

UK Centre for Bioscience and the Future

As this edition of the Bulletin goes to press bioscientists in the UK higher education community are braced for the outcome of the Government's Comprehensive Spending Review (CSR). It seems likely that the CSR will herald swingeing cuts in funding for universities and related organisations. These cuts will no doubt be implemented as the variable rate tuition fees, recommended by the Browne Review, lead to many students paying much more for their university education. They will therefore, rightly, expect a very high quality learning and teaching experience from institutions that, in many cases, will be experiencing severe financial pressures and constraints. These institutions will need the help of the Higher Education Academy (HEA) as never before so how is the HEA and, more specifically, the UK Centre for Bioscience, positioned to deliver effective support for learning and teaching during these difficult times?

In common with every other organisation associated with higher education, the HEA will be markedly affected by forthcoming cuts in funding. Currently the organisation is responding to this challenge by reviewing its activities and structure. An announcement of a new structure for the Academy is expected before the end of the year with implementation from August 2011. We hope to provide details in the next edition of the Bulletin but at this stage we should make plain that the current structure, that includes 24 Subject Centres (including UK Centre for Bioscience) distributed throughout the UK, will certainly change. As this change occurs a major priority for HEA staff associated with bioscience programmes will be continued delivery of the best possible subject-specific support for learning and teaching in the remarkably wide range of bioscience disciplines. I place emphasis on subject-specific support here because members of our community have told us repeatedly how much they value the fact that our events and resources are placed in the context of their discipline(s). It is abundantly clear that academics and their students engage much more enthusiastically with resources in support of, for example, ethics teaching or peer-assessment if the relevance of the material to their own subject area is immediately apparent.

The current period of economic uncertainty and gloom will no doubt pass and meantime we must not miss valuable opportunities as they arise. For example, there have been recent, encouraging developments at national level with the establishment of the Society of Biology and the Office for Life Sciences' Industry and Higher Education Forum. The Centre is working closely with colleagues in these and other organisations, including the Research and Sector Skills Councils, in what we hope will be a more holistic, joined-up approach to bioscience learning and teaching in the UK. We have a well-established and extensive network of academics based in all of the approximately 130 institutions offering bioscience, or bioscience-related, degree programmes. The Centre is therefore uniquely placed to help facilitate meaningful interaction between colleagues working in learned societies, government bodies, industry and academia and we hope we will have the opportunity to expand this role in the new structure adopted by the HEA.

In a similar, positive vein this issue of the Bulletin is typical of its predecessors in illustrating the wide range of learning and teaching themes and projects supported by the Centre. Diverse topics including creativity, e-learning, the relationship between theory and observation, writing skills and the National Student Survey are considered from the perspective of the bioscientist. In addition there are articles celebrating the teaching excellence and success of bioscientists (recognised via the HEA's National Teaching Fellowship Scheme and the Centre's Ed Wood Teaching Award). The Centre is always keen to explore new avenues of activity and this issue also contains preliminary information about our first ever International Conference on Bioscience Education to be held 30th June, 1st July, 2011 in Edinburgh.

The next academic year will no doubt be challenging for many working in higher education. During these difficult times we will do all we can to help colleagues continue to provide a first class student learning experience. Good luck and see you in Edinburgh!

David J. Adams
Director, UK Centre for Bioscience
d.j.adams@leeds.ac.uk

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2 | A Brief History of e-Learning in the Biosciences

We are conducting a systematic review which asks 'are multimedia resources effective in bioscience teaching?' The review has identified around 200 publications which give an interesting history of computer-assisted-hypermedia-enhanced-virtual-learning through the decades.

Swinging 60s and 70s

One of the first references to computer assisted instruction was in 1963 by Patrick Suppes at Stanford University, who developed an instructional programme for teaching maths. Suppes was very insightful and correctly forecast that in the coming years computer terminals would be placed in homes and a wide range of courses would be made available for the continuing education of adults.

In biology, the first pioneers to boldly go into the electronic age and explore auto-instruction were academics in the late 1960s who used audio-tapes of lectures to replace teaching. However it was at least another decade before the use of 'digital computers as teaching machines' were more fully explored to support biology education.

1980s and Naughty 90s

With the advent of BBC Microcomputers, the Commodore 64 and the Sinclair ZX Spectrum in the 1980s, Suppe's prediction was coming to life, and along with the increased use of computers in the home, they started to make a bigger educational impact. Garrett *et al* (1987) used a 'microcomputer videodisc programme' to supplement medical teaching, with resources written in BASIC computer language. Similar approaches were used to teach neurophysiology and ventilation around that time, notably the 'Multimedia Hyperlung'.

This level of programming was able to produce good quality lab simulations. Coleman *et al* (1994) devised an exercise physiology experiment where students could obtain data from a computer model. Dewhurst *et al* (1994) devised an intestinal absorption experiment. Programming was becoming more sophisticated with colour graphics and simple animations. Although I look back at these resources with memories of basic graphics and a lot of blue, their ingenuity and learning content were spectacular, and some of the early papers evaluating them still give a relevant insight into e-learning and teaching practices today.

In the late 1980s programming languages changed, reducing the need for coding expertise. Authorware Inc. was software widely used for producing learning materials with content accessed through a series of menus. Electronic resources and the accompanying research were becoming more sophisticated, with increasing numbers of studies evaluating the impact of computer simulations, animations, and computer-assisted learning on student satisfaction and learning. Research questions included (and still include): Is it better than a lecture? Is it cheaper? Does it require less time

to teach and use? Does student performance improve?

The 1990s brought the World Wide Web and towards the end of the decade researchers explored the concept of online courses to teach physiology to medical students (Davis, 1997). With increasing computing power, another approach was to produce a Virtual Learning Environment (VLE) on a CD-ROM with recordings of lectures, animations and text to accompany modules.

The Millennium

This decade we have seen the emergence of 3D graphics as educational tools, Broadband, online VLEs (Blackboard, WebCT, Moodle), and increasingly user-friendly development software such as Adobe Flash – offering solutions for both the hard core programmer and the enthusiastic amateur. The review yielded a splurge of publications evaluating the effectiveness of animation although as yet no papers assessing the impact of video and podcasts. Coupled with the abundance of resources is an increased understanding of the educational benefits of multimedia, such as work led by Richard Mayer demonstrating that well designed materials can enhance learning processes.

To Infinity and Beyond

Industry software and hardware manufacturers have made it easier to develop resources, from animations to video, podcasts and slide presentations with voice-overs. The growth of open educational resource initiatives will provide academics with increasing volumes of electronic materials to use, re-purpose and develop (see for example www.bioscience.heacademy.ac.uk/resources/oeer/). The challenge for us is to produce evermore dynamic and engaging resources to meet changing student expectations, and to use them in pedagogically effective ways. Therefore, the future will always need good quality educational research in this area.

And Whatever Happened to?

Two of my favourite papers were on 'The Virtual Rat' (Odenweller, 1997 and Hsu, 1999), superb simulations for teaching endocrinology. Like their furry counterparts, and fate of most electronic resources it would seem, their lifespan was sadly restricted. Or was it? Judging by the tooth marks on one of my suitcases, I might have one of these in my loft, although I haven't seen signs of any virtual doo doo's.

References

A reference list is available from Vivien's blog at <http://scooter-dmu.blogspot.com/> where you can also get in touch with Vivien and comment on her article.

Vivien Rolfe
De Montfort University
vrolfe@dmu.ac.uk



Developing Creativity in Bioscience Undergraduates – a Preliminary Project

Inspired by attending the 'Creativity in the Sciences' UK Centre for Bioscience workshop (Glasgow, April 2009, event report available at www.bioscience.heacademy.ac.uk/events/glasgow290409.aspx) I initiated a project to explore developing students' creativity within a Level 6 (final year) Bioscience module with around 65 undergraduates (securing funding from the Learning and Teaching Institute at the University of Chester). However, creativity is very hard to define let alone measure in any meaningful way. So with the help of Jo Hockenhill (as Research Assistant on the project) we measured instead how valuable students found using two creativity techniques. The tools were 'mindmapping', familiar to most of the students (though little used in reality) and 'freewriting' – borrowed from the field of creative writing and much less familiar to the students.

The creativity tools were used in seminars (with half the class, around 30 students in each) running alongside the lecture series. Students are often reluctant to engage with work not obviously related to assessments, so the writing tasks invited them to freewrite for 10 minutes (without stopping to edit or worry about spelling etc) on e.g. 'why we should save the Northern Hairy-nosed wombat' (arguments that may help develop a response to an exam question). A mind-mapping task might involve making links between subjects hitherto unexplored. I argued that engagement with these 'creativity-promoting' tasks could help them a) fully explore the subject material discussed in the formal lectures and b) develop broader creative skills: e.g. lateral thinking, an ability to make new connections and see things in a new light.

Students' perceptions were measured by use of questionnaires, one after a couple sessions using the techniques and an identical second one, six months later, at the end of the module. I made my own (anecdotal) observations of how students engaged with the tasks and Jo ran formal focus groups with some students.

During the seminar sessions I was impressed by the level of engagement by students in the activities (and to be truthful, surprised!). The full results are being submitted to *Bioscience Education* but key findings indicated that around two-thirds of questionnaire respondents felt the mindmapping technique helped them explore the module material in more depth and over two-thirds of them felt it helped with their assessment and exam preparation. For the freewriting technique over half found it valuable and two-thirds felt it was helpful in their exam preparation. Interestingly students rated the techniques highly even in the first questionnaire, after only one or two sessions. Clearly, and this was borne out by classroom discussions and the focus groups, there is an appetite amongst bioscience students for these kinds of activities, particularly when related to their subject material. The freewriting exercises in particular raised animated discussions about how students engage with writing tasks. Many commented on how useful they found the discussions about their writing processes and development. They were less engaged by discussions about their creativity *per se* but many felt that they did use and develop it during their studies. Given the slippery nature of defining and assessing creativity, even within traditionally perceived 'creative' subjects, it is not surprising that bioscience students have difficulty in identifying and articulating ideas about their creativity

(as, perhaps, do many academics in these fields).

From a tutor viewpoint it is important to note how little time it took to prepare the seminar sessions using the creativity techniques. Many bioscience tutors may feel compelled to undertake extensive preparation of sessions but these seminars required minimal preparation – the students' activity is the point. It took an effort to 'let go' and not try and intervene, guide and direct them, but doing this did enable students to develop their own ideas and voices.

The final thread of the project focussed on the value of writing exercises and involved convening a workshop with bioscience subject tutors and also experts from student writing support and tutors of Creative Writing. The idea was to explore the potential value of incorporating creative writing techniques into 'everyday' bioscience module teaching/learning sessions. Valuable discussions suggested that there is much mileage in trying to incorporate writing exercises into bioscience students' learning. Subject specialists were also heartened to learn that tutors in English/Creative Writing also encounter students with writing difficulties. All present felt more across-discipline discussions of this kind would be very valuable, and not just to those in the biosciences.

Overall the project took a small step in trying to develop creativity with bioscience students and generated valuable learning for students and staff.

Lottie Hosie and Jo Hockenhill

University of Chester

l.hosie@chester.ac.uk

j.hockenhill@chester.ac.uk

Would your students be interested in winning £300?



The UK Centre for Bioscience Student Award 2011 is now open and we want to hear from students about **"The pluses and minuses of maths on my bioscience course"**. The Award gives students an opportunity to reflect on teaching and learning on their bioscience course – perhaps your students could submit an entry as a tutorial exercise?

This year there will be two winners – one undergraduate and one postgraduate and our thanks go to BBSRC (the Biotechnology and Biological Sciences Research Council) for sponsoring the postgraduate prize.

Entries can be submitted in a range of formats, from a poster to a short video. Full details about the Award, including competition rules, criteria and an entry form are available from www.bioscience.heacademy.ac.uk/funding/essay/award/

The closing date for entries is the 8th April 2011. Please pass the message on to your students!



4 | Putting Data Ahead of Theory in Biology Practicals

Practical exercises can be frustrating for students, particularly those that require them to follow a pre-ordained protocol. There are at least two problems with protocol-based practicals. First, it may be difficult to prevent students from following the protocol blindly. Very little is then retained by students after the practical, and they (accordingly) tend to report finding the practical 'pointless'. Second, students are likely to evaluate a practical as 'successful' only if their experiments or observations yield the 'right' results. Failure to find results confirming an established theory, for instance, may lead students to feel the practical has not worked and was thus a waste of time.

In recent years, as part of an annual field trip focused on the evolutionary ecology of plants, I have developed a practical exercise that successfully avoids both of the pitfalls of protocol-based teaching. Students derive their own model, with help from tutors, formulate their own predictions, and settle, as a group, on a methodology that could test the theory. The practical finishes not with them reporting and discussing their results, but rather with a group discussion about the nature of data and theory, and the relationship between theory and observation. The students experience the frustration of failure and emerge with a sense of having done real science.

The practical takes place over two consecutive days. On the first day, as part of another exercise involving plant-pollinator interactions and plant sexual-system diversity, the students 'discover' a sexual polymorphism, where male plants co-occur with hermaphrodites. In the discussion at the end of the day, I raise the question of how such a polymorphism might be maintained. More specifically, I ask the students, in groups of three or four, to try to predict the sex ratio at equilibrium. Initially the students are completely lost. However, with gradual prompting, each group grasps two essential ideas: first – males and hermaphrodites must be equally fit in a population at equilibrium; and second – males gain fitness only through their pollen, whereas hermaphrodites gain fitness through both pollen and seeds. Each group then derives a simple expression for the proportion of males as a function of the amount of pollen produced by the two sexes.

The next day, the students stay in their groups to test their model. Each group samples a different population, estimating both the sex ratio and the pollen production of males and hermaphrodites. Crucial here is the task of deciding how to define and delimit their population, how large a sample they need to estimate the sex ratio, and how large a sub-sample is needed to estimate pollen production; issues at the heart of the design of field-based studies in ecology.

The most interesting part of the exercise comes when the students' results are collated into a single dataset. With the students sitting in a circle, I first remind them of their model by plotting on the board the equation they derived at the start of the exercise. We establish that the curve makes intuitive sense. I then reveal the students' data by overlaying each groups' results onto the plot. Invariably, one immediately gains an impression of a spread of data with no clear pattern –



and certainly no approximation to the curve. The sense of failure and the inevitable pointlessness of the practical is palpable.

I next ask the students to reflect on why most of their points fall so far from the curve. Predictably, they all suggest potential problems with their protocol and sampling. Rarely is it suggested that the model might be in error; indeed they tend unanimously to declare more faith in the model. I then invite the students to consider the assumptions they made in deriving their model. Only then does it gradually dawn on them just how many simplifying assumptions they had made, specifically that the hermaphrodites don't self-fertilise. Now the pendulum swings in the other direction, as the students become more critical of the model than the data. We discuss the dynamic interplay between theory and data, and the practical ends with the students asked to think about how one might estimate selfing rates and incorporate self-fertilisation into their model. I have known keener students to go off and derive a more general model on their own.

Of course, ultimately this practical, too, has a protocol the students have to follow. However, they are led towards defining their own protocol themselves, and they thus begin the practical component of the exercise with more understanding and motivation. In this exercise, the students happen to learn about theories of sex ratios and mating systems –intrinsic to their specific course. But the same principles of group-centred learning could of course be applied to a wide range of subject material. The important outcome is that the students finish the exercise with new insights into how science moves from simple to more general models in a dynamic discourse between theory and data. Students recognise that messy data can in fact be an accurate picture of reality, and that models can only ever approximate the real world – and then only if their assumptions are reasonably met.

John R. Pannell
University of Oxford
john.pannell@plants.ox.ac.uk



Support for Essay Writing in Biosciences

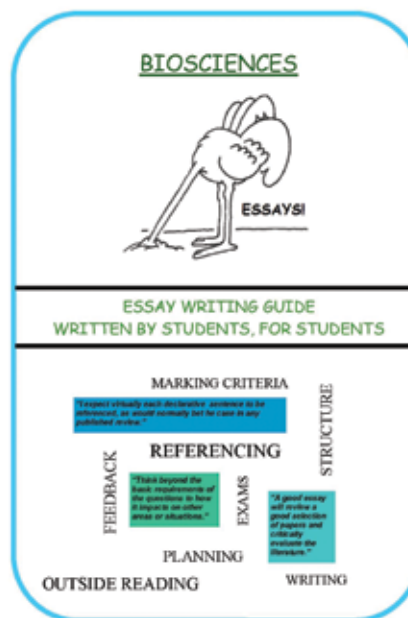
Good written communication skills are not only vital to a student's success in their degree programme but also to their employability and future prospects. Being able to construct coherent arguments, write clearly and articulate ideas to a range of audiences are key transferable skills and these can often be found amongst learning objectives on module and programme descriptions, and in marking criteria and guidelines laid down for assessment. However students coming from school and college to study biosciences in higher education have less experience of writing essays than ever before and for many students the prospect of writing an essay for credit is a daunting one. Their achievement can be significantly hampered by a lack of confidence and a lack of understanding of what is actually expected.

At Exeter in the School of Biosciences in October 2008 we moved towards an assessment structure for 1st year students which focussed mainly on online assessment and the use of MCQ, both for coursework and examinations. Whilst this was well received by students at the time many felt at the beginning of the 2nd year that they had not had sufficient practice at writing essays to adequately prepare them for examination by essay. One of the key stumbling blocks for students was the marking criteria, to which they were often referred when they asked "how do I get a top mark?" or "what did I do wrong in my essay?"; whilst pedagogically sound these marking criteria have proved difficult for students to interpret. A survey of student opinion on assessment methods was conducted and strikingly 65% of students felt they were not well prepared to write an essay under exam conditions and only 22% felt that they understood the mark scheme well.

The Education Enhancement Unit at the University of Exeter runs 'Students as Agents of Change' (<http://as.exeter.ac.uk/support/educationenhancementprojects/change/>), an innovative scheme to involve students in education research to improve the learning and teaching experience within their Schools. In October 2009 a group of five 1st and 2nd year students in the School of Biosciences decided to address the issue of essay writing in the School and through their excellent work have not only changed practice in Biosciences but also in other Schools across the University. The students showed a mature understanding of the pressures on academic staff from increasing student numbers and research requirements and so rather than simply asking for more essay writing assignments at level 1 the students addressed the question of "what do I wish I'd known when I wrote my first essay?". The output from the project was a booklet; the 'Biosciences Essay Writing Guide, Written By Students For Students', which is available to download from the UK Centre for Bioscience website (www.bioscience.heacademy.ac.uk/ftp/resources/essayguide.pdf). The students collated School learning outcomes and marking criteria for essay writing, as well as tips and tricks from the Education Enhancement team, and, importantly, annotated this with quotes from staff about

what they look for in a good essay, effectively 'translating' the marking criteria for students. In addition to this an essay writing workshop was laid on for all 1st year students after their summer exams to prepare them for essay writing in the 2nd year. During this workshop they were all given a copy of the booklet and they discussed the marking criteria in groups, peer-marking extracts from essays from previous years to help them identify the core attributes of 2:1 and 1st class essays. The feedback from students on the workshop was very positive and on the booklet was excellent. Students said: "so much information and tips I would never have known about", "a very, very good resource. Just what we need!", "really useful... to know what the tutors and lecturers think is important" and "excellent information and detail".

Copies of the booklet are to be given to all new first year students and the impact of the work is being felt elsewhere at Exeter where the Business School are using the template to produce their own version of the booklet. The *Students as Agents of Change* project has revolutionised the way in which we develop tools for learning and teaching and is an excellent way of embedding student involvement through the curriculum.



Thanks must go to the students involved: Thomas Clarke, Emily Malbon, Kirsty Clemow, Alessandra Bittante and Charlotte Mardon, and also to Harriet Whewell and Liz Dunne in Education Enhancement for their roles coordinating and supporting the project.

Nicola King
University of Exeter
n.c.king@exeter.ac.uk

6 | The Ed Wood Teaching Award 2010

The Ed Wood Teaching Award was established in 2008/09 by the UK Centre for Bioscience to provide an annual opportunity for bioscience academics to receive national recognition for their outstanding learning and teaching practices. The Award is open to all UK bioscience academics who work in higher education or who teach higher education in a further education establishment.

In 2010 the Award received 10 applications, of which 3 were shortlisted. The shortlisted applicants, Stephen McClean, Graham Scott and Anne Tierney, then worked with a member of the Centre team to develop a two-page case study based on:

- Observation of the teaching practice;
- Interviews with the applicant;
- Student questionnaires; and
- Student focus groups.

These case studies are available from our website at: www.bioscience.heacademy.ac.uk/funding/recognition/finalists.aspx

The standard of the shortlist for the 2010 Award was very high and the judges had a difficult time selecting a winner from three very deserving candidates. The decision was announced and a presentation to the finalists was held at the 2010 Bioscience Representatives' Forum in Cardiff. The finalists also showcased their ideas and reflected on the process of the Award at the Forum and their presentations are available as part of the Forum report (www.bioscience.heacademy.ac.uk/events/repforum10.aspx).

The Centre would like to congratulate all three finalists and the overall winner, Graham Scott of the University of Hull, who was presented with his award and received £500 towards future professional development activity. Here the finalists reflect on their participation in the Award.

Stephen McClean



Put simply, the Ed Wood Teaching Award process is straightforward, supportive and highly beneficial. When I applied for the award it was with a certain degree of trepidation as to what might be entailed, however I discovered that the most challenging part was completing the application form in a manner that succinctly conveyed the teaching practice I was offering up for consideration.

Once that was done and I had been shortlisted the rest of the process allowed for reflection on my own practice during the observed teaching sessions and the ensuing interviews and evaluation, culminating in the production of the case study. This part of the process I found very helpful and unobtrusive given that the teaching observations and interviews were carried out during one of the busiest times of the academic year. The case study was written by Sheryl Meskin and passed back to me for comment; the whole process being very supportive with minimal stress for the academic.

While I have benefited from a working environment where innovation in teaching and learning is encouraged, supported and rewarded, the Ed Wood Award process allowed me to gauge how my teaching practice was perceived on a national level by peers and closer to home by my own students. Applying for such awards is as one of my own colleagues described "like putting your head above the parapet". However, in terms of reflecting on your teaching practice and having it supportively evaluated and showcased on a national level I highly recommend being involved in the Bioscience Teacher of the Year Awards!

Graham Scott



Shy bairns get nowt has always been a favourite saying of my grandmother but it hasn't been a favourite of mine. The very idea of self nomination for an award, a process that she would no doubt relish, is something that I find very difficult. Thankfully however, self nomination is the only difficult part of the Ed Wood Teaching Award process. Working with Steve Maw, my Centre contact, to produce a case study based upon an aspect of

my work involving student managed learning was a pleasure. The opportunity to discuss my work with someone of Steve's experience, and the way that he helped me to see it through new eyes enabled valuable reflection and self criticism. Presenting my work to peers at the Centre's Representatives' Forum in Cardiff and discussing it with them helped me to appreciate it and to see how it might be further developed. Steve's feedback on the views expressed to him by my students (positive views, negative views, and some delightful comments that they might otherwise not have shared) gave me food for thought. Winning the award was a bonus. Being able to come back to my own university as an award winner has raised my internal profile a little and the profile of learning and teaching in my department to a greater extent. It has validated my work and to be quite honest allowed me to step into the new session with renewed vigour. Go on; remember what granny would have said. Nominate yourself.

Anne Tierney



When developing new learning for students, I always wonder how it will affect them, if the changes are worth the effort put in, and should there be a wider audience for the developments that I perceive work for me and my students. Taking part in the Ed Wood Teaching Award gave me the opportunity to take the reflective diary project and show its benefits to a wider audience, and validated my belief that using

reflective writing as an assessment process is worthwhile. I have always had an interest in technology, and have led developments in asynchronous support and online group working for first year bioscience students. For me, the use of a virtual learning environment was always more than a



- Finalists' Reflections

repository for lecture notes, but should, instead, be a way for online collaborations to flourish. Developing the case study became a masterclass in the use of technology as Julian Park and I communicated between Reading and Glasgow via email and Skype, and my students were interviewed by video conference, an experience which they thoroughly enjoyed. Having visual contact during discussions about the case study was invaluable (when my camera was working!) and we were able to get a lot of work done on the case study in relatively little time. It also gave me the opportunity to reflect on the project and how I saw it evolving.

For me, one of the most important parts of the experience was involving the students, and giving them the freedom to talk about their experiences of the project on their own terms. It is always gratifying to hear from students that they are getting out of a course what you think they should be getting!

My thanks, of course, go to Julian Park, who led me through the process of developing a case study, and the students of Business and Bioscience 2009, who made the diary project a privilege to take forward.

Bioscience Teacher of the Year 2011



Developed from the Ed Wood Teaching Award the Bioscience Teacher of the Year is supported

by the UK Centre for Bioscience and sponsored by Oxford University Press. The scheme rewards lecturers who:

- Engage, motivate and inspire their students;
- Go the extra mile to support their students' development as individuals; and
- Have influenced and enhanced students' achievements and colleagues' practices within and beyond their own institution.

The winner will receive the Ed Wood Memorial Prize, named in honour of Professor Edward J. Wood, who established and became the first Director of the Learning and Teaching Support Network for Bioscience, now the UK Centre for Bioscience, who dedicated himself to the promotion of biochemistry and molecular biology education.

Applications for the Bioscience Teacher of the Year 2011 closed on the 15th October. The winner of the 2011 Bioscience Teacher of the Year will be announced at the Effective Learning in the Biosciences Conference on the 30th June and 1st July in Edinburgh.

Find out more about the process of the Bioscience Teaching of the Year Award on the Centre website at www.bioscience.heacademy.ac.uk/funding/recognition/award.aspx

Announcing our Finalists for 2011

Congratulations to:

- Phil Langton, University of Bristol
- Richard Milne, University of Edinburgh
- Jon Scott, University of Leicester
- Carol Wakeford, University of Manchester

Teaching Development Fund - Grants of up to £4,000 available

The UK Centre for Bioscience is pleased to announce the availability of grants of up to £4,000 for members of the bioscience community from departments with bioscience HE provision. This funding is offered to encourage the development, establishment or validation of innovative learning, teaching and assessment materials or methods, and to encourage pedagogic research in the biosciences. We welcome proposals from Wales, Scotland, Northern Ireland and England.

Applications in the following areas are particularly welcome:

- Student engagement;
- Flexible learning (can include responding to student needs and changing student populations and diverse modes of learning provision);
- Education for Sustainable Development (with an emphasis on sustainable literacy and skills relating to professional, social, ethical or environmental responsibility); and
- Graduate impact.

The deadline for the submission of bids is Wednesday 15th December 2010 with projects expected to start by the end of January 2011.

Further details and an application form are available from our website at www.bioscience.heacademy.ac.uk/funding/tdf/callautumn2010.aspx



8 | Bioscience National Teaching Fellows

The National Teaching Fellowship Scheme (NTFS) aims to raise the profile of learning and teaching in higher education. The scheme currently has two separate strands: individual awards and projects. The aim of individual awards is to recognise and celebrate individuals who make a significant impact on the student learning experience. In 2010, fifty lecturers and learning support staff were awarded National Teaching Fellowships of whom three were bioscientists; here they describe the activities and experiences which led to their Fellowships.

Roger Eston



Over the last five years as Head of the School of Sport and Health Sciences, Roger's leadership and personal touch have been instrumental in establishing the quality of the student learning experience as among the top three in the UK (National Student Survey 2007-09); one year achieving the accolade of best student experience of any subject. In recognition of his contributions, he received a

University of Exeter Teaching Fellowship Award. Prior to Exeter, Roger was Professor and Head of Sports Science at Bangor University for five years, during which time the School received the highest accolade ('exemplary') for teaching and learning in the QAA audit.

From a background of teaching physical education and science, his career has involved teaching teachers in the UK and Hong Kong; leading and developing national accreditation procedures and teaching sports science and physiology to a wide range of students (BSc to PhD). He was student-centred well before it became popular.

A world leading researcher and internationally respected academic in sport and exercise science, with over 160 academic papers, Roger is in high demand to examine or provide advice on academic programmes in the UK and internationally. He has been a key adviser on various panels at the leading sports science institutions in the UK and Hong Kong.

Roger's drive and enthusiasm, ability to create and contribute to novel learning experiences, willingness to learn and apply new technologies and commitment to deliver the best to students have made him an inspirational teacher. His laboratory manual, now in its third edition (Routledge's top selling sports science text), was developed as a key resource for students and teachers.

Roger Eston

University of Exeter
R.G.Eston@exeter.ac.uk

Adam Hart



Although an entomologist by training and persuasion, Adam has a tremendous depth of knowledge and enthusiasm for all aspects of science and he is driven by his passion to nurture scientific curiosity in others. In his work Adam does not see a clear distinction between the lecture theatre, the lab and the world outside the University. From the start of his career he has been keen

to engage the public with his research and with science in general and he and his students have benefited from the synergies that result from linking these activities.

Adam's teaching work sees him lecturing on everything from statistics to ants as well as taking field courses around the UK and abroad. His excellence in teaching has been recognised with a University Teaching Fellowship awarded in 2008 and now a National Teaching Fellowship (awarded in 2010). Research remains an important aspect of his academic career and his activities and profile have led to him becoming Editor-in-Chief of Ecological Entomology, published by the Royal Entomological Society, of which Adam is also a Fellow. Much of Adam's outreach work with schools is based around insects, and includes an ambitious biomimetic project in collaboration with the Rutherford-Appleton Laboratory and a project studying solitary bee nesting, which was recently featured in the Royal Society's 350th birthday Summer Science Exhibition in London. This bee project was undertaken as part of his role as Scientific Director of the Bee Guardian Foundation, with whom he now carries out research involving his students – a nice example of the self-reinforcing connections between teaching, research and outreach that his approach encourages.

Adam's outreach work is not limited to schools – he was a speaker at the 2010 Cheltenham Science Festival, is a regular speaker at beekeepers meetings and scientific groups and has his own science slot on BBC Radio Gloucestershire. His experiences in communicating science have led to the development of a strong media theme in the Contemporary Issues module he has developed. Encouraging students to engage with the portrayal and explanation of science through the media provides them with important skills and develops them as critical thinkers, which can only be a good thing in the modern world.

Adam Hart

University of Gloucestershire
ahart@glos.ac.uk

Catherine Sanderson



A Principal Lecturer in Health Sciences (Biochemistry) at Leeds Metropolitan University, Cath is renowned amongst students and colleagues alike for her inexhaustible energy and enthusiasm for her subject and her innovative approaches to teaching.

Her students say that she transforms their learning by empowering them – the heart of her

teaching philosophy. In all Cath's modules students decide content following discussions about what they want and need to learn. They also choose appropriate formative tasks and summative assessments and generate the assessment criteria. Cath also encourages them to be reflective learners, continually self-evaluating their progress.

To inspire and engage first year students she creatively delivered a blended learning Bioethics module assessed by debates to 170 students as an intensive block over the first four weeks of their course. Students commented on how much of a confidence boost it was to have a whole module 'in the bag' so early!

Cath believes difficult subjects like Biochemistry are more easily learnt when applied to everyday life. She teaches the relationship between nutrition, activity and health and as a fully qualified personal trainer often brings that experience into the classroom for memorable learning experiences. A final-year biosciences student said: "You remember muscle action much better when you listen to Cath talking through what's happening inside her own muscles whilst she is slowly but perfectly executing a full press-up!"

She inspires colleagues across the university by being a role model of best practice during her delivery within the institution's PGCHE and as a very active member of Leeds Met's Institutional Teacher Fellow Network, where she helps to influence policy and practice in assessment, learning and teaching. She also delivers workshops within her own institution and at national and international conferences, and institutions such as the University of Addis Ababa in Ethiopia where she is working on a British council funded project to help establish PGCHE courses for African colleagues.

Cath loves her job because she says she is just as inspired by her students as they are by her.

Catherine Sanderson

Leeds Metropolitan University

C.Sanderson@leedsmet.ac.uk

Ten years of the National Teaching Fellowship Scheme

Launched in 2000 the NTFS aims to raise the status of learning and teaching, and recognise and reward teachers and learning support staff for their excellence. The scheme, run by the Higher Education Academy, is open to all those involved in supporting the student learning experience in higher education in England and Northern Ireland (and from Autumn 2010, Wales).

Over the ten years of the NTFS there have been changes to both the structure of the scheme and the number of Fellowships awarded each year. From 2000–2006 awards of £50,000 were made to individuals for projects designed to make a significant contribution to learning and teaching. In 2004 the scheme was expanded and then in 2006, following feedback from the sector and a review by the Academy, the scheme was re-launched with two strands: the individual strand and the projects strand.

For the individual strand, up to 50 awards of £10,000 are made in recognition of individual excellence. The award may be used for professional development in learning and teaching. Nominations must demonstrate evidence of enhancing the student learning experience both within and beyond the nominee's own institution, supporting colleagues and influencing support for student learning. The project strand is an opportunity for institutions to build on the expertise of National Teaching Fellows and since 2006, up to ten projects have been funded each year.

In the ten years of the scheme twenty-three bioscientists have been awarded Fellowships (a full list is available from www.bioscience.heacademy.ac.uk/funding/recognition/ntf.aspx). The recent publication by the Higher Education Academy of "Recognising Success, Celebrating 10 years of the National teaching Fellowship Scheme" (www.heacademy.ac.uk/assets/York/documents/ourwork/ntfs/NTFS10.pdf) gave a number of Fellows the opportunity to reflect on the scheme and the impact it has had on both their individual teaching and learning practice and within their own institution and the wider teaching and learning community. Stephen Gomez, one of the twenty-three bioscientists awarded a Fellowship reflects "The Fellowship was instrumental in my personal and professional development and I am thankful to be part of a community of likeminded colleagues across the nation who have at their heart helping people learn and sharing their passion for knowledge and its application." As a group the Fellows also have the potential to share expertise and practice across disciplines and Lesley-Jane Eales-Reynolds, Chair of the Association of National Teaching Fellows, reflects on this: "Over the past ten years, there have been vast changes in HE... The changes and challenges we face in higher education involve creativity and innovation in curriculum and pedagogy, and the National Teaching Fellows are well placed to meet this challenge."

Do you have what it takes to become a National Teaching Fellow?

More information about the scheme is available from the Academy website at www.heacademy.ac.uk/ourwork/supportingindividuals/ntfs, and nominations for the 2011 Fellowships will open in January.



10 | Interpreting the NSS

The National Student Survey (NSS) has raised awareness of the student experience of learning and teaching in HE. With sections on ‘teaching on my course’ and ‘assessment and feedback’ and a number of other questions bringing in elements of learning and teaching, students’ experiences of learning and teaching are given a high profile. In our impact survey in July 2010 we asked Centre contacts about the influences on their teaching practice. Approximately one fifth of respondents reported the NSS as one of several reasons they had been prompted to modify their teaching practices. Various university websites explicitly report how they are responding to NSS data, for example Loughborough (<http://tiny.cc/lboro>) and Warwick (<http://tiny.cc/wwick>), have implemented changes in their approaches to assessment and feedback. NSS data may also be used to influence policy, for example the NUS Feedback Amnesty campaign (<http://tiny.cc/fdbck>).

But can NSS data alone be used as an effective starting point for changing policy and practice in teaching? The NSS is seen by some as a tool for identifying questions that can then be researched further. Williams and Kane (2008) consider that “Analysis should go beyond the headline scales, ... to explore reasons for the specific items that cause concern ... and to relate those to specific institutional contexts” and that further research should involve student focus groups and involving students in identifying areas where action is needed. Fielding *et al* (2010) caution that “Interpretation [of NSS data] should also include the possibility that perceptions of exactly what the questionnaire items mean may differ between the respondents and those academics interpreting the survey outputs and trying to enhance the learner experience.”

When analysing NSS data it may also be important to consider, for example, the discipline and student demographic. Surridge (2008) found a number of trends in NSS responses relating to student ethnicity and gender. Overall, across all disciplines, females were more positive about teaching and learning than males, so a course with higher numbers of female students could return higher scores than one which was predominantly male. Fielding *et al* (2010) highlight a number of trends in STEM (science, technology, engineering and maths) disciplines, noting that science and engineering students tend to be less satisfied with the usefulness and promptness of feedback than others. They also highlight biology as being one of the poorest performing disciplines with respect to feedback, but achieving high overall satisfaction, suggesting that, for biology students, feedback is not the overriding determinant of overall learner satisfaction.

The Centre and the NSS

With these caveats in mind the Evidence Informed Practice team at the Higher Education Academy has undertaken some analysis of 2009 NSS data on behalf of the Centre. This analysis looked at responses across a number of bioscience disciplines (for a full list please see www.bioscience.heacademy.ac.uk/resources/nss) and compared responses from a) male and female students and b) students domiciled in the UK, EU or Rest of the World. The percentage agree

(the percentage of students responding ‘definitely’ or ‘mostly agree’) was used as a measure of satisfaction.

This analysis has shown some statistically significant differences in responses across the bioscience disciplines. For example, in courses with a higher proportion of non-UK domiciled students, EU students were significantly more satisfied with the overall quality of the course than UK and Rest of World students. In Pharmacology, Toxicology and Pharmacy courses, female students were significantly less positive about the feedback on their course than male students. It must be stressed that these are preliminary results and the Centre will continue to explore and consider the data and analysis conducted on our behalf.

Are you using NSS data?

Are the results of the NSS informing changes in your department? Would you be interested in submitting a case study about it? We can offer a small payment of £100 to the first author of a case study.

Would you be interested in understanding more about your students’ responses to the NSS? The Centre is investigating the possibility of holding small student focus groups within departments, discussing with students how they view and respond to the NSS. Results would be made available confidentially to participating departments and the Centre would then draw together the messages from the focus groups in a report which would be made available across the bioscience community.

Are you interested in undertaking research involving the full NSS data set? The full data set brings together all the data collected by the NSS, such as gender and nationality of respondents, and is not publically available. Do you have a research question you would be interested in exploring with or on behalf of the Centre (and the bioscience community)?

If you are interested in any of the above please contact me on k.a.clark@leeds.ac.uk.

We would also welcome your comments and suggestions for other ways in which NSS data might be used to inform the bioscience learning and teaching community.

Further details about the NSS and our work in this area will be added to our NSS pages, available at www.bioscience.heacademy.ac.uk/resources/nss.aspx

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Katherine Clark
UK Centre for Bioscience
k.a.clark@leeds.ac.uk

Improving Postgraduate Scientific Writing

Part of my role as Postgraduate Tutor in the Department of Biology at the University of Leicester is highly enjoyable, as I interact with some extremely talented, engaged and successful research students. Inevitably, in any population there are highs and lows, and I occasionally have to deal with students who are struggling for a variety of reasons, and also with supervisors' concerns. One of the most frequent supervisor issues is the quality and quantity of student writing. There is a vague feeling of generational decline – students aren't what they used to be. Certainly, the quality of student writing is variable. Leaving aside the issue of whether student writing really is in decline (or if supervisors' memories fade), how to support students and improve the quality of student writing is a major concern for someone in my role.

Like most institutions, my University offers a number of interventions designed to support student writing. These are formatted as discrete events such as workshops with no ongoing support beyond what would be expected from the supervisor. Can you teach a struggling student to write in a three hour workshop? I don't think so. A year ago I set out to investigate an alternative strategy based on the time-honoured idea that authors learn by writing.

Funded by a grant from the UK Centre for Bioscience, I designed a short programme of scientific writing exercises which I undertook with the new postgraduates entering my Department:

1. Correct a short passage (~500 words) extracted from the professional literature containing introduced errors.
2. Write a short (one side of A4) summary of an assigned published research paper relevant to their research topic which describes the background, a summary of how the research was conducted and the main findings.
3. Write a short report on a given set of relevant research papers following an exemplar.
4. Perform a literature search and write a short report on the resulting papers without an exemplar.
5. Write a summary of up to 1000 words describing an area related to their research.

These exercises were based on what supervisors perceived to be the most frequent areas of difficulty for postgraduate students. The key to all the exercises was that they were based on each candidate's own research topic and thus distinct from the general research skills approach. Over a 10 week period, the participants came to regular personal meetings to discuss their writing. Each meeting lasted as long as was necessary for the individual and the topic, which averaged 15-30 minutes. There was no assessment, rather a face to face discussion of the merits and weaknesses of their writing. At the end of the project, students and supervisors completed a questionnaire giving their impressions. Overall, I was pleased at how positive the reception was, but it was clear some changes needed to be made. The students felt the programme was too long (a difficult criticism, considering

the reason for its existence) and too repetitive (possibly a more justified complaint). Exercises 3 and 4 also proved to be problematic for a number of reasons. By straying away from the focus on student writing and introducing other skills such as literature searching, some of the focus on writing was lost. In the case of one student, it proved difficult to find enough highly relevant papers related to their research topic. When the students performed their own literature search, they tended to select review articles to write about, which were far harder to critique than original research articles. A decision was made to reframe the approach for subsequent years by reducing the number of tasks from five to three (exercises 1, 2 and 5 above), exercise 5 was changed slightly – students were required to produce a document of 500-1000 words describing their research topic and planned experiments, and more emphasis was put on diagnosis rather than treatment of writing needs.

A report on the project was tabled at the Research Degrees Committee. After consideration, the Committee decided to record the project as best practice, but not to recommend formal adoption in other departments. Teaching students to write well is hard work, resource-intensive and largely unrewarded, apart from the potential of a warm glow. And what of the students who are identified as needing support with writing – what do we do with them? In an ideal world, they might be supported and encouraged to become dedicated bloggers, honing their craft by writing about their research on a regular basis. In reality, writers write, and non-writers don't, unless they are forced to, and all the pressure on postgraduates is against writing merely to improve their craft. An alternative solution might be writing groups, as described in <http://chronicle.com/blogPost/Starting-a-Dissertation/25794>, but the comments on this article point to the fatal weakness of this approach – time and timing. Another possibility might be peer-assessment. This however moves away from the original concept of students benefitting from intensive face-to-face meetings with experienced academic writing tutors.

So where do we go from here? A one size fits all solution doesn't seem to fit anyone else. Ideally, this is a role for the research supervisor, but some don't see it that way and a few are hardly qualified to help. In the meantime, students struggle on with the three hour workshop sticking plaster. Further reading: www.citeulike.org/user/AJCann/tag/writing

Alan J. Cann
University of Leicester
alan.cann@le.ac.uk

Have you undertaken anything similar with postgraduate students in your department or school? Do you have any comments about Alan's article?

Get in touch with Alan through his blog at <http://scienceoftheinvisible.blogspot.com> or via Twitter at <http://twitter.com/AJCann>



12 | Centre News

Ed Wood Teaching Award 2010 – Winner Announced

Congratulations to Graham Scott, University of Hull, winner of the Ed Wood Teaching Award 2010 and also to our Award finalists Stephen McClean (University of Ulster) and Anne Tierney (University of Glasgow).



Reflections from all the finalists on taking part in the Award can be found on pages 6 and 7 of this Bulletin and further details about the Award are available from the Centre website at www.bioscience.heacademy.ac.uk/funding/recognition/finalists.aspx

Effective Learning in the Biosciences 2011: Equipping Students for the 21st Century

Our inaugural Effective Learning in the Biosciences conference on the 30th June and 1st July 2011 in Edinburgh will provide a platform to consider how we nurture and inspire all bioscience students to realise their full potential, and will:

- showcase and disseminate evidence informed practice in the biosciences from the UK and overseas;
- explore how we can most effectively engage bioscience students to maximise their learning and achievement; and
- provide networking and professional development opportunities for participants.

The themes of the Conference are:

- Inspiring (1st year) learning;
- Active learning and learning by doing (to include laboratory and field work and student research);
- Biologists working with others - interdisciplinary and multidisciplinary learning; and
- Students as partners and co-creators of learning.

The Conference programme will bring together practitioners to discuss and share experiences and practice, through parallel sessions, workshops and poster sessions alongside more informal discussion time during breaks and the conference dinner. The smaller nature of the Conference (around 120 delegates) will facilitate informal discussion and networking amongst all participants.

The call for contributions is now open, information on submitting a contribution, alongside further information about the conference is available from www.bioscience.heacademy.ac.uk/bioconf

Registration will open in December 2010. We look forward to seeing you in Edinburgh!

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To request copies of the Bulletin in an alternative format please contact the Centre. The Bulletin is printed on recycled paper.

Centre Resources

Sharing Learning Resources - OeRBITAL

The Centre has gained further funding to investigate and support the sharing of Open Educational Resources (OERs) in the biosciences. The OeRBITAL project will see us working with members of the bioscience learning and teaching community to identify, sign-post, and add educational content to openly available resources in a variety of bioscience disciplines. We are currently seeking to commission a number of 'Discipline Consultants' to work with us on this. For further details please see www.bioscience.heacademy.ac.uk/resources/oe/

New Student Short Guides

We have produced two new Short Guides for students: Assessment; and Feedback – Make it work for you! Based on leaflets produced by the ASKe CETL the new guides are intended to encourage students to think about how best to use the feedback they receive, the different ways in which they could receive feedback, how their work might be assessed and using assessment criteria.

Both guides are available to download from www.bioscience.heacademy.ac.uk/resources/studentguides.aspx



New Lecturers Folder Updated

Our popular New Lecturers folder has been updated for 2010 and we have a limited number of copies to distribute free of charge on a first come, first served basis. The folder brings together information and resources aimed at new teaching staff and is intended to complement the largely-generic information delivered in staff development courses. Find out more at www.bioscience.heacademy.ac.uk/resources/resourcepack.aspx



Comments Box

The Centre would love to hear your opinions and views on issues in the Bulletin

- How do you support the development of undergraduate and postgraduate writing skills in your department or faculty? See pages 5 and 11.
- Have you implemented a change in teaching practice as a result of attending a Centre event? See page 3.
- What are your experiences of e-learning in the biosciences? See page 2.

If you have any comments on any of the articles in this edition of the Bulletin please visit www.bioscience.heacademy.ac.uk/resources/bulletin.aspx to share your views.