LTSN BIOSCIENCE
BULLETIN
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The Learning and Teaching Support Network (LTSN) Centre for Bioscience is one of 24 Subject Centres, funded by the four UK higher education funding bodies, to promote and support high quality learning, teaching and assessment in UK higher education

WILL WE ALL BE ACADEMICIANS?

The Teaching Quality Enhancement Committee (TQEC) has proposed that an Academy for the Advancement of Learning and Teaching be formed from the LTSN, ILTHE (the Institute for Learning and Teaching in Higher Education) and HESDA (the Higher Education Staff Development Agency). The role of the Academy would include support to enhance learning and teaching at the tertiary level. At present this support is perceived to be to some extent fragmented, and one notion is that busy academics would like to have a one-stop-shop. However, there is a danger that an over-arching body might become monolithic and standardised, and may not feel the need to develop the same productive working relationships with other bodies. A one-size-fits-all approach might not be the most appropriate if it entailed loss of ability to tailor provision to discipline and to individual and institutional needs. It might also be more susceptible to political influences. If all teaching staff in universities would eventually become members of the Academy, this might give a higher value to teaching activities and also 'professionalise' teaching: everyone would be accredited in respect of their teaching activities.

This poses a dilemma. At present academic staff can join ILTHE after being assessed (and paying their subscription). Membership of the Academy would eventually be for all: in fact, it would not be a membership organisation in the same sense. How this would work remains to be settled.

From the point of view of the LTSN Subject Centres, there are different problems. These are mostly connected with the fact that their services are free to all, that the LTSN 'brand' is now well established, and that, perhaps most importantly of all, the subject focus is very strong. Bioscientists can talk to each other easily through the Network, sharing ideas and innovations partly because the subject disciplines that make up 'bioscience' are so similar in subject matter and in the ways in which the disciplines are taught. Bioscientist talks to bioscientist and has credibility. The fact that any one can join the LTSN network and participate and share the facilities really needs to be taken forward to how the Academy would work. Most importantly of all, the LTSN is a helping, not a judgmental organization, in the sense that joining the Network is open. The aim is solely to improve student learning by helping people to improve their teaching, mostly by sharing with each other. The spirit of this is that we (present) academics have the responsibility to train the next generation of bioscientists. No one else can do it, and we should do it as effectively as we can.

We may also ask: in what ways will the Academy look after the staff development of the next generation of bioscientist educators and researchers in higher education? What qualities, skills and attributes will they need in order to survive and prosper in a different world?

The idea of an Academy is out for consultation at the moment, and the likely time-scale for start-up will be the beginning of 2004. No doubt there will be changes and modifications on the way, but we wish the Academy well. However, there is concern to maintain the 'flavour' of the LTSN Subject Centres which we have developed over the last three years, mostly by consultation with our subject constituency about their teaching needs.

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Bioscience

THE SCHOLARSHIP OF TEACHING

The professional life of academics is often made unnecessarily complicated by educational terminology, jargon and acronyms. One such apparently new term or concept is the 'scholarship of teaching'. This is a phrase which seems quite suddenly to have leapt from obscurity to prominence and which is now being liberally sprinkled across the educational literature both in bioscience and more widely.

THE CONCEPT'S ORIGINS

The concept of the scholarship of teaching was first developed by Ernest Boyer in 1990 and was subsequently taken forward by his colleagues at the USA Carnegie Foundation for the Advancement of Science (Glassick *et. al.* 1997, Hutchings 2000). Boyer and his colleagues were concerned about higher education becoming excessively focussed on discipline-based research, which is often seen as the only form of properly valued and recognised scholarship. They argued that the honourable term 'scholarship' should instead be given a broader interpretation which would bestow legitimacy on the full range of academic work. Boyer, therefore, identified four separate, though related, areas of scholarship, namely: the scholarship of discovery research, the scholarship of integration and synthesis (e.g. writing textbooks), the scholarship of service (including the application of research knowledge) and, of course, the scholarship of teaching.

Interestingly, Boyer himself did not attempt to define the scholarship of teaching or to describe in detail its essential or principal characteristics. However, since the publication of his seminal text many others have stepped into the breach (e.g. Hutchings & Shulman, 1999; Huber & Morreale, 2002). The result, for the enthusiast, is an increasingly rich, pluralistic and subtle seam of literature. Given, however, that few busy academics are likely to find time to dig into this rich seam of work, the purpose of this article is simply to lay bare some of the main features of the scholarship of teaching concept.

THE KEY ELEMENTS

And, lest there be any doubt, we must begin by underlining that the term means much more than simply striving to be a good teacher and keeping up-to-date with one's subject. The key additional ingredients are as follows:

- keeping abreast of developments in the theory, and practice of teaching, particularly in ones own discipline or specialist field;
- reflecting carefully and critically on one's own teaching and on its successes and failures in promoting high quality learning;
- engaging in pedagogic research so as to help provide a firm basis of evidence for the adoption or rejection of particular learning and teaching methods;
- contributing to the communication and dissemination of good practice in the learning and teaching of one's discipline or specialist field;
- bringing to one's work in teaching and curriculum development the same high standards of intellectual rigour and peer review which are commonplace in research.

ATTITUDES TO SCHOLARSHIP

In the United States the agenda outlined above has been given particular prominence through the work of the Carnegie Academy for the Scholarship of Teaching and Learning (CASTL) which funds a variety of schemes designed to disseminate examples of good educational practice at individual departmental and institutional level. A key goal for the Carnegie Academy is to raise the status of higher education teaching and to promote the idea that staff reward systems need to value teaching as well as research.

Here in the UK the scholarship of teaching concept is increasingly prominent in the work of agencies such as the Learning and Teaching Support Network (LTSN), the Institute for Learning and Teaching in Higher Education (ILTHE) and the Staff and Educational Development Association (SEDA).

For many academics who see themselves first and foremost as educators, the scholarship of teaching concept may seem self-evidently to be a good idea and one whose time has come (or is indeed long overdue!) Few, for example, would argue with the need to raise the status of teaching or to treat it as a serious intellectual activity. However, the concept does need to be examined critically. Among the questions which might be asked are the following:

- is this a utopian model with little relevance to busy academics facing high student - staff ratios and low levels of resourcing? Is there time for pedagogic research? Is the scholarship model only for an elite minority or more positively, is it essentially a statement of what most good teachers already do?
- how far is it appropriate to impose a partly research-based model and culture on teaching and learning?
- should not staff rewards go to excellent practising teachers rather than those who merely write about education or produce 'flashy' portfolios?
- might the scholarship of teaching provide the conceptual basis and the political banner under which to unite those in HE keen to advance the cause of teaching?

Before coming to a judgement on the merits or otherwise of the scholarship of teaching concept or on the kinds of questions raised above, do bear in mind that this article provides only the quickest glimpse of the emergent scholarship of teaching arena.

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INFORMATION RETENTION – PRACTISE (AND REVISION) MAKES PERFECT

Every teacher has probably been in a situation where they think that students' brains are like sieves – they simply cannot retain any information from one day to the next. It is clear that information retention, i.e. what students can remember from previously taught subjects, is a very important issue in HE. To investigate how well students retain information, we compared a cohort of first-year Bioscience students (n=57) with final-year students (n=43). Both groups were asked to perform some basic data analysis as part of their continuous assessment. Students had to use a graph to determine K_m and V_{max} of an enzyme reaction and also to calculate molarities in a buffer solution using the Henderson-Hasselbalch equation. These subjects were taught extensively during the first year of undergraduate studies and the learning outcomes were assessed immediately after the course has finished. A similar problem was then given to final-year undergraduate students. The students, although informed about the nature of the test, did not receive any particular teaching in that area before the assessment and therefore had to rely on their knowledge of the subject gained during their previous years. Figure 1 shows the results of the investigation. While final-year students and first-year students were similarly competent in drawing appropriate graphs, the recently taught first-year students were better in analysing the data from the graphs (e.g. obtaining K_m and V_{max} values) and also in calculating the molarities of a buffer solution.

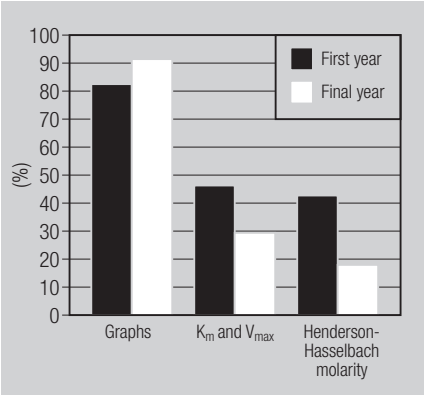

Figure 1. Comparison of first and final year students in their retention of biochemical knowledge.

Final-year students had been more or less constantly exposed to drawing graphs and therefore appeared to be well adapted to this task. However, the analysis of kinetic parameters of enzymes was done only during their first year and, depending on the degree strand, to some extent during the second year. A similar observation was made for the application of the Henderson-Hasselbalch equation and calculation of molarities. Although these aspects seem to be fundamental for Bioscience students, students are only required to perform these calculations in their first year. From this test we conclude that a sufficient retention of information can only be achieved, if students are continuously exposed to certain problems and tasks. Once this exposure is relaxed, a decline in information retention is observed. Very clearly, this result emphasises the need for continuing revision and practice of subject specific skills during the entire length of the study programme.

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feature

DEVELOPING PROBLEM SOLVING SKILLS THROUGH PRACTICAL WORK

In the shifting context of mass higher education, there are pressures to ensure that the curriculum is as accessible and as inclusive as possible. There is an onus on staff involved in supporting and facilitating learning to provide explicit opportunities for students to develop a raft of key skills, amongst them the ability to display initiative and to solve increasingly complex problems.

One means of providing such explicit opportunities is that of well organised practical classes, where students, instead of being led by the hand through 'predictable outcome scientific experiments' are presented with more open-ended problems, to promote a spirit of inquiry. If the outcome of an 'experiment' is entirely predictable, it poses little opportunity for students to be creative, to search for information, to apply and develop their own skills of observation, analysis and critical thinking.

'True learning is based on discovery guided by mentoring rather than on the transmission of knowledge' (Boyer, 1990). It should therefore be our goal to enable students to embark on a voyage of discovery in the course of practical work and other aspects of their overall learning experience. But how can we achieve this scenario, given the pressures staff are under?

For some time now there has been an increasing level of interest in the concept of problem-based learning (PBL). The basic principle supporting PBL is that learning is initiated by a posed problem, query or puzzle that the learner wants to solve (Boud & Feletti 1997). In a problem-based approach, complex real world problems are used to motivate students to identify or research the concepts and principles they need to know to work through those problems. Students can be encouraged to work in small learning teams to bring together their collective skills in acquiring, communicating and integrating information.

Can we easily bring PBL into practical work in large classes with low levels of resources?

The answer is yes we can – but to do so requires a commitment to reviewing course and curriculum design. It is important to set out the learning outcomes of any programme or course of study very clearly and then follow through with a review of assessment procedures ensuring that the assessment matches the learning outcomes. It is not too unusual to find staff being innovative in teaching and learning strategies but falling back on traditional assessment protocols (Stefani, 1998). There are many examples of the use of PBL in practical classes which can be followed and enhanced.

For illustrative purposes a summary of useful steps in a successful 'PBL in practical classes' strategy is presented.

1. Use Case Studies or pose a new problem for the students e.g. In the event of a blight on citrus crops, how might we maintain production levels of citric acid? (see Tariq *et al.,* 1995).

2. Prepare your class for working in groups of 4 or 5. It is unwise to assume your students have the ability to work in groups. Provide an introductory induction session.

3. Assign laboratory demonstrators as group 'consultants'. The 'consultants' need to have considered the problem or scenario themselves so that they can advise and support students.

4. Consider the assessment strategy carefully. If students are working in small groups, it is essential to consider the group process as an essential component of assessment. Consider the importance of peer- and self-assessment to enable further skills development. Proper induction into the processes is essential, both for staff and for students.

5. Consider the major input of tutors to assessment being that of the 'group product' i.e. a project report, a poster presentation etc.

6. Consider the assessment weightings of the group process and the group project. Trust your students (but only if you have carefully introduced them to the key process of peer assessment).

7. If you need an individual component to the assessment, consider asking students as individuals to complete a reflective report on their learning experience.

If we allow students a level of autonomy and creativity in practical classes we can enable the development of a range of skills, for example:

- critical thinking and the ability to analyse complex 'real' problems;
- finding, evaluating and analysing appropriate learning resources;
- co-operating in small teams;
- demonstrating a range of communication skills; and
- making objective judgements about the value of their own and others work.

All of these skills are valued by employers and fit well with the concepts of mass higher education and life-long learning.

Less 'individual, recipe type practical classes' and more longer term PBL practicals engage students, enable skills development and reduces the overall assessment load (Stefani, 1999).

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THE GENOME ANALYSIS TRAINING CENTRE

An on-line learning experience in Computational Genomics

In October 2002, a new website called the Genome Analysis Training Centre (GATC for short) and hosted by the Department of Biological Sciences, Brunel University, was launched *(http://www.brunel.ac.uk/depts/bio/GATC).* The site was funded by a grant from LTSN Bioscience's Teaching Development Fund.

GATC's main objective is to provide a platform which allows relative newcomers into the field of Computational Genomics to make themselves familiar with the content of some of the most pertinent databases used for storing and displaying genomic, and increasingly transcriptomic and proteomic data.

No prior knowledge of computing is required for studies within GATC as this is not a Bioinformatics site. Its emphasis lies instead in the analysis and interpretation of existing molecular data, in the context of well defined, but hypothetical test cases. However a sound understanding of Molecular Biology and Genetics is required to fully benefit from the activities offered within GATC.

The Web-site is built around an assisted '*problem-based learning'* (PBL) approach throughout. All the PBL-exercises aim to enable the learner, through hypothetical scenarios and case studies, to undertake a number of interactive tasks which, at increasing depth and complexity, aim to reveal the intricate connections between molecular biology and the observed disease pathology.

Within the site there are at present five main '*Topics*' (at the time of writing four are more or less complete with the final one under development). These topics include '*Inherited Diseases / Virtual positional cloning / Disease, mutations and pathologies / Bacterial genomics*. All the main topics contain subtopics in the form of defined medical or scientific problems; we aim to expand the range of topics covered over the next year or so.

It was decided to keep the webpage layout simple and intuitive. Clear aims and objectives are given for each activity and some instruction is provided to assist the novice user to configure the relevant software (browser, plug-ins, Java capabilities etc.). A conclusion is provided for each (sub)topic to set the scene for possible further investigations.

It is hoped that GATC will serve as a major 'stop-over' or 'drop-in' site for any learner who wishes to explore the fascinating area of Molecular and Computational Genomics, applied within a medical context. We shall aim to develop and improve the site within the next 6 months and would welcome any suggestions and feedback on further refinements and additional content.

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SPECIAL INTEREST GROUP: IMPROVING FORMATIVE ASSESSMENT IN SCIENCE

The Special Interest Group (SIG) will be convened by Professor Graham Gibbs of the Open University. The first formal meeting will be on 18 September 2003 at an event in Leeds. The SIG will be concerned with all aspects of assessment that support learning, especially:

>> the design of assignments and assessment processes that capture students' time and energy and engage them in high quality learning

>> the provision of feedback on learning that students learn from and use to direct further learning.

Membership of the SIG is open to anyone interested in formative assessment in science, regardless of discipline. To join, simply send an email to Nicky Brown *(n.brown@open.ac.uk).*

C&IT COURSES

LTSN Bioscience now offers short C&IT courses integrating various communications and information technology tools into teaching. This programme is open to all staff involved in learning and teaching and are designed for those who are interested in discovering what benefits new technologies can bring to their practice or their students' experience. Workshops will include practical tips for ensuring quality and encouraging good practice. See: *http://bio.ltsn.ac.uk/events/courses/*

NO PLACE TO LEARN?

John Hoddinott contributes to the learning and teaching debate by commenting on a recent book by Pocklington and Tupper (2002) 'No Place to Learn: Why Universities Aren't Working'.

Actually, Pocklington and Tupper's book title does not have the question mark. They are even more declarative in their subtitle: 'Why Universities Aren't Working.' While their thesis is based on an analysis of Canadian institutions, it does not differ in substance from those driving similar discussions globally.

Much of their critique is based on the accusation that universities place too much emphasis on research at the expense of teaching and at the expense of 'reflective enquiry'. Are they adding anything new to the perennial debate?

Most universities in Canada are wholly under provincial jurisdiction. Federal money flows through transfer payments to the Provinces, via grants from the Tri-Council research agencies and as indirect cost payments for research overheads. There is no formal Federal role for deciding on or evaluating curricula and instruction.

Whatever political coordination exists in the post-secondary sector comes through the Council of Ministers of Education, Canada (CMEC). They have set broad learner-outcome goals highlighting lifelong learning ability, field-specific learning, generic and employability skills, IT skills and individual development. However, achieving them is the responsibility of the autonomous institutions. It is hard to judge how well such goals are achieved. In Alberta, the government occasionally surveys graduates from the Province's four universities. The last one, conducted in 2002, was of the 1998 graduating class. It revealed that 78 per cent of graduates thought that: *"the generic skills and abilities they had acquired in their programme were 'somewhat' or 'very related' to their job."*

This statistic is greatly at odds with the sub-title of Pocklington and Tupper's book. Don't the students know they are being short-changed in their undergraduate experience? The authors concede their conclusion could be wrong but dismiss that possibility based on their own experience. It could be that students know of the problem but are silent about it because they are deeply conservative. They just want to get along and do not think they could change the situation anyway. The authors reject that conclusion, as there is no evidence for it in anonymous end-of-term student satisfaction surveys.

Where then is the explanation? Is indifferent teaching not noticed by undergraduate students? Pocklington and Tupper think that is the case. The institutions tell students they are getting good teaching, that good teaching is valued and that many teachers are award winners, and the students accept it. Further they argue that, unless the teaching is really bad, students will tolerate mediocre teaching because their focus is on a credential and employment not intellectual challenge and distinction. Finally they say that students have no real ability to evaluate teaching and assume that what they receive is the norm.

Why would faculty be content to provide mediocre teaching? Because they are more interested in their research than in enhancing their teaching. If a student is putting in a modicum of effort they will pass the course anyway so why would professors bother with professional development for teaching excellence? In other words, teachers and students conspire to keep teaching mediocre because it is less effort for everyone. This is the most depressing conclusion in the book.

How to improve this perceived situation? Many jurisdictions are currently linking teaching and research in specific disciplines and even in interdisciplinary areas (e.g. the LTSN is funding a project Linking Teaching and Research in the disciplines, *http://bio.ltsn.ac.uk/projects/ltr/*). This represents an interesting historical develop-ment and a novel reframing of the old teaching versus research debate.

There now seems to be, an often grudging, consensus that the old fiction about teaching and research abilities being inextricably linked is not supported by research evidence. The idea was never applied symmetrically anyway so it was always a dubious proposition. The past decade has also seen an increased emphasis on generic skill development in curricula. While this was often dismissed as being vocational, reframing that debate in terms of developing, amongst other things, communication skills, critical thinking, IT and library skills was more successful in influencing course and programme design.

Is the rediscovery of the nexus between teaching and research really new? As Ed Wood pointed out in the last issue of this Bulletin, effective instruction always involved working through the Meselson-Stahl experiment rather than telling the class that DNA replication is semi-conservative. You can even keep the discussion topical by reminding learners about Matthew Meselson's work against weapons of mass-destruction. Time spent reviewing the experi-mental basis for major discoveries enriches the learner's understanding of the nature of science but also, as the BIO 2010 report (National Research Council, 2002) indicated, helps them learn about science as a human endeavour.

One problem with this approach is that many biologists worry about their ability to "cover the content" if students are delving deeply into the experimental basis of science. The tyranny of coverage is particularly acute in biology but not fatal. When Marshall Sundberg compared the understanding of biological concepts by students in classes delivered separately to non-majors and majors, he found that the non-majors, while having been exposed to less content, ended up with a better understanding of the concepts than the information overloaded majors (Sundberg *et al.*, 1994). A remarkable example of "less is more" that is a salutary caution to curriculum designers.

However, talking about research can only take students so far. It is common for undergraduates in Canadian universities to complete

a research project within a first degree. That usually involves designing, performing and analysing experimental work and even presenting it during an end-of-year mini-symposium for a whole department. Such work is frequently published in peer-reviewed journals and the students become well prepared for post-graduate study or any other career. When faculty mentor students in this way the linkage between teaching and research is self-evident.

When undergraduate education is conceptualised in this way, attempts to create a divide between teaching and research universities seem futile. However, it still leaves open the development of research-intensive universities that would give greater emphasis to the mentoring of post-graduates into a research career. There is a place for universities concentrating on undergraduate liberal arts and science programs but research is still embedded in them.

How then would Pocklington and Tupper react to these trends? Surely giving a prominent place to research in undergraduate education would compound their perceived problem. However, their principle concern is that students and faculty have too little time for 'reflective enquiry' which they characterise as involving careful thought about the human condition, disciplined thinking about scholarship beyond ones own specialisation, assessment of underlying principles, putting present understanding in context with past ones and, finally, constantly assessing one's own strengths and weaknesses as a scholar. It seems to me that the proper contextualising of research within teaching will achieve those outcomes.

At least one Canadian university is moving systematically in this direction. McMaster University in Ontario offers 'Inquiry' courses to all first-year students. They are partly designed to build student research skills and help them assess their progress in learning.

It just goes to show we can provide a "place to learn."

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STAR QUESTIONNAIRE

The STAR project (Student Transition and Retention) is developing good practice in dealing with students as they move into and through higher education. Developments depend on gathering information on current practices. If your institutional role includes organising a programme or responsibility for a student group in Bioscience we would like you to complete the questionnaire, available at *http://bio.ltsn.ac.uk/projects/fdtl/starq.htm*

Thank you for your help.

HAVE YOU RECEIVED FUNDING TO DEVELOP YOUR TEACHING?

A common complaint among academics is that teaching activities and commitments are undervalued and often unrecognised. In some institutions this may be changing with more formal acknowledgement of teaching duties and funding opportunities to develop teaching practice. You will be aware that LTSN Bioscience funds a number of small teaching development projects through its Teaching Development Fund. We would like to find out about other teaching developments taking place in Bioscience higher education. If you would like publicity for any other funding you have received to develop your teaching, then please get in touch at *ltsnbioscience@leeds.ac.uk.* Suitable projects will be highlighted in the new 'Current Projects' section of the LTSN Bioscience website and the Knowledgebase.

BIOSCIENCES FEDERATION EDUCATION COLLOQUIUM 2003

Changes and Challenges – The Changing Face of Bioscience Undergraduates

Monday 6 October 2003, Hamilton House, London

LTSN Bioscience and member societies of the new Biosciences Federation are collaborating in a one-day event for universities and schools: 'Changes and Challenges: the Changing Face of Bioscience Undergraduates.

The aim of the event is to:

>> update Bioscience departments on proposed changes to the school science curriculum and the government perspective on progression of science students;

>> exchange views on how the lack of fundamental skills (particularly chemistry and mathematics) is affecting undergraduate performance;

>> discuss student perception of university science courses and widening participation through links between universities and schools.

For more information and a booking form visit: *http://bio.ltsn.ac.uk/events/*

SPECIAL INTEREST GROUP – FINAL YEAR PROJECT WORK IN THE BIOSCIENCES

The LTSN Centre for Biosciences has set up a new Special Interest Group (SIG) looking at Final Year Project Work in the Biosciences. The Co-ordinator is Richard Cowie from Cardiff University.

There are currently many issues surrounding final year projects that seem to preoccupy academic staff involved with learning and teaching in HE Bioscience departments. For example, one of our external examiners at Cardiff insists that practical projects, which involve some element of independent research in the laboratory or field, should be given a greater weighting than literature projects when it comes to calculating final degree results. I have other colleagues who are absolutely opposed to this and think that good literature projects are just as demanding and should be weighted equally. From talking to colleagues in other universities, there seems to be a wide variety of practices when it comes to final year project work and some of the other contentious issues often raised include:

- should all Bioscience students be required to undertake some form of practical, experimental project work in the final year of an honours degree course? If not, what alternatives are acceptable?
- how best should we cater for students who do not intend to follow a research career as biologists?
- is it acceptable for students to work in small groups when undertaking final year project work, or should each work independently?
- what is the best way of allocating students to final year projects?
- how can we cope with project work given increasing student numbers and increasing resourcing issues? These include: space for project work, funding of project work, and the provision of staff resources in supervising projects.
- should students be permitted to undertake the practical research element of their final year project in the summer vacation prior to their final year?
- what are the best ways of assessing final year projects? How can we be confident that the learning outcomes have been met?

I am sure most people can add questions of their own to this list: it is not meant to be comprehensive. However, they provide an example of the sort of questions that I hope the Final Year Project Special Interest Group will address over the forthcoming year. The aims of the SIG are:

- Firstly, to establish a network of academics who are interested in discussing issues relating to project work via email and at LTSN meetings. To enable this a jisc mail list has been set up at *project-ed@jiscmail.ac.uk.* This email discussion group is open to anyone who is interested. We also hope to circulate details of LTSN meetings involving the Project Work SIG in due course.
- The second aim is to conduct a survey of current practice regarding final year projects, over a wide a range of institutions. This will be achieved by sending out a questionnaire on final year project work to all Bioscience Departments, collating the replies and making the summary information available to the whole Bioscience community.
- Eventually, we hope to be in a position where we can identify examples of good, and particularly innovative, practice in final year projects and plan to disseminate these via the web and the LTSN Bulletin. Ultimately, the SIG will aim to identify generally agreed 'good practice' with respect to final year project work and to publish this along with the results of the survey.

If you have strong views on any of the above questions, or are wrestling with similar issues in your own department, please join the Special Interest Group. Apart from having been involved in supervising final year projects for over 20 years, I cannot claim to be 'an expert' and have no definitive answers to the questions I posed at the start. However, I am interested in discussing these issues with colleagues and am particularly keen to hear about any innovative approaches to project work that are being used in the Bioscience Higher Education sector. Hopefully, discussion of these issues will enable us to share good practice and learn from one another's experience.

If you are interested in the Project Work SIG, or just want to express your views about any aspects of this article, please contact me via email at (Cowie@cf.ac.uk) or via the LTSN Bioscience team.

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RESOURCE GUIDE

Ever feel like you are drowning in information? The Resource Guide for Health and Life Sciences can help you keep afloat! A concise guide to the essential resources for learning and teaching in your subject area. See the flier included with this edition of the newsletter or visit *http://www.jisc.ac.uk/resourceguides/hls*

DEVELOPING SELF-STUDY MATERIALS WITH POWERPOINT®

Following on from Ross Mill's article,[1] I have devised additional ways in which the in-built features of PowerPoint XP can be adapted for delivering self-study materials on the web or CD-ROM.

NAVIGATION BARS

Good navigation is necessary for self-study materials. I find it best to number each slide and have a navigation bar made up of a list of links to all other slides at the same place on each slide (see figure).

EXTRA NOTES

Text can be minimised on each slide by providing extra chunks of detailed information or smaller points of clarification as 'Speaker's notes' or 'ScreenTips'.

'Speaker's notes' can only be seen when a show is in progress and allow for quite large chunks of extra text to be accessed on each slide. They are written to and read by right clicking on a slide and selecting 'Speaker's Notes'. Their presence can be indicated with an animated icon to attract the attention of learners when they open a slide.

'Tips' have limited amounts of text and are set up as part of hyperlinks to the same slide. Any number of tips can be set up for each slide. I place tips in superscript next to the text or object I want to explain. When the cursor is placed over the link, a window containing the text appears (see figure). Instructions should be provided for this but, if the link is clicked, it goes nowhere as it is linked to the current slide.

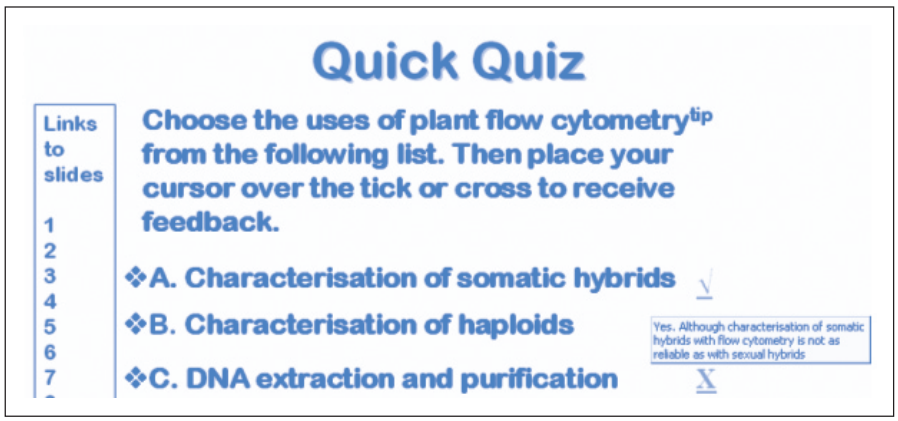
QUIZZES

Multiple choice quizzes with associated sounds and written or spoken feedback can be easily created in PowerPoint using appropriate links and animations, as follows:

1. Set up each question, each answer and each tick and cross in separate text boxes on the same slide.

2. Each of the ticks or crosses is animated to 'Appear' and the 'Timing' of this animation should be changed so that it is triggered to 'Start on click of…' the related answer. This means that when an answer is clicked, a tick or cross appears at its side. It is also easy to add built-in sound to the animation scheme so that a correct answer earns applause, whilst a wrong answer gets an explosion!

3. Feedback to each answer can be easily provided by setting each cross or tick as a hyperlink to the current slide with a ScreenTip attached. Spoken feedback can be used instead of, or in addition, to the text. This is achieved by adding separate narrations (see below) to the slide for each answer. The relevant speaker icons that appear can be moved out of site off the slide and animated so that they begin to play ('Start with previous') when the relevant tick or cross appears.



ACCESSIBILITY

Accessibility can be improved in PowerPoint using alternative text and narration. Alternative text can be added to an image by using the ScreenTip facility. Here the whole image is used for the hyperlink and its ScreenTip text becomes the alternative text. I make narration on a slide a clickable feature. Only a simple microphone is necessary and I use the feature 'Insert' – 'Movies and Sounds' – 'Record Sound'.

Features such as these are being used by myself and colleagues to develop CD and Web based tutorials in Biosciences using only PowerPoint XP. It can also be used where a learning resource is researched, created and evaluated as a final year research project by those students who intend to combine multimedia production with their main bioscience area.

Footnote

[1] Ross Mills (2003) Using PowerPoint for Learning and Teaching, LTSN Bioscience Bulletin Spring 2003, No. 8, p.7.

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AT21C OR NOT!

UK universities use various different approaches to teaching human anatomy to undergraduate and postgraduate students. Anatomy is a basic science naturally founded on the study of dissected cadavers and the aim of any course is to provide students with a solid platform on which to base their continuing professional development. As the anatomy consultant for the Learning and Teaching Support Network Centre for Bioscience, I felt it would be useful to organise a one-day symposium on the different approaches to teaching anatomy in the UK. I called this symposium *Anatomy Teaching in the 21st Century"* or AT21C for short.

As any organiser will tell you, with enough time and knowledge you can easily get speakers and subject matter for any worthwhile symposium. However, my problem was that juggling commitments to arrange a suitable symposium date when everyone was available was impossible. Nevertheless I had the speakers I wanted (from Leeds, Manchester, Keele, Newcastle and Teesside) and an outline of each presentation so I started to look at alternative ways of *hosting* AT21C.

My interest is in using web-based tutorials to enhance my gross anatomy teaching so in essence I teach anatomy on the cadaver and on the computer. For me the benefit of the internet is that it is an information pool that is available 24/7 to anyone that has a link to the network. The aim of any web-based tutorial should be to add to this information pool.

Using the web to host a symposium initially seemed like a daunting task. However, the advantages of this option are clear:

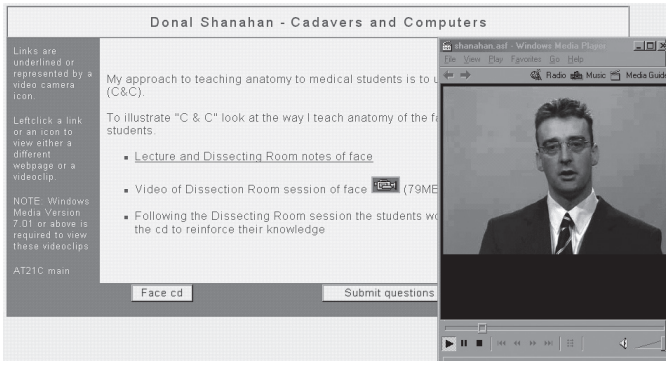
- presentations can be prepared and reviewed in advance;
- presentations can be viewed by anyone linked to the internet not just the 100 or so delegates that could make it to Newcastle- upon-Tyne;
- people can view each presentation at their convenience; and
- people can view the presentations that actually interest them.

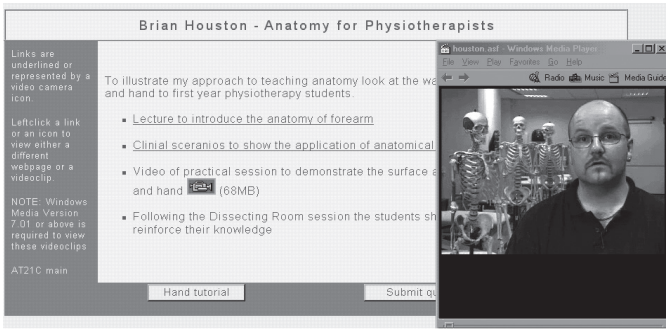
Once I decided on an on-line format it seemed logical that each talk should consist of videoclips supported by web-based tutorials. Following the presentation visitors can pose questions to the speaker by email.

I am lucky in that I am the administrator of a server so:

1. I knew that I could determine where the symposium was going to be housed and as such the web address that users would need to access the site – this is important in the promotion of the symposium.
2. I did not have a quota on the size of the symposium I could organise so there was flexibility in the size of videoclips, i.e. we were not limited to just fifteen-minute presentations.

Planning is very important, ensuring that all presenters know exactly what is expected of them. A test website should be online some months before the actual symposium date, this site consisted of basic information on speakers and topics covered plus a ten-second videoclip so that users can check that they have a compatible video player. To host an online symposium like AT21C you also need to design the symposium website so that visitors will actually like the look of the site and find it easy to use. I went for a clean look with simple navigation (see above).





I think that this online symposium has added to the information pool and has been a success in that we enjoyed creating this work and that even though the symposium went live at 9.00 am on 6 December 2002 we still get visitors to the site from countries as far apart as India and America. In addition, this symposium is listed as an educational resource on the American Association of Anatomists web links page.

URLs

AT21C main page
http://anatome.ncl.ac.uk/tutorials/at21c.html

Web Server Statistics for the CyberAnatomy Tutorials
http://anatome.ncl.ac.uk/tutorials/stats/statsat.html

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YOUR CAREERS SERVICE – HOW CAN IT HELP?

No doubt you have heard of your institution's careers service. Maybe you have sent students there, possibly in a touch of desperation, but how much do you know about it, and how it can help your students? Do you know where it is?

Careers services vary widely but all of them will be able to offer the following:

INDIVIDUAL HELP

This is often the most valued feature of a Service. Students arrive, at all stages of their course, with anything, ranging from total confusion to very specific queries such as *How can I find work experience?* or *Should I do a PhD?* Many have some general ideas, and one of the most common is *How can I use my subject without having to work in a lab?*, while others come for help in entering particular areas such as medicine or the environment.

INFORMATION

Clearly students cannot make decisions without information, and all Services have a library containing information on occupations, employers, postgraduate study, etc. There are also staff who can help students to find what they want, and answer a whole range of other queries. Of course there is now a vast amount of information on the web (try entering *Career* into your favourite search engine), and one of our activities is to help students find the most relevant sites.

EMPLOYERS

There are various ways in which we put students in touch with employers. We publish vacancies - not only permanent ones for graduates, but also vacation placements, internships, insight courses etc. There are also events such as presentations and fairs which give students the chance to talk informally to employers – a more personal supplement to the information available elsewhere. Of course there are other ways of meeting employers. For example your Department is a major employer of biologists. In what ways does it help to give students an insight into biological opportunities?

We also offer a range of practical help in dealing with the various hurdles involved in obtaining a job – CVs, application forms, interviews, and assessment centres.

GRADUATE DESTINATIONS

If an applicant or a student asks you what happens to your graduates after they have finished their course how much can you tell them? Each year Careers Services undertake a survey if all of their Institution's students to find out what they are doing six months after graduation. Amongst other things the results provide one of the Performance Indicators for your institution, and are often used in quality assessments of individual departments. They also contribute to the League Tables beloved of certain newspapers.

WORK IN ACADEMIC DEPARTMENTS

Careers Staff frequently give talks in Departments to students at all stages of their course, and even to prospective applicants, since the earlier they start to plan for life after graduation the better. Sometimes we make a formal contribution to Departmental modules and, if resources permit, they may even run a full scale, assessed Career Planning Module. Some Departments invite us to contribute to open days for prospective applicants.

TO FIND OUT MORE

Check your Career Service's website. Websites are used not only to provide information on services, events, and vacancies, but they also serve as an additional careers guidance resource.

AND FINALLY…

I know that you could not imagine a better job than the one you have now, but if ever you do have second thoughts then remember that we are here to help staff as well as students!

Chris Newton
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NEW! EMPLOYABILITY WEB PAGES

http://bio.ltsn.ac.uk/
>> 'Current Issues'
>> 'Employability'

Within the LTSN Bioscience website is a new section devoted to Employability. We plan to develop and expand it and need feedback to ensure that your requirements are met. Please have a look and let us have your views about its content, structure, and ease of use. What else would you like it to include?

In addition, LTSN Generic Centre has produced a Directory of Employability Resources. The directory provides information for academic staff who wish to enhance their students' preparedness for work. LTSN Bioscience has free copies of the directory to give away.

To comment on the employability web pages, or request a copy of the Directory of Employability Resources email: *ltsnbioscience@leeds.ac.uk*

feature

THE NEW BIOSCIENCES FEDERATION: A MAJOR STEP FORWARD FOR BIOLOGY

On 2 December 2002, the Biosciences Federation came into being as an umbrella organisation of the learned societies in bioscience and having the following key aims:

- To promote liaison, dialogue and interactions within the diverse community of bioscientists on common issues that relate to research and teaching;
- To provide opinion and information to assist the formulation of public policy;
- To promote wide and open debate, involving the wider public where appropriate, about the practical and ethical issues surrounding developments in the biosciences and their applications.

The Federation is to be launched formally at the House of Commons presentation towards the end of September 2003.

The Institute of Physics and the Royal Society of Chemistry have long served as examples of the importance of there being a single large representative body to support a scientific discipline. Biology has not had such a powerful body. The Institute of Biology (IOB) has partly fulfilled this role, but has only about 16,000 members out of a possible 100,000 or so active (research) biologists in the UK. A UK Life Sciences Committee (UKLSC) was established some six years ago to promote the interests of scientists at the molecular and cellular end of the biosciences, and has been quite active, building up to a membership of eighteen learned societies representing about 35,000 bioscientists. However, more was needed. During the past three years leading members of the bioscience community have been working behind the scenes to establish a new organisation that can truly claim to be a single, united voice for life scientists. Those societies already signed up to the Biosciences Federation represent 60,000 life scientists and cover the range from physiology and neuroscience, biochemistry and microbiology to ecology. Crucially, the IOB has agreed to join the Federation and will bring valuable expertise particularly in areas such as links with schools, continuing professional development, and in the accreditation of qualifications. Colin Blakemore (Oxford) has agreed to be the Federation's first President.

The Council of the Biosciences Federation agreed two Standing Committees – on Education (chaired by Keith Elliott, Manchester) and Animal Science (chaired by the author), but more are planned. These will probably be on the environment and sustainability, bioethics, and public affairs. LTSN Bioscience was closely involved with the work of the former UKLSC Education Group and we look forward to continued collaboration. In fact, the first event to be organised by the Federation will be an education colloquium in October run jointly with the LTSN, intended to help school teachers, careers advisers, and university admissions tutors understand the changes that are taking place to the school science curricula and their implications. The Animal Science Group achieved a reputation under UKLSC as being the leading body representing researchers working with experimental animals, and established a good working relationship with the Home Office Inspectorate. We anticipate that the Group will be even more effective under the Federation.

Both the IOB and the UKLSC can justifiably claim to have made an impact on government science policy and will now combine their efforts under the Federation. At the time of writing submissions have already been made to inquiries by the Commons Science and Technology Committee into the value the UK obtains from participating in European science, and into bioterrorism, and one is being prepared on the Higher Education White Paper. Ways to help the Federation become proactive rather than reactive are being investigated.

This is an exciting development for Biology, but there is much still to do. We welcome receiving comments or suggestions for the Federation from the readership of the Bioscience bulletin.

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BEE-j GOES LIVE!

LTSN Bioscience now has its own on-line, bi-annual journal – BEE-j (Bioscience Education Electronic-journal). The first articles appeared on 29 May 2003. The journal publishes a range of original articles on tertiary-level biosciences education, including peer-reviewed research and practice papers. Articles will be published on the web as soon as they are accepted. BEE-j should be of interest to tertiary level staff and students and to upper secondary school staff. To view articles and see further information regarding BEE-j, including how to submit papers, visit the following website: *http://bio.ltsn.ac.uk/journal/*

THE BULLETIN

If you have any queries regarding the *LTSN Bioscience Bulletin,* would like to contribute an article, or reserve a box space to advertise an event, publication etc., then please contact the Operations Editor, Dr Stephen Maw *(s.j.maw@leeds.ac.uk),* who will be very pleased to hear from you.