trained, which in our experience they welcome enormously, and this must include a discipline specific component. Otherwise this, and not the postgraduates themselves, will remain the ‘weakest link’ in the learning and teaching provision.

References