

# Wavelength

Autumn 2008

## This issue...

In this issue we have four articles detailing the work of the Centre in e-resources, all of which are available to use:

1. WebPA - the web version of the peer-assessment tool (in collaboration with colleagues at the University of Hull and the Faculty of Engineering/Engineering Subject Centre at Loughborough University and funded by JISC);
2. the Question Bank for the physical sciences (again funded by JISC) which is available for WebCT, Blackboard, Moodle and Questionmark Perception or for export into MSWord or MS Powerpoint 2007;
3. the e-Portfolio Framework for the physical sciences (a DeL II JISC project) which offers strategic guidelines to allow academics to customise their institutional system and enabling students to develop a subject specific e-portfolio;
4. the Online Employability Resource - a development of the Centre's successful employability resources (again a DeL II JISC project) which is compatible with Blackboard, Moodle and WebCT.

There is also a discussion of the needs for Employer Engagement within the physical sciences and an update on the situation with the Reviews of the Student Learning Experience in the physical sciences that we at the Centre have been undertaking, in collaboration with independent consultants and Advisory Panels, over the past few months (plus a news item from the Academy about 3 other subject profiles that have recently been undertaken - on the rear cover).

Finally we reproduce the winning essay for the physical sciences for 2008 from the Higher Education Academy's Student Essay Award scheme. This year's title was 'What makes a good lecturer?' and the data from an analysis of the criteria from all the essays are included here. ■

## Inside this issue...

WebPA project – update	2	Employer Engagement	10
Physical Sciences Question Bank	4	The Student Learning Experience	12
e-Portfolio Framework...	6	What makes a good lecturer?	14
The Online Employability Resource	8		

Paul Chin  
Physical Sciences Centre  
Chemistry Dept  
University of Hull  
Hull HU6 7RX  
Email: p.a.chin@hull.ac.uk

## WebPA project – update

Since we announced the launch of the WebPA project in the March 2007 newsletter, the project team has been busy and the Centre would now like to update you on its progress. WebPA is a JISC funded project between the Centre and colleagues at the University of Hull, together with the Faculty of Engineering and the Engineering Subject Centre at Loughborough University. WebPA is an electronic peer assessment tool that allows students to submit peer assessment marks via a web form. The marks are collated based on a tried and tested marking algorithm that reduces any risk of marking bias by students and presents the results in a series of reports to suit the tutor's needs.

therefore not only enhance student learning but also bring benefits of its own in terms of time savings and being able to cope with larger student numbers.

A range of peer assessment models are commonly used but many of these models relate to face to face interaction 'in the classroom'. Therefore, from the tutor's point of view this often only works well for relatively small numbers of students. However, with ever increasing student numbers there are increased pressures on a tutor's time which makes it more difficult to engage with peer assessment. WebPA was specifically designed to address these issues to enable tutors to engage students in peer assessment and at the same time

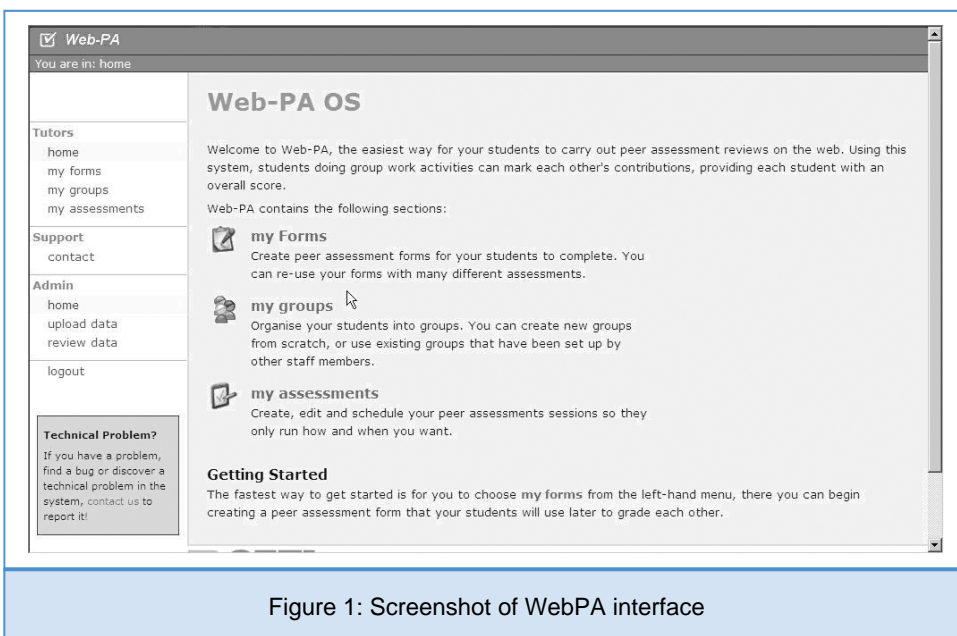


Figure 1: Screenshot of WebPA interface

### Benefits of peer assessment

Peer assessment offers wide ranging educational and social benefits. Collaborative learning is enhanced, self reflection and critical thinking improve and students develop self confidence. Students enjoy the chance to mix with fellow students and appreciate the range of transferable skills they develop, such as communication skills. Academics also develop a better appreciation of how to support students and to see students as partners in the learning process.

However, whilst peer assessment offers a number of benefits for students its administration can be very time consuming for the tutor. Tutors can involve students in the planning and execution of such activities; but often the perceived time savings for the tutor are only transferred to the students. Peer assessment should

keep administrative overheads to a minimum.

### Overcoming the barriers to peer assessment

Unfortunately peer assessment poses a number of potential problems. Firstly, administering peer assessment to large classes can be time consuming, as already mentioned. Secondly, students may try to compete against each other instead of collaborating, assuming this will gain them extra credit. Therefore students need to be fully aware that peer assessment is not a competition and offers real benefits.

The idea of peer assessment can often seem alien to both academics and students. It is important therefore that staff appreciate the proven educational benefits of peer assessment so that students fully engage with the process. Students

## WebPA project – update

themselves also need to be briefed on what to expect, so that they don't see it simply as a way of being dependent on their fellow students for good grades.

With just a little thought, students can be actively engaged in peer assessment activities; for example in a formative way through reviewing each other's work and providing constructive feedback. Alternatively students can use peer assessment in a summative way by engaging in group work and then evaluating the efforts of their peers based on the work they did. This gives students the ability to reflect on their performance as they progress and receive recognition from their peers, rather than just get a final 'impersonal' mark from a summative test by the tutor.

### Early adopters of WebPA

The project has the following aims:

- Make significant enhancements to the online peer assessment system 'WebPA' based on evidence from pedagogic research undertaken at Loughborough and Hull Universities
- Provide a mature open source peer assessment application
- Support the adoption of WebPA with additional pilot sites

The WebPA team are pleased to report that an open source version of the software is now available for download by anyone who wishes to install and use it locally. Use at the host institutions now covers a number of departments, including chemistry, engineering, business, biosciences, computer science and even careers. There have been numerous downloads of the software to date and the WebPA team are specifically working with Liverpool, Northumbria and Derby Universities as pilot sites.

### WebPA wins international award!



IMS award logo

On 14 May 2008 the WebPA project was presented with a Bronze 'Learning Impact' Award at the IMS Annual Conference and Summit on Global Learning Industry Challenges in Austin, Texas. The Awards recognise the use of technology to improve learning and WebPA

was the only UK project among the twenty-three shortlisted finalists. Nicola Wilkinson and Peter Willmot from the WebPA team were there in person to present WebPA to the expert panel of judges and collect the award.

In addition to receiving the Bronze 'Learning Impact' Award, the WebPA tool was named 'Best Assessment Support' for the 'best in category' awards.

### Further information

If you would like to know more about the WebPA project and how the Centre can support you in using peer assessment, contact the Centre or go to the project website at:  
<[webpaproject.lboro.ac.uk/](http://webpaproject.lboro.ac.uk/)>

You can also join the project email list to:

- keep up to date with the project,
- get advice about peer assessment,
- find out what other like minded people think.

To join the list please visit:

<[www.jiscmail.ac.uk/lists/webpa.html](http://www.jiscmail.ac.uk/lists/webpa.html)> ■

*Peer assessment offers wide ranging... benefits. Collaborative learning is enhanced, self reflection and critical thinking improve and students develop self confidence*

*With just a little thought, students can be actively engaged in peer assessment activities; for example in a formative way... reviewing each other's work and providing constructive feedback.*

## Physical Sciences Question Bank

### Overview

The recently released Physical Science Question Bank provides support for choosing and deploying questions in Chemistry and Physics. Questions can be found by topic and by keyword, with integrated browsing and searching to simplify the process. Selected questions can be aggregated into a group, and can be downloaded in a form suitable for immediate import into a VLE or assessment system. We currently support WebCT, Blackboard, Moodle, STOMP and Questionmark Perception. Questions may alternatively be downloaded for import into Microsoft Word, for use on paper.

The question bank is available via a web browser (either Internet Explorer 6 or 7, or Mozilla Firefox) from the Subject Centre web home page (follow 'Q' from the 'A-Z' menu link for question bank), and a new 'bank' account can be set up automatically in the time it takes for an email to reach you. Help is provided on-line, so that a new user can get going straight away.

Dick Bacon  
Physical Sciences Centre  
School of Physics  
University of Surrey  
Guildford GU2 7XH  
Email: r.bacon@surrey.ac.uk

### Latest

A new feature of the Physical Sciences Question Bank is that questions can now be downloaded in MS PowerPoint 2007 xml format, for display in slides. This is particularly appropriate for use with electronic voting systems. This can be used to promote discussion between students, which can lead to excellent learning opportunities.

### Searching for questions.

An expanding topic tree (top left in Fig 1) allows subjects or topics to be selected, automatically listing questions in that topic and its subtopics. If there are too many questions to be conveniently displayed then a random sub-selection will be shown. You can force the browser to show all the questions in a topic by clicking on 'list all'.

The list shows a brief description of each question, its type (the left hand icon) and

The 'domain' selection refers to Bloom's Taxonomy of the pedagogic domain. For practical reasons we are offering just three of Bloom's six levels - Knowledge, Comprehension and Application, with higher levels (of which we have very few examples) being listed with Application. The difficulty rating (Simple, Intermediate, Difficult) refers to the difficulty of the question within the academic level and the pedagogic domain.

The screenshot shows the 'Higher Education Academy Physical Sciences question bank (UKEL 8)' interface. On the left is a tree view of subjects: Chemistry (Biological, Inorganic, Organic, Physical), Kinetics, Gas laws, Liquids and their properties, Thermodynamics, Free energy, enthalpy, entropy calculations, Chemical equilibria, Analytical Chemistry, and Physics. The main panel shows a list of questions under 'Chemistry > Physical > Kinetics (32 items)'. Each entry includes a question type icon (M for Multiple choice, S for Selection), a brief description, and 'view' and 'add' buttons. At the bottom, there is a search bar with 'description', 'keywords', and 'question' filters, and a 'shopping trolley' icon with a 'checkout' button.

Figure 1 - the browser interface.

whether or not it has feedback. All the questions in Figure 1 are multiple choice (M) except two which are multiple selection (S). Each question can be viewed complete with question, marking rules and feedback by pressing the 'view' button. This view includes some of the question metadata, any comments left by users, and an entry box for your own comments. A question and can be added to the 'shopping trolley' by pressing the 'add' button.

The area at the top right in figure 1 allows you control over the selection of questions that are included in each listing. The first (on the left) is the target system. This should always be selected first, because not all questions are available in each system. You can choose between WebCT, Blackboard, Moodle, STOMP, Questionmark Perception and a word processor format (rtf) for printing on paper. A further alternative is QTI v1.2, which is a generic question format designed for interoperability between systems.

The feedback selector allows you to select just questions with, or questions without feedback to be displayed. The feedback indicator icon is not used in these cases. The question type selection area performs two purposes, it indicates the meanings of the single letter icons used in the question listing, and allows you to restrict the question types searched for. In practice, the questions that are so far included in the question bank are almost all of the Multiple Choice type (MCQ). This is mainly due to the limitations of the VLE based assessment systems.

You can search for questions containing words or phrases in the description, the metadata or the question text using the features shown at the bottom left of Figure 1. Up to three such filters can be applied simultaneously, and two can be set to exclude a selection. For example, a search filter can be set up to list only questions containing the word 'energy' but not the word 'kinetic'. These searches are applied only to the questions in the currently selected topic tree item and sub-topics.

## Physical Sciences Question Bank

### Deploying questions

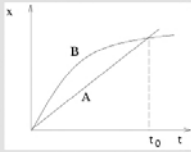
When you have selected the questions you want to use in an exercise, and they are in the 'shopping basket' in the order you

can get the system to record the marks at each attempt and you can decide the worth of a question that is only correct at the second or third attempt.

The effectiveness of repeat tries depends upon a variety of factors, including the quality and nature of the feedback. Some feedback just gives the user the correct answer, but some give a hint specific to the wrong answer they selected and some give a general description of how the question should be addressed. All three types can help, depending upon the domain of the question (knowledge, comprehension or application) and upon the reason the student selected the wrong answer. Your assessment system may allow repeat tries to be on a question by question basis, but it will always be possible to set up duplicates of a whole exercise to provide such multiple attempts.

**Preview Question 1**

1 The sketch shows the position coordinates  $x_A$  and  $x_B$  for two trains running on parallel tracks, as functions of time  $t$ . Identify which of the following statements is correct.



Choose one answer.

a. At time  $t_0$  both trains have the same velocity.

b. Both trains speed up all the time.

c. Both trains have the same velocity at some time before  $t_0$ .

d. At some instant both trains have the same acceleration.

e. In the interval between  $t = 0$  and  $t = t_0$  train B goes further.

Submit

Figure 2 - question in Moodle

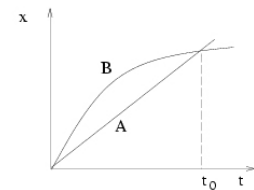
*One of the aims of the question bank project is to encourage the sharing of questions*

want, you can download them by pressing the 'download' button. A new dialogue will appear in the bottom right panel specific to the target with which you are working. In each case there is a help button giving information about the download and import for that system. In the case of the VLE targets, the download comprises just one file which contains all the information for your collection of questions. When imported, however, you will have to use the VLE features to enable the assessment exercise, and resolve issues such as whether marks or feedback are to be shown, etc. The questions appear in the various systems with only minor differences, for example figures 2 and 3 show the same question deployed in Moodle and WebCT respectively. The more serious differences are in the handling of feedback for question types other than simple multiple choice.

### Using questions

If you are using the questions to assess your students' progress, you might like also to think about how they could provide help for your students' learning. Most of the questions come with feedback, although if you wish to use it, it will need to be enabled as you set up the exercise in your VLE. It can also be a good idea in this case to set up the exercise so that your students can have more than one attempt at the questions in order that they can apply any feedback promptly, for effective learning. If the marks really are important, then you

### 1. Question 1 (Points: 10)



The sketch shows the position coordinates  $x_A$  and  $x_B$  for two trains running on parallel tracks, as functions of time  $t$ . Identify which of the following statements is correct:

- a. In the interval between  $t = 0$  and  $t = t_0$  train B goes further.
- b. At some instant both trains have the same acceleration.
- c. Both trains have the same velocity at some time before  $t_0$ .
- d. Both trains speed up all the time.
- e. At time  $t_0$  both trains have the same velocity.

Save Answer

Figure 3 - question in WebTV

### Sharing questions

One of the aims of the question bank project is to encourage the sharing of questions. Due to the complex nature of the conversions required for the different target systems, however, questions cannot (yet) be submitted directly to the bank. If you have questions that you are willing to share with others via this question bank please get in touch with Tracey Madden or Dick Bacon at psc@hull.ac.uk. ■

## e-Portfolio Framework for Physical Sciences

### Overview

As part of our DeL II funding from JISC (Joint Information Systems Committee), the Centre has completed a project based around one of their key themes, that of exploring the use of e-portfolios in a subject context. One of the main outcomes of this work has been the e-Portfolio Framework for Physical Sciences.

The purpose of the e-Portfolio Framework is to offer strategic guidelines for academics to customise their institutional e-portfolio system, enabling students to develop a subject specific e-portfolio. It is not an 'e-portfolio' in itself but is designed to be sufficiently flexible to be used in support of any e-portfolio tool in a discipline specific manner.

Initial trials of the e-Portfolio Framework have been positive demonstrating its adaptability not only in different institutions but also in support of different courses and disciplines, including those outside the physical sciences, something that we shall be investigating further in the future. It has shown itself to be suitable not only for use with an e-portfolio tool but also without one, for instance employed in a VLE or wiki.

Tracey Madden  
Physical Sciences Centre  
Chemistry Dept  
University of Hull  
Hull HU6 7RX  
Email: t.madden@hull.ac.uk

### What is an e-Portfolio?

Due to the wide diversity of practice in the world of e-portfolios, this is by no means a straightforward question. In order to offer a resource that is potentially useful to the greatest number of practitioners, we have chosen to adopt the widest possible definition that would encompass a variety of interpretations. Our working definition has been

*an archive of material, relating to an individual, held in a digital format*

and it is this concept of the e-portfolio that the e-Portfolio Framework has been made to support.

Just as there is no standard definition, there is no standard e-portfolio. Contents will vary according to the purpose of the e-portfolio, which could include

- storing materials
- sharing them with an outside audience
- aiding self-analysis
- supporting assessment

Keeping our inclusive definition in mind, we designed the e-Portfolio Framework to support e-portfolios developed for any purpose.

### Design of the e-Portfolio Framework

Following an investigation into the use of e-portfolios in UK HEIs, particularly in the physical sciences and related disciplines, we devised the underlying concept for the e-Portfolio Framework. Rather than an e-portfolio tool in its own right, many of which had already been built and are available for use, our aim was to construct a discipline specific template that could be adopted by anyone using any e-portfolio tool. Taking this approach freed us from the problems of compatibility between systems, having to develop different versions of the e-Portfolio Framework for each application and dealing with the inevitable upgrades and development of new e-portfolio tools in the future. It also enabled us to be able to offer a completely adaptable resource.

The e-Portfolio Framework is designed to provide the appropriate recording mechanism for students developing their own e-portfolio and will enable them to chart their development from a discipline perspective. It will structure what they recorded, how they evidence their progress and how they reflect on their development, all in a subject specific manner to which they can relate. And because courses differ in terms of content, structure and length the e-Portfolio Framework is adaptable to these parameters.

### Why use the e-Portfolio Framework?

Building an e-portfolio can be quite a daunting process especially when you first begin. It can also be quite time consuming. Making sure students get the most out of the experience depends on them receiving strategic guidance. Whatever e-portfolio tool you are using, adopting the e-Portfolio Framework enables you to guide students towards adding material to their e-portfolio that relates to their discipline, helping them to focus on their specific skill development and reflect upon their progress. This in turn can make students more self-directed learners, involving themselves in their own development.

### Format of the e-Portfolio Framework

The e-Portfolio Framework comprises three parts:

- skills
  - ability rating
  - evidence rating
- which we designed to be used together but may be used independently.

#### Skills

These are a set of statements, each one about a specific skill, subdivided into categories.

In the versions of the e-Portfolio Framework that we have already developed, for undergraduate and postgraduate chemistry and undergraduate physics and astronomy, we based these skill statements on QAA Benchmarks and skill audit documentation from the relevant professional bodies. For instance, in the case of undergraduate chemistry we used:

- QAA Subject Benchmark Statements for Chemistry
- Physical Sciences Subject Centre 'Student Employability Guides' for Chemistry
- Royal Society of Chemistry 'Undergraduate Skills Record'

Using the Subject Benchmark Statements ensures the e-Portfolio Framework includes all the skills outlined as essential for that discipline. Including the 'Student Profiles' ensures that essential skills cited by employers are included. For courses that lack a Benchmark we have helped develop versions of the e-Portfolio Framework with skills statements distilled from detailed course documentation.

If you adopt a version of the e-Portfolio Framework that we have already developed you are free to select which of the skills to include and may reword or reorder them, as appropriate. You may also add or encourage students to add additional skills statements of their own.

## e-Portfolio Framework for Physical Sciences

### Getting involved

We have versions of the e-Portfolio Framework for

- undergraduate chemistry
- undergraduate physics and astronomy
- post graduate chemistry
- general postgraduate

which can be easily adapted to suit specific courses. Further details can be found on our website (see below).

Alternatively the principal behind building the e-Portfolio Framework can be used to develop versions for any course in any discipline. For each subject discipline, the e-Portfolio Framework was developed using the e-Portfolio Framework Development Tool, details of which can be found on our website (see below).

### Further information

Further information about the e-Portfolio Framework: [www.heacademy.ac.uk/physsci/home/projects/jisc\\_del/eportfolio](http://www.heacademy.ac.uk/physsci/home/projects/jisc_del/eportfolio)

QAA Subject Benchmarks Statements: [www.qaa.ac.uk/academicinfrastructure/benchmark/default.asp](http://www.qaa.ac.uk/academicinfrastructure/benchmark/default.asp)

Physical Sciences Subject Centre 'Student Employability Guides' (available for chemistry, physics and astronomy, and forensic science): [www.heacademy.ac.uk/physsci/publications/miscellaneous](http://www.heacademy.ac.uk/physsci/publications/miscellaneous)

Royal Society of Chemistry 'Undergraduate Skills Record': [www.rsc.org/Education/HEstudents/usr/index.asp](http://www.rsc.org/Education/HEstudents/usr/index.asp)

### Ability rating

For each skill statement, students estimate their competence using the ability rating (Table 1). This consists of a series of statements from which students have to identify the one closest to their current ability, though they could request feedback

their stated skills, they need to consider the quality of this material. This is done using the evidence rating (Table 2). As with ability ratings, students need to monitor this over time and work will be required to keep both ratings high. Such reflection could be used for future planning.

4	Practitioner I can use this skill well and with confidence such that I have or believe I could instruct/support someone else.
3	Improver I can use this skill but am not yet fully confident and feel I need more experience to improve or I have been a confident user in the past but lack recent experience and need to update my skills.
2	Learner I have limited experience of this skill and feel I would need much more experience to become competent.
1	Beginner I am aware of this skill but have little or no real experience so far.
0	New Starter I do not know about this skill and need to find out more about it.

Table 1: Ability Ratings

from peers or staff to assist them. These ability ratings incorporate the idea of recent experience without which the ability level reduces. This may have more relevance to mature students or postgraduates but may prompt others to practice old skills and consequently improve their ability or keep their ability level high.

Over time, and as the students add more evidence to their e-portfolio, they would need to review these ability ratings. They could also use this information to plan further activities to improve their ratings.

Again the students could request peer or staff feedback on their evidence and you are free to reword the evidence rating to suit yourself and your students.

### How can the e-Portfolio Framework be used?

Because of the number of different systems in current use, we designed the e-Portfolio Framework to be independent of any specific e-portfolio software system or VLE. It can however, be adapted for use with any or none at all. We have seen examples of it being adapted for use within specific e-portfolio tools, in VLEs, in a

3	I have up to date evidence which demonstrates my current ability level
2	I have evidence which demonstrates my current ability level but it is not recent
1	I have evidence but it does not demonstrate my current level of ability
0	I have no evidence to support my ability

Table 2: Evidence Rating

You are free to reword the ability rating to suit your own circumstances and your own experience.

WIKI, on a university website and presented to students on a CD. Its simplicity lends itself to any application. ■

### Evidence rating

Evidence is rated as well as ability since both are integral to the e-portfolio concept. Thus students understand that both are important and the levels do not necessarily correspond. Because students need to gather and store evidence in support of

## The Online Employability Resource

### Overview

Following on from the successful development of our employability resources for the physical sciences community, the Centre was awarded additional funding as part of the DeL II project from JISC (Joint Information Systems Committee) to develop this project further. The most important part of this development from the existing paper-based resource has been the adaptation of the activities to produce an online module. We have achieved this by creating versions of the resource that can be uploaded into a virtual learning environment (VLE). Several versions have been produced which are compatible with the most popular VLEs in use in UK HEIs.

The extra funding has also made possible an increase in the level of interaction and the development of additional elements for the resource, partly inspired by the pilot studies that were carried out across the UK. Although primarily aimed at supporting physical sciences students the resource is designed to be customisable and we have developed our own version to support the education discipline. You can customise the employability resource to any subject or institution. Like the original employability resource, you can use the online version complete or take individual sections from it to use as standalone activities. The accompanying Tutor Guide indicates which parts of the resource are best suited to this.

Tracey Madden  
Physical Sciences Centre  
Chemistry Dept  
University of Hull  
Hull HU6 7RX  
Email: t.madden@hull.ac.uk

### Why use the online Employability Resource?

Increasingly academic staff are being asked to support personal development planning (PDP) with students as part of their degree course. The many facets that make up employability are an integral part of this. It also offers valuable resources for you to use as part of the increasingly common core skills modules.

The online employability resource is ideal for those of you who wish to deliver such material through your VLE. Making the resource available online enables students to work at their own pace, access the material where and when they wish and review sections multiple times if they need to.

The added benefit of being able to customise the resource to your discipline and institution can help your students relate to the material and make the process/experience more relevant and meaningful.

### What's in the online Employability Resource?

The complete online employability resource consists of

- a User Guide
- Activities
- Resources

which the student can access in any order. Our Tutor Guide, made to accompany the resource (available from our website, see Further Information section), gives the aims of each activity, explains how each of these sections can be delivered to students and indicates whether they are suitable for

- Assessment
- Individual work
- Group work
- Stand Alone work (students would not need to have worked through any of the previous material)
- Producing evidence for a Progress File

#### User Guide

This section explains the aims of the resource and gives an overview of the types of activities that the student will find contained here and their purpose. It also gives information on how the activities are presented and practical advice on how to access them, including what software programmes need to be installed to access content, such as that in the form of videos or *Flash* applets.

#### Activities

The core of the resource is a series of activities which include a mix of presentations (with notes to download), surveys, exercises (such as writing and

research assignments), videos etc. (Fig 1). These activities are subdivided into four sections:

1. 'Getting started' consists of:
  - Where are you now?  
*Designed to help the student think about what kind of career would suit them*
  - Where do you want to be?  
*Examining the options available to the student at the end of their studies*
  - Getting the balance right  
*Looking at the work-life balance*
  - Skills audit  
*Helping the student to assess their transferable skills*
2. 'Finding our more' consists of:
  - Skills development  
*Looking at ways the student can enhance existing skills and develop new ones*
  - Searching for opportunities  
*Highlighting the range of sources of information on job vacancies, postgraduate courses and placements*
  - Building up your contacts  
*Considering who a student can contact to find out more about their chosen career*
  - Doing your research  
*Identifying the kind of information a student would need to find out about an employer or course and how to obtain it*
3. 'Getting that job' consists of:
  - Making applications  
*Examining how the student should produce their CV and how to complete application forms and covering letters*
  - Interviews  
*Looking at what a student can expect to happen at interview and how they can perform at their best*
  - Assessment Centres 1  
*Explaining what assessment centres are and what they are used for; providing the opportunity to try some of the tasks that they may be asked to perform as an individual*
  - Assessment Centres 2  
*Focusing on group activities that a student may be involved with at an assessment centre*
4. 'What next' consists of:
  - Applications outcomes  
*Looking at how to progress given either a positive or a negative result*
  - Where to go from here  
*Considering potential next steps after the course and in the future*

### Piloting

Extensive piloting of this online resource across the UK and Ireland and the use of wide ranging student focus groups at several institutions has demonstrated the usefulness of this resource. Feedback from academics and undergraduates has been very positive and has enabled us to make further improvements and add additional resources. We've been delighted to find that after the trials have concluded the majority of students have requested continued access to the resource for the remainder of their course and HEIs have chosen to embed the resource into their curriculum.

### Further information

Further information about the original and online Employability Resource: <[www.heacademy.ac.uk/physsci/home/projects/jisc\\_del/employability](http://www.heacademy.ac.uk/physsci/home/projects/jisc_del/employability)>

## The Online Employability Resource

### Resources

This section consists of four subsections

- Web Resources
- Books
- AGCAS (Association of Graduate Careers Advisory Services) resources
- Software

process. Full instructions on how to import the course into BlackBoard, WebCT and Moodle are available to download from our website (see Further Information section). We also have available a detailed Tutor Guide and guidance on how to adapt the resource for



Figure 1: Part of one of the activities in the Online Employability Resource (Blackboard version)

each containing a number of useful links to relevant resources, customisable to your discipline, course and host institution.

### Additional resources

Feedback from staff and students highlighted additional areas that it was felt we should cover. This has led to the creation of additional material such as a section on industrial placements.

We were also granted permission to use video material from the Channel 5 series 'Selling Yourself' which we have used to produce an additional interactive resource on interview techniques.

### Guidance for adopting and adapting the Employability Resource

To make the resource accessible to as many HEIs as possible we produced a number of versions that could be imported directly into a VLE. We have versions of the online Employability Resource compatible with the following VLEs:

- Blackboard
- Moodle
- WebCT Campus Edition
- WebCT Vista

Importation has been tested and this enables us to offer clear guidance on the

- different disciplines
  - assessment
  - class-based work
  - specific locations (ie so references are to the host HEI and local information)
- Further details of all these resources can be found on our website.

### Employability Visits

A common response from lecturers is to say "I'm not a careers adviser" so we offer Employability Visits to support you in trialling the resource. We have conducted several such visits at HEIs across the UK and in Ireland. These visits have proved very successful in helping lecturers realise that they can deliver the resource. The aim of the visit is to show how easy it is to deliver the material with authority and then the local HEI is able to successfully embed the resource in the curriculum with confidence.

A popular alternative has been to run the activities jointly with lecturers in timetabled classes with their students to see how they can fit this resource into the curriculum as part of a skills development activity. If you are interested in running an employability session either with your colleagues or with your students please contact the Centre for further details. ■

## Employer Engagement

### Employer Engagement: What? Why? When? and How?

#### Overview

At a recent Physical Sciences Centre meeting for Departmental Representatives, groups were asked to consider *employer engagement* in terms of identifying future priorities. One group came up with the response: 'What? Why? When? and How?' This article will try to answer these questions.

Steve Hanson  
Physical Sciences Centre  
Chemistry Dept  
University of Hull  
Hull HU6 7RX  
Email: S.W.Hanson@hull.ac.uk

and

Paul Chin  
Physical Sciences Centre  
Chemistry Dept  
University of Hull  
Hull HU6 7RX  
Email: p.a.chin@hull.ac.uk

#### Find out more

If you want to find out more about *employer engagement* and what is being done to meet the challenge, then please contact the Physical Sciences Centre. The final report on the *Engage* project will be available soon in printed form; please let us know if you would like a copy.

#### What?

*Employer engagement* is currently a key policy driver in higher education stimulated by the Leitch review (2006), which focuses on developing the capacity of higher education to deliver high-level skills to the current workforce. However *employer engagement* can also be considered in a wider context including employer support of work-based and work-related learning in the curriculum. Examples in the physical sciences include the many well-established industrial placement years as part of undergraduate degree programmes. At a postgraduate level, Knowledge Transfer Partnerships are examples of employers engaging with higher education institutions (HEIs) in jointly supervised research projects. These well established examples of *employer engagement* may provide useful links for HEIs to move forward the Leitch agenda on workforce development.

#### Why?

Leitch (2006) reviewed the skills needs of UK economy to ensure world class competitiveness and set out goals for 2020. He pointed out that demographic changes mean that skill improvements cannot focus on young people. On current demographic trends, by the year 2020 it is to be expected that, on current enrolment patterns, the full time undergraduate population of UK HEIs will decline by 4.6%, ie about 50,000 students (Universities UK, 2008). It was pointed out that this represents perhaps the greatest demographic challenge to the HE sector over the next twenty years.

Does that mean more university departments will close, and possibly even whole universities? This might well be the outcome if universities ignore the implications of the Leitch review and the key proposal that more than 40% of all adults should have an HE qualification (level 4 and above), up from 29% in 2005. That will require a massive programme of training for those already in the workforce. In the government's plans for the implementation of the Leitch recommendations, it is indicated that encouragement will be given to HEIs to collaborate with employers to develop programmes and delivery methods that meet their higher skill level needs. For example, funding will be provided in 2008-09 for 5,000 student places, co-funded with employers (DIUS, 2007). The physical sciences sector has a key role to play in this retraining exercise and this could to some extent counteract the effects of fewer young people opting for science A-levels and science degrees.

Work has been undertaken over a number of years to establish partnerships culminating in the *Engage* project - one of six employer engagement projects supported by the Higher Education Academy (HEA), with funding from the Higher Education Funding Council for England (HEFCE), that are helping HEIs to meet the challenge set by Leitch.

The Physical Sciences Centre has been a key player in the *Engage* project, in collaboration with other Subject Centres, Sector Skills Councils, employers and professional bodies. The *Engage* project aimed to develop a common understanding of the skills agenda relating to engineering, physical sciences and materials disciplines in higher education and to build capacity for future collaboration. The Physical Sciences Centre concentrated on identifying how the employer engagement process can be managed. A workshop brought together representatives of HEIs, employers and other relevant organisations, including recruitment agencies, to discuss drivers, barriers and solutions (*Engage Meeting*, 2007). Results were reported at the *Engage Conference* in London (2008) and in the final report (*Engage Report*, 2008).

In addition to the Leitch review, other drivers to employer engagement were identified. From an employer's standpoint, engagement with HEIs in training their current workforce can help to overcome skills shortages and to retain existing staff. Involvement of an employer in assisting HEIs with work-based learning, eg industrial placements, can help to attract well-trained recruits and make recruitment more effective. From an HEI's standpoint, drivers for *employer engagement* also include attracting entrants to courses that have additional funding (bursaries) and result in good employment prospects. HEIs can also gain from employer input into course development and delivery and from building contacts for possible research collaboration.

#### When?

If the workforce skill targets set by Leitch are to be met, then HEIs and employers need to work together now to overcome the various barriers to engagement. Some of these barriers were identified by Wedgwood (2007). She noted that traditional HE degrees (30 week courses starting in October, lasting three years) are not accessible, flexible or responsive enough for workforce development. With respect to employer demand, King (2007) pointed out that employer training is often not related to academically recognised

## Employer Engagement

### References

- DIUS (2007). *World class skills: Implementing the Leitch review of skills in England*. London: HM Treasury  
<[www.dius.gov.uk/publications/worldclassskills.pdf](http://www.dius.gov.uk/publications/worldclassskills.pdf)>
- Engage Project (2008). *Facilitating dialogue between employers and Engineering, Physical Sciences and Materials academics in Higher Education*  
<[engage.lboro.ac.uk/index.php?section=12](http://engage.lboro.ac.uk/index.php?section=12)>
- Engage Conference (2008). *Higher education and the workplace - Supporting employer engagement in engineering and physical science*, 15th January 2008  
<[www.engsc.ac.uk/engageconf](http://www.engsc.ac.uk/engageconf)>
- Engage Meeting (2007). *Engage - Staff development/ management of change*, 24th October 2007  
<[engage.lboro.ac.uk/index.php?section=21](http://engage.lboro.ac.uk/index.php?section=21)>
- King, M (2007). *Workforce development: how much engagement do employers have with higher education? A review of the evidence on employer demand*. London: Council for Industry and Higher Education  
<[www.cihe-uk.com/docs/PUBS/0702WFDEmployerEngagement.pdf](http://www.cihe-uk.com/docs/PUBS/0702WFDEmployerEngagement.pdf)>
- Leitch, S (2006). *Prosperity for all in the global economy - world class skills*. London: HM Treasury  
<[www.hm-treasury.gov.uk/media/6/4/leitch\\_finalreport051206.pdf](http://www.hm-treasury.gov.uk/media/6/4/leitch_finalreport051206.pdf)>
- Melville, D (2008). Sir David Melville's keynote speech to the 'Engage' Conference, January 2008  
<[www.engsc.ac.uk/engageconf/index.php/draft-programme/sir-david-melville/](http://www.engsc.ac.uk/engageconf/index.php/draft-programme/sir-david-melville/)>
- Universities UK (2008). Research report: *The future size and shape of the HE sector in the UK: Demographic projections*. London: Universities UK  
<[bookshop.universitiesuk.ac.uk/downloads/size\\_and\\_shape.pdf](http://bookshop.universitiesuk.ac.uk/downloads/size_and_shape.pdf)>
- Wedgewood, M (2007). *Higher Education for the Workforce: Barriers and Facilitators to Employer Engagement*. DIUS Research Report  
<[www.dius.gov.uk/publications/DIUS-RR-08-04.pdf](http://www.dius.gov.uk/publications/DIUS-RR-08-04.pdf)>

[all accessed 8th July, 2008]

levels and that much of the training delivered in the workplace focused on health and safety requirements and economic performance.

Additional barriers to engagement identified in the *Engage* project were difficulties in making contacts - both employers with HEIs and HEIs with employers - although links built up through work placement programmes, research collaboration and personal contacts can help in this regard. There were also difficulties with regard to the different terminologies used by employers and HEIs and with respect to the funding of courses and the continuity of funding.

### How?

How can barriers to employer engagement be overcome? Wedgewood (2007) suggested that HE requires a new culture, new skills, new approaches, new attitudes and a new business model. King (2007) indicated that employers will require flexible provision from HE providers, plus accreditation and assessment of work based learning.

The *Engage* project looked at practical solutions and made several proposals:

- Transparent, single points of contact for both HEIs and companies.
- Use of professional facilitators to kick start the engagement process.
- Brokerage service, properly structured and maintained.
- More effective use of Subject Centres and SSCs as intermediaries.
- Development of employer/HEI forums.
- HEIs to be more proactive in making business contacts.
- Links built up through industrial placement programmes and research collaboration to be used more effectively.
- Increased personal links with industry, for example via academic time buy-out.
- Senior level involvement for both employers and HEIs.
- Developing courses to meet industrial needs and timescales.
- Review and shortening of the university course validation processes.
- Transfer of some training/education to the workplace.
- Development of appropriate funding mechanisms.

Three examples of good practice in employer engagement were presented at the *Engage* Meeting and further details are reported in the website (2007). These examples covered the following topics:

- Network Rail working together with Sheffield Hallam University to develop a foundation degree in Railway Engineering.
- Employer engagement with Bradford College in support of foundation degrees in Packaging Technology and Powder Technology and an MEng degree in Metallurgy & Materials.
- Bodycote's development of partnerships with learning providers in order to meet its skills requirements.



Figure 1: The Engage conference in London in January 2008 brought together representatives from Subject Centres, Sector Skills Councils, employers and professional bodies.

Melville (2008) at the *Engage* Conference provided as a case study the accreditation of graduate training at GlaxoSmithKline in their UK chemistry function.

### Conclusion

Although *employer engagement* has been well established in the physical sciences sector in the form of industrial placements and research collaboration, the Leitch review has placed strong emphasis on HEIs engaging with employers to provide workforce training. This has can have many advantages for both employers and HEIs and can help to plug the demographic shortfall of young people entering universities over the next ten years; this may be of key importance in the physical sciences sector. It will involve overcoming a range of barriers relating in part to employers and HEIs having different cultures.

A final question. If an employer wanted to get in touch with someone in your department to discuss setting up a work-based training course, how easy would it be to find who to contact via the departmental website? Try it yourself and see! ■

## The Student Learning Experience

### Reviews of the Student Learning Experience

#### Overview

What can Chemistry and Physics undergraduates expect at University? Do the teaching staff and the learning students have the same expectations? What is involved nowadays in undertaking an undergraduate degree in physical science? Is the sector undergoing major changes? How much variation is there in practise between different institutions?

Mike Edmunds  
Cardiff School of Physics  
and Astronomy  
Cardiff University  
CF24 3AA  
Email:  
Mike.Edmunds@  
astro.cf.ac.uk

and

Michael Gagan  
formerly of the  
Open University  
Email:  
jmg8@tutor.open.ac.uk

The Reviews of the Student Learning Experience in Chemistry and Physics were initiated by the HEA Physical Sciences Centre in 2007. The main aims were to provide an overview of what doing a Physics or Chemistry degree represented for the present-day undergraduate, and to provide a basis against which future changes in the content and style of these degree schemes can be measured. Two consultants were appointed – Michael Gagan (formerly of the Open University) for Chemistry, and Mike Edmunds (Cardiff University) for Physics – supported by Advisory Panels in each subject (Chaired respectively by David Phillips, Imperial College London, and Bob Lambourne, Open University). Each Advisory Panel has met three times already, and has overseen and constructively criticised first the planning and strategy, then the initial form of the questionnaires, and most recently the preliminary analysis of the results. Much essential support has been given, too, by the Physical Sciences Centre – in educational matters by Tina Overton, in data input and analysis by Ruth Wellock and in administration by Liz Pickering.

Many students and staff have provided data for these surveys, and there is a strict understanding that no individual person or department will be identifiable in the reports. Instead the focus will be on trends and features that are common, or just developing, in the hope that such information will inform all those responsible for the organisation, development or presentation of physics and chemistry teaching in our university departments.

The decision was taken to look only at the provision for full-time undergraduate degrees, and at departments that were offering complete degrees in Physics or Chemistry that have been authenticated by the professional bodies, the IoP and the RSC. A large number of science degrees, especially engineering and biosciences include modules of physics or chemistry, and these departments often employ physics or chemistry staff, but this area of physical science teaching is outside the scope of this review.

The data that forms the basis of the Reviews have been gathered both from published statistical data, from a comprehensive trawl through departmental websites, and from an extensive consultation exercise with undergraduate students and staff. The main consultations were based on three types of questionnaires which were available both on-line and in paper form during the early part of 2008. Drawing up the questionnaires

followed three concentrated discussion sessions with focus groups, which included both staff and students, held at Leeds, Aston and Stirling Universities with the intention of getting a wide range of views.

In developing and piloting the structure of these questionnaires it was found that the issues facing Chemistry and Physics are remarkably similar. As a result, the final form of the questionnaires in each subject was very similar, with only a few variations to cover the differences in professional bodies and the greater mathematical content of Physics-based degrees. The first of the three questionnaires was for undergraduate students of all years of study for BSc and MPhys/MChem/MSci degrees – no attempt was made to include taught or research masters schemes in this survey. The second questionnaire sought the views of university teaching staff, and the third (a much smaller sample) was targeted at Departmental “Directors of Teaching”. The response was very encouraging – with some 700 students and 289 staff replying for Physics, and 332 students and 237 staff for Chemistry. Analysis of the responses has been backed up with selective interviewing of individuals and groups. Although there will be inevitable ‘selection effects’ in who chose to reply, we believe that this is certainly a large enough sample to give a very good indication of major trends, successes and problems.

Two separate reports will be developed from the collected data, as it was thought that if Physics and Chemistry were to be combined in a single report some of the flavour to be found in the detailed differences between the two subjects would be lost.

The reports will be set in an educational context that has seen much change over the last few years. From the formation of the QAA there have been several government initiatives that have had considerable impact on university level teaching, not least the introduction of student fees and the priority for widening participation. We now have benchmarking, HEA Centres and CETLs. We have seen much reorganisation of individual science departments into more inclusive schools where several sciences are administered together; and some departments have been lost. The traditional pure science degrees have been supplemented by interdisciplinary, combined and joint degrees; and new sciences now compete for students who would formerly have studied physics or chemistry. The effect of introducing the MPhys/MChem/MSci

## The Student Learning Experience

degrees has been profound. Influences from Europe have not yet started to shape our approach to university teaching, but may do so as the Bologna process develops. So this was thought to be a good time to take a snapshot (or 'profile' to use the HEA's preferred description) of the student learning experience in university level physics and chemistry. It should stand as a baseline for studies of further change over the years ahead.

From published data we will summarise current undergraduate numbers and courses in the UK, together with recent trends, likewise the projected and attained A-level (or similar) entrance requirements for courses. It is already evident that there has been an upward shift in the typical A-level entrance grades asked for by Departments. In some departments, average A-level scores easily exceed that specified for entrance; in others there is a closer match.

In the student questionnaires we have sought to look at workloads (both expected and actual), the popularity and effectiveness of various teaching methods, the response of students to electronic approaches to teaching and learning, attitudes to assessment and laboratory classes, problems of transition into higher education, skills acquisition, preparation for employment and attitudes to choices in modules outside the main subject area, work experience and overseas exchange programmes. We have asked them what sort of feedback do they get, and what sort they would like; and whether they have to undertake paid work, and how it affects their studies.

The staff questionnaire will allow staff attitudes in many of these areas to be compared and contrasted with those of the students. It also indicates the extent and changing profile of specific educational training and professional development for teaching staff, and their teaching workloads. In general QAA Benchmarking and the input of the professional bodies through accreditation of degrees etc is seen as beneficial. Two areas already identified as of interest are the divergence of staff and student perceptions of workloads, and the convergence on the particular effectiveness of small-group tutorials and individual project work. It is clear that 'e-learning' is receiving a very mixed reception. Increasingly problem- and context-based learning are becoming part of the general approach to teaching, and like transferable skills, they are usually being introduced as part of the tutorial, workshop and laboratory programmes. A

wide variety of assessment techniques is being employed, and examination questions are being more and more frequently oriented towards testing student understanding and application rather than straight recall. Laboratory examinations are now almost extinct; and fixed response questions, often computer mediated, are rarely used for summative assessment but regularly used for formative or diagnostic purposes. The particular problem areas identified in the secondary-tertiary education transition will probably not come as a surprise – although it looks as though it is lack of previous experience of application of mathematics to physical problems that is more acute than any actual lack of mathematical ability. Most staff also feel students have been well enough prepared in project work, and have acquired sufficient IT skills at school, but they are light on basic physical or chemical concepts, short of laboratory experience, and need more problem solving skills when they reach university. On a few issues, the sample of responses was large enough to track divergences between Russell-group and other Universities, but differences were found to be remarkably small – and not always as expected. There appears to be a definite advantage in having Departmental research activity to stimulate both interest and project work for students.

Much of the detail will require careful mulling-over, although the overall satisfaction level seems to be reasonably high for both staff and students. In general, the structure of Physics degree courses does not vary much between Universities, and with Chemistry the picture is similar. For the future, more work may be required in understanding how to challenge the brightest students while providing good support for the weakest, and in maintaining a wide range of course provision within the sector to ensure attractiveness, relevance and suitability for students of all abilities and backgrounds who might wish to study physical sciences.

Provisional draft versions of the two reports should be available in early September, on which considerable comment will be sought to ensure that any conclusions drawn are fair and comprehensive. Publication of the final reports is planned for late October or early November. ■

*Provisional draft versions of the two reports should be available in early September, on which considerable comment will be sought...*

Higher Education Academy  
Student Essay Award

### What makes a good Physical Sciences lecturer?

Here is the winning entry for  
2008 to the Physical  
Sciences Student Essay  
Competition, by...

Frederik Floether  
University of Cambridge  
Email:  
fff22@hermes.cam.ac.uk

#### Overview

Each year the Higher Education Academy Physical Sciences Centre offers students the chance to submit their thoughts in an essay of around 1,000 words. The winner receives £250, publication on the Centre's nationally recognised website and the chance to represent Physical Sciences in the UK-wide competition. This offers a top prize of a Toshiba laptop and all expenses paid attendance at the Higher Education Academy's Annual Conference.

The overall winner of the Subject Centres' Student Essay Award 2008 will be announced in the near future.

## What makes a good lecturer?

Evaluating what makes a good Physical Sciences Lecturer is in a sense similar to judging whether a painting is of a high standard or not. Is a Picasso better than a Van Gogh? Is an objective answer to this question even possible; if so, who is qualified to make the definitive decision? Like other artists, lecturers will be assessed on the degree to which they are skilled and effective by their audiences – and assessments are certain to vary. However, certain paintings are universally recognised as being of exceptional quality. Similarly, some lecturers are viewed by a vast majority of students as talented. Accordingly, there must exist certain qualities that generally characterise a good Physical Sciences lecturer. Pinpointing these is naturally not easy. However, based on my own experience and on what I have heard from fellow students, I identified the following three areas: presentation, organisation, and knowledge. Mastering these is what most often makes a lecturer successful.

Firstly, the fashion in which a Physical Sciences lecturer presents his or her material usually makes or breaks a lecture course. Deciding on an effective approach is intricate. Studies show no definite results regarding the question whether students learn better through interactive or straightforward teaching. It is crucial to strike a balance between involving students and allowing them to passively digest the information presented. Before coming to university, I expected that lectures would consist exclusively of a professor standing up front and talking about the subject. It would then be up to the students to choose whether they would like to take notes or simply listen. However, I have actually experienced a multitude of approaches so far. At the negative end, I had a lecturer who provided a handout with plain diagrams and, when showing the annotated diagrams during the lecture, proceeded at a pace that left no time to either annotate or understand the material. It was equally irritating when, following each lecture, he would ask the audience whether any questions remained. Of course participants were hesitant to expose their lack of comprehension, so no question was ever asked. This evident obstacle must have been noticed by the lecturer. Still, the dearth of questions regularly prompted a complacent smile on his face since he seemed to misinterpret it as a sign of successful education. On the other hand, I have a chemistry lecturer whose teaching epitomises efficient dissemination of scientific material. Each lecture is carefully planned. Every student gets a detailed handout with a few gaps,

and the lecturer is meticulous about showing how to fill these in. Furthermore, halfway through the lecture, there is always a brief break during which he either conducts a relevant experiment or shares an amusing anecdote. This approach fosters students' understanding, allows them to obtain a full set of notes for revision, and keeps them motivated and focused due to the vitalising breaks.

Organisation is another key to giving a good lecture. It is imperative that a lecturer makes it crystal-clear what topics will be looked at during the lecture(s) and how these fit into the bigger picture of the specific course. From my own experience, I can say that nothing is more frustrating than having a lecturer who spends the entire lecture ploughing through notes but completely omits even a brief introduction or conclusion. Moreover, good organisation implies effective time management too. I had a physics lecturer who nicely illustrated this skill. Each lecture would start at nine o'clock sharp; hence, every student knew being unpunctual meant missing information. The lecturer would then begin by outlining the current topic and would proceed to explain the relevant theory. He provided us with the right level of detail as well. For example, the handouts contained complete derivations of equations but, in the lecture, he would only draw our attention to challenging steps that could cause confusion. Finally he would work through one or two examples to demonstrate how to apply the equations. He would finish each lecture either on time or slightly early. There are other lecturers who regularly digress; as a result, they have to rush toward the end of the lecture and finish late. When it comes to planning a lecture, the empathy that a lecturer has for students – regardless of how small the dose – can make a significant difference. Firstly, key messages are usually underscored at the end. Skipping over that part could preclude a student's comprehension of the topic. Ironic though it may sound, many students are also highly grateful for even two additional minutes of free time, especially when they have up to four consecutive lectures. I myself found that coming late, being quite stressed after rushing from one building to the other, drastically lowered my initial receptiveness to the second lecture.

Finally, a lecturer's knowledge naturally also plays a role in how effective a lecture is. A lecturer will typically have a deeper knowledge of the subject than is required for the course. The deeper this understanding is, the better. This is because a lecturer needs to know how his

## What makes a good lecturer?

or her topic fits into the subject's general context. Accordingly, he or she can show students the reasoning in and links between various theories but avoid clouding their minds with excess detail. Moreover, it would be beneficial for a lecturer to be knowledgeable, to some degree, in related disciplines too. Given that the (Physical) Sciences have so many interdisciplinary connections, a lecture can often be made all the more stimulating by occasionally highlighting how the material applies to other areas as well. One of my mathematics lecturers would, even though it was superfluous for the final exams, regularly mention what role certain topics played in the derivation and development of theories in physics. This certainly made the lectures more intellectually inspiring.

Ultimately, characterising a good Physical Sciences Lecturer is, to some degree, a subjective task, and it is most definitely a challenging one. Nevertheless, general attributes of a skilled lecturer include: effective delivery of the material, strong organisational skills, and a thorough knowledge of the Physical Sciences. Furthermore, a lecturer should be able to see the lecture from a student's point of view and be motivated to invest effort and passion into making his or her teaching stimulating as well as intriguing. Just as not every painter can create a masterpiece, not everybody can give impeccable lectures. However, every lecturer can work to make his or her lectures as rewarding as possible for all involved – including him-/herself. This will invariably lead to a mutually beneficial and satisfying learning environment; education is, after all, a cooperative enterprise. ■

*However... I identified the following three areas: presentation, organisation, and knowledge. Mastering these is what most often makes a lecturer successful*

### More on what students think

An analysis of the complete set of 14 student essays shows the following skills are considered important (in no particular order) by students in the physical sciences. For convenience, skills have been grouped under headings but some could appear in more than one category.

Roger Gladwin  
Physical Sciences Centre  
Chemistry Dept  
University of Liverpool  
Liverpool L69 7ZD  
Email: rgladwin@liv.ac.uk

#### Interpersonal skills

- Is approachable
- Shows empathy (eg speed of delivery/ balance between complexity of subject material and working in manageable chunks)
- Is a good communicator
- Has a sense of humour
- Demonstrates charisma
- Is a motivator
- Can engage students (eg to think)
- Has patience (eg to deal with questions sensitively)
- Uses a variety of styles (eg demonstrations, models)
- Has other interests outside science
- Doesn't just read from notes

#### Personal skills

- Is organised (eg arrives on time, prepared for lecture)
- Is in control of lecture hall
- Has respect of students
- Lectures with a clear voice

- Is a good presenter
- Demonstrates confidence (in themselves)
- Has ability to use technology
- Uses legible handwriting
- Provides useful notes
- Sets expectations for assignments and provides timely marking/feedback
- Acts to reduce stereotype image of scientists

#### Subject skills

- Demonstrates enthusiasm for subject (ie is a subject champion)
- Is inspirational
- Has a deep insight into the subject
- Shows the 'connections' within the subject area and wider afield (ie provides context)
- Includes links to research (own/others)
- Is not too narrow (ie demonstrates knowledge of other work in the area)
- Has confidence in subject knowledge
- Is good at elucidating difficult concepts
- Makes course material accessible
- Structures delivery (eg getting lecture/lab order right)
- Imparts knowledge successfully
- Has experience in delivering materials and of subject matter
- Helps to foster a real understanding in students
- Takes time to check understanding
- Provides suggestions for further reading (eg books, websites, journals)

## New Development Projects 2008/09

*The Centre has a limited amount of money to support academics wishing to develop and disseminate good, innovative teaching practices or to improve the quality of learning, teaching or assessment in the physical sciences.*

*Each January the Centre invites bids for funding of Development Projects which commence in September. The deadline for the 2008 call for bids has now passed and the projects below have been funded to start in 2008.*

*The next call for bids will begin in January 2009.*

A Quantum Mechanics Concept Inventory  
Simon Bates, Judy Hardy, Marialuisa Aliotta, University of Edinburgh

Web-Based Interactive 3D Simulations of Materials and Polymers  
Nick Greeves, University of Liverpool

Development of model-based learning in first year mechanics  
David Sands, University of Hull

Physical Sciences Centre  
Department of Chemistry  
University of Hull  
Hull HU6 7RX

### Director:

Prof Tina Overton  
Phone: 01482 465453

### Administrator:

Liz Pickering  
Phone: 01482 465418  
Fax: 01482 465418  
Email: [psc@hull.ac.uk](mailto:psc@hull.ac.uk)  
Web:  
[www.heacademy.ac.uk/physsci](http://www.heacademy.ac.uk/physsci)

*The Physical Sciences Centre is funded by the Higher Education Academy ([www.heacademy.ac.uk](http://www.heacademy.ac.uk)) and is part of the Academy's Subject Network. The Centre is supported by the Universities of Hull, Liverpool and Surrey.*

*Offers to contribute to the newsletter are welcomed. Please contact the Centre.*

## National Subject Profiles Launched

In a scheme similar to the Centre's *Reviews of the Student Learning Experience* (see p12 of this issue) the Higher Education Academy has launched a landmark series of publications, researched and written by the Academy's Subject Centres.

The series, entitled *National Subject Profiles*, provides contemporary characterisations of subjects and their provision in higher education. Informed by discipline communities and practitioners, no other tool currently provides such a multi-faceted view of a subject.

Three profiles have been published by the Academy's Subject Centres as part of the pilot phase of the project - **Materials, Microbiology, and Biochemistry** - which will provide a useful and unique reference work for academics, departments, students and higher education institutions and a wide range of other groups, including employers, careers advisors, and prospective applicants.

### The Profiles:

- Set out the historical development of the subject as a teaching discipline
- Show the significance of the subject at multiple levels, for example in relation to the employment sector
- Establish the current range of higher education programmes and curriculum content as well as the key teaching, learning and assessment patterns
- Establish trends: in the discipline and in aspects of the student learning experience, for example, graduate destinations
- Establish baseline comparisons with other countries including models of provision elsewhere and transferability of qualifications

More information on the National Subject Profiles can be found at:  
<[www.heacademy.ac.uk/ourwork/network/nsp](http://www.heacademy.ac.uk/ourwork/network/nsp)>

*Adapted from the Higher Education Academy News section at:*

<[www.heacademy.ac.uk/news/current](http://www.heacademy.ac.uk/news/current)> ■

## Events —2008/9—

- Plagiarism and Assessment, 19th November, Birmingham
- New and Aspiring Lecturers Workshop, 14/15th November, York
- Development Projects Meeting, 3rd December, York
- Postgraduate Demonstrators Workshop, 11th February, Birmingham
- e-learning SIG/New Technology, January/February (tbc)
- Improving the student experience in teaching laboratories and project work, 18th February, Glasgow (with IOP/HEG)
- Research-Teaching Linkages Workshop, March, Warwick CETL Centre (tbc)
- Development Projects Meeting, 29th April, York
- Departmental Representatives Meeting, 12/13th May, Warwick
- E/PBL Workshop, 20th May (tbc)
- Science, Learning and Teaching Conference, 16/17th June, Heriot Watt University
- Eurovariety, 2/3/4th September, Manchester

*Contact us or visit our web site for details.*