
The first National Teaching Fellows

Patricia Egerton
University of Teesside

p.a.egerton@tees.ac.uk

Keith Hirst
University of
Southampton

k.e.hirst@maths.soton.ac.uk

Peter Edwards
University of
Bournemouth

pedwards@bournemouth.ac.uk

The National Teaching Fellowships Scheme was launched earlier this year by the Higher Education Funding Council for England and the Department for Higher and Further Education, Training and Employment in Northern Ireland. The scheme is designed to recognise and reward individual academics who have demonstrated excellence in teaching and support for learning. This is a high profile scheme that will not only reward teaching excellence, but will also serve to raise the profile of teaching and learning across the sector.

Fellowships are open to nominees from all Higher Education Institutions in England and Northern Ireland and to nominees from Further Education Institutions in England that meet HEFCE-established criteria. Each eligible institution was invited to select one candidate as its nominee for the award, and the institutional nominations were judged by a National Advisory Panel, chaired by Sir Martin Harris, Vice-Chancellor of the University of Manchester.

The criteria agreed by the panel for judging the awards are:

- The ways in which the application demonstrates the nominee's ability to influence students positively, to inspire students and to enable students to achieve specific learning outcomes as defined by the institution and/or the subject area (this relates to their own students and/or others in the field);
- The ways in which the application demonstrates the nominee's ability to influence and inspires colleagues in their teaching, learning and assessment practice by example and/or through the dissemination of good practice;
- The nominee's track record or potential, as demonstrated through the application, to influence positively the wider national community of teachers and learners in Higher Education in relation to teaching, learning and assessment practice;
- The nominee's ability, as evident in the application, to demonstrate a reflective approach to teaching/ the support of learning.

Twenty successful nominees were chosen to receive awards of £50,000 to benefit their work in teaching and learning. Three of these work in the subject area of mathematics, and they have all agreed to contribute a brief article about their plans to this newsletter.

Further information about the National Teaching Fellowships Scheme can be found at <http://ntfs.ilt.ac.uk>

Mathematics, proud servant of science

Patricia Egerton, University of Teesside

Having just come away from the inaugural Awards Ceremony for the National Teaching Fellowship Scheme, I am gradually beginning to come down to earth again! It is only three weeks since we 20 National Teaching Fellows were notified of our success: three weeks already filled, in my case, with marking examination papers and attending examiners' meetings, into which now had also to be fitted a day's filming and also photo sessions and press interviews. Last night's ceremony, at Church House Westminster in the presence of VCs, MPs and other dignitaries, was the splendid culmination of all this activity. After a pleasant dinner we had speeches and presentations, the video which introduced all twenty of us, and handshakes and (more) photos with Baroness Tessa Blackstone, the Minister for Higher Education. This temporary exposure to a high profile life-style has come as rather a shock (to us all, I think).

The ILT's remit is to promote learning and teaching issues in Higher Education, and alongside its institutional accreditations and its professional body status for individual members, it sees this major recognition of Excellence in Teaching in HE as a crucial way to promote high quality in teaching. Whilst the results of each round of the Research Assessment Exercise are important, it is possible that they cause some institutions to play down the attention given to student learning. Student learning (and hence the issue of teaching) is integral to the work of universities, and I believe that the ILT is quite right to seek to raise the profile of teaching in Higher Education. The award of £50,000 to each National Teaching Fellow is to ensure that these Fellowships are taken seriously by the institutions and by the academic community, as well as to allow each Fellow to engage in a Project, over three years. The ILT intends that the Fellows will meet together regularly during their term. It hopes that it has invested enough in the Scheme to achieve a 'critical mass' of exemplary high quality practice, and that this will make a real difference in terms of achieving the government's goals for developments in education at this level. This imaginative Scheme gives considerable freedom to its recipients, and consequently has the possibility of delivering more added value to learning and teaching in Higher Education than other, more prescriptive, measures.

My project is entitled "Mathematics, proud servant of science", and I intend to use my award money for the benefit of students who must learn mathematics to support their studies in other specialist disciplines. I hope my work will benefit students at the University of Teesside in particular, but also be of use more widely. The LTSN Newsletter provides an excellent mode of communication, so I shall be delighted to hear from anyone with whom my concerns strike a chord, or who wishes to become involved in any way.

My principal focus is on all those degrees, in diverse disciplines, which demand either that students study mathematical subjects in their programme or else that students use mathematical skills and techniques as an essential part of their work. For degrees in Engineering, Technology, the Natural Sciences and Computer Science students generally have modules of mathematics integrated within their studies; for degrees in Business, Management, Economics, Sport Science and the Social Sciences students are expected to apply quantitative and statistical techniques whether or not they are offered formal support in these areas. Student with different backgrounds embark on these degrees (they may have GCSE Maths or Further Mathematics at A level) and it is presently unclear how well we in universities deal with their different needs. I have already begun an evaluation across several subject areas at Teesside to investigate how effectively 'service maths' and 'maths support' are delivered, and how we pitch the level of our delivery or differentiate our approach to students with various entry qualifications. I aim to extend this investigation regionally, nationally and internationally, and to identify good practice.

It seems to me that this study is particularly timely as the National Numeracy Strategy is now entering our secondary schools, and Curriculum 2000 is about to be brought into our Sixth Forms: both these are bound to have an effect on the capabilities of future students on entry, and we shall be wise to be prepared for them. Additionally, the issues of supporting the mathematics learning for all disciplines must be dealt with seriously in the present climate of increasingly widening access to HE, and the present focus on retention rates. As aspects of mathematics are embedded in so many subjects - indeed mathematics can be said to be embedded at the core of our culture - it is vital that we investigate and focus on the best practice in supporting student learning in our area.

MathBank, a Resource Bank for Teachers and Learners

Keith Hirst, Southampton

I feel very privileged to be one of the first National Teaching Fellows. This has been made possible through my working in a department with a strong commitment to teaching and learning alongside research, and by the generations of students who have shared some of their learning experiences with me. Thank you everyone.

The project which the award will fund, based in the University of Southampton, will involve a team of colleagues, and I hope that this introduction to the project's aims will encourage interested colleagues from elsewhere to become involved. This will be welcomed.

When we were planning the framework for the project we had in mind the many academic staff teaching mathematics in Higher Education who use what are generally referred to as "traditional" teaching methods, based on oral and text-based delivery. A great deal of excellent teaching and learning takes place within this framework, and we felt that we wanted to put together a project for which a major aim was to support such teaching using technology. This would complement the many developments which have placed technology at the core of delivery methods, including some of the high quality TLTP products produced in the UK.

The core of the project will be the development of a modularised bank of text-based teaching materials, with an associated item bank of associated learning and assessment tasks. Access to the material will be via the web, and users will be able to use the resource to create teaching sequences geared to the need of the particular clientele they are serving. In the first instance we shall address the requirements of students in mathematics, engineering and the physical sciences, although the platform will be designed to be capable of continual enhancement, so that the biological and social sciences would form a natural area of extension.

The project is funded through the Award scheme by HEFCE, and so it is our intention that MathBank will be an open resource without restrictions of access and use. We hope therefore that contributions from many institutions will be included in due course.

So how do we envisage MathBank being used? Some examples will illustrate preliminary ideas.

1. You are a young lecturer setting your first exam paper for a second level differential equations course for Chemistry students. You are busy and would like not to have to re-invent the wheel and devise the paper from scratch. You can use Mathbank as a source of well-evaluated examination questions which come with solutions and a suggested marking scheme. You should

be able to download these questions in to fit the format you need (LaTeX, Word, PDF for example). You can use your experience in teaching the course to make any modifications you judge appropriate. Bingo – there is your examination paper.

2. You are an experienced lecturer who has to teach a course next year on algebra for first year Computer Scientists. The syllabus from the Computer Science department is a miscellany of topics including some matrix algebra, Boolean algebra, elementary logic etc. Some of these things you have taught before, and others not. You are not terribly familiar with appropriate applications. MathBank would be able to provide a suite of application modules as well as modules on the individual topics themselves, together with suitable student problems for the course. You can download this material to form a framework and make appropriate modifications for a much more efficient production of the course, for you are very busy like the rest of us.

3. You are teaching a second level Real Analysis course and would like to broaden the students' experience by providing an extended coursework assignment which will help them to synthesise some of the ideas in the course, to provide opportunities both for the very able and for the less able students to explore and extend ideas. You haven't had any experience of doing this kind of thing but would like to try. Your colleagues are not much help. Can MathBank provide some suitable ideas?

The project will not ignore developments which are heavily technology-based, and will aim to provide some information and links for those who want to think about this direction of development for their teaching.

As I have said, for a project of this kind to be successful it needs to draw upon a wide variety of experience. There is no way I can do even a fraction of the work on my own, and it cannot be the product of just one mathematics department. The co-ordinating role and the expert knowledge of the LSTN centre will therefore be very important, and will provide a vital conduit for reaching colleagues who are interested in contributing. We shall hope to be able to report progress in this Newsletter as well as by other means from time to time. Get in Touch!

Java Mathematics

Peter Edwards, Bournemouth University

I was delighted with being awarded a National Teaching Fellowship from the Institute of Learning and Teaching. I was further delighted that, at long last, teaching is being recognised as equal in importance with teaching administration and research. I have always felt that administrative and research skills took precedence over teaching ability in a lecturer's career progression. I hope younger recipients of this award, who have been acknowledged for their teaching (and facilitating learning) skills, will now be on a fast track to well-earned promotion.

Some six years ago I started writing software in my own time to help my students gain a deeper understanding of mathematical topics. Written in Visual Basic (VB), I completed several modules and their accompanying tutorial worksheets and wrote up my experiences in the *Maths&Stats* Newsletter [Edwards, 1995]. At the time, the university network for students on our part of the campus was a problem and so I was loading the software on individual machines. Needless to say, inquisitive hands would soon corrupt the software's set up and maintaining a working order proved too great a problem.

During 1999, Bournemouth University's Learning and Teaching Development Initiative released funding for innovative projects. Mine was one of those chosen for some of this funding. With the £15,000 awarded, I was able to employ one of our Software Engineering Management undergraduates, Colin Barry, on his industrial placement to transcribe my existing VB programs into a set of Java applets and set up a mathematics web site on the university's Intranet. Colin's programming skills and mathematical ability were such that he was able to enhance my software further than time had allowed me to do with the original VB programs.

Those attending the Loughborough Engineering Mathematics conference at Easter this year had the opportunity to see the software in action. One example demonstrated was the "Exponential Function" applet. Give a student the equation $y = A + Be^{kt}$ and how many could tell you the effect of changing A , B or k ? Using Windows-type slider bars these parameters can be changed in the applets with the graph of the associated exponential function changing in real time.

The applets alone are insufficient – there is too great a tendency for students to play randomly without reflection – so each applet is accompanied by a worksheet that takes the user by the hand through a highly prescribed set of instructions. Space is left on the sheets for students to write down the answers to some reflective questions and to sketch what they have seen, so forming a

permanent record of their investigations. Those who have already undertaken the worksheets are encouraged *then* to play with the software to further deepen their understanding. This takes some of the emphasis from teaching and places more emphasis on learning and gives students a greater feeling of ownership of what they learn and how they have learnt it. In turn, they can obtain more of a feel for the mathematics and a deeper understanding. However, it is not a replacement for lecture time.

The applet site, although not yet officially set up for in-class use, has already been used enthusiastically by some of my students. Feedback from students has been positive. "Are you going to write an applet on...?" is a regular question. I had been concerned about how I was going to continue to develop the project once the Bournemouth funding had run dry, so I was delighted at how opportune was the ILT award. The ILT funding will allow me to make use of an industrial placement student each year for the next three years.

What about unleashing the applets on the world? A book publisher present at the Easter conference was interested but was having difficulty trying to establish the best marketing model for the project. At present there are no firm plans but if, philanthropically, we were to go from Intranet to Internet then the possibility opens up of running a web site with further contributions, in the same style as the existing applet / worksheet combination, from the world over.

There are many people I would like to thank individually, but special thanks go to Colin Barry for his excellent support this year and to Professor Peter Hogarth and Dr Kamran Tabeshfar of Bournemouth University for allowing me the total self-indulgence needed to bring this project to its current state.

Reference

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