

Special points of interest:

- Centre Reachout resources under development
- Forensic Science - report findings
- New web design for Centre
- New HE group at IoP
- CETLs approach second stage of bidding

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LTSN Physical Sciences News

...supporting learning and teaching in chemistry, physics and astronomy



The Higher Education Academy

On May 1st 2004, LTSN became part of the Higher Education Academy.

The Higher Education Academy is a new UK-wide organisation set up to support quality enhancement in teaching and the student experience in higher education. It was formed from a merger of the Institute for Learning and Teaching in Higher Education (ILTHe), the Learning and Teaching Support Network (LTSN), and the TQEF National Co-ordination Team (NCT).

For the present, please continue to use the former organisations' existing web-sites for news, events, publications and resources.

Institute for Learning and Teaching in Higher Education (ILTHe)
<http://www.ilt.ac.uk/>

Learning and Teaching Support Network (LTSN)
<http://www.ltsn.ac.uk/>

LTSN Generic Centre
<http://www.ltsn.ac.uk/genericcentre/>

National Co-ordination Team (NCT)
<http://www.ncteam.ac.uk/>

National Teaching Fellowship Scheme (NTFS)
<http://www.ntfs.ac.uk/>

LTSN Subject Centres
<http://www.ltsn.ac.uk/index.asp?id=9>

The Higher Education Academy web site is at:

<http://www.heacademy.ac.uk/>

The Higher Education Academy will be officially launched in October. There will be four high profile events as detailed below.

- **Belfast**
Thursday 14th October 2004
Belfast Castle
- **London**
Monday 18th October 2004
Queen Elizabeth II Conference Centre
- **Edinburgh**
Thursday 21st October 2004
The Hub
- **Cardiff**
Monday 25th October 2004
National Museum and Gallery

Following these events individual Centres may run their own launch events for their respective communities. ■

Rebranding the Centre

Now that the LTSN has become part of the Higher Education Academy, it will be necessary for us to take on the livery of the Academy.

Instead the twenty-four Subject Centres will be collectively referred to as The Higher Education Academy Subject Network. We will be known as the 'Physical Sciences Centre' or where appropriate 'Physical Sciences' or just 'the Centre'.

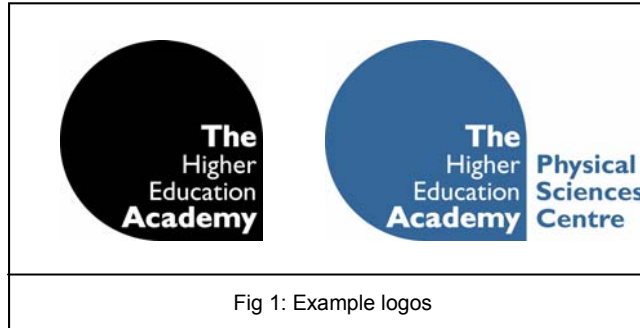


Fig 1: Example logos

Figure 1 shows two versions of the new logo—with and without the Centre designation. This may appear in a number of colours. Our preferred colour will probably be blue as this is a colour we have previously included in our old designs.

This new brand has been designed in consultation with all the parties involved and will be formally unveiled in October 2004.

A style manual is being devised for using the new branding. This will include information on colours, logos, graphic devices, stationery and fonts.

As we still have materials in the old style livery these will continue to be used but after October new publications should start to appear with the new look.

Our newly designed web site (see page 14) will also need to take on the new livery. Styles for this are also being devised and once finalised we will begin the change-over process. Because the new web is designed with ease of maintenance in mind the changes should not be too difficult.

There will no longer be a Learning and Teaching Support Network and consequently we will no longer be called the LTSN Physical Sciences Subject Centre.

An example of using the logo and other design features in a letter is shown in figure 2. ■

'Subject Centres will collectively be referred to as The Higher Education Academy Subject Network'

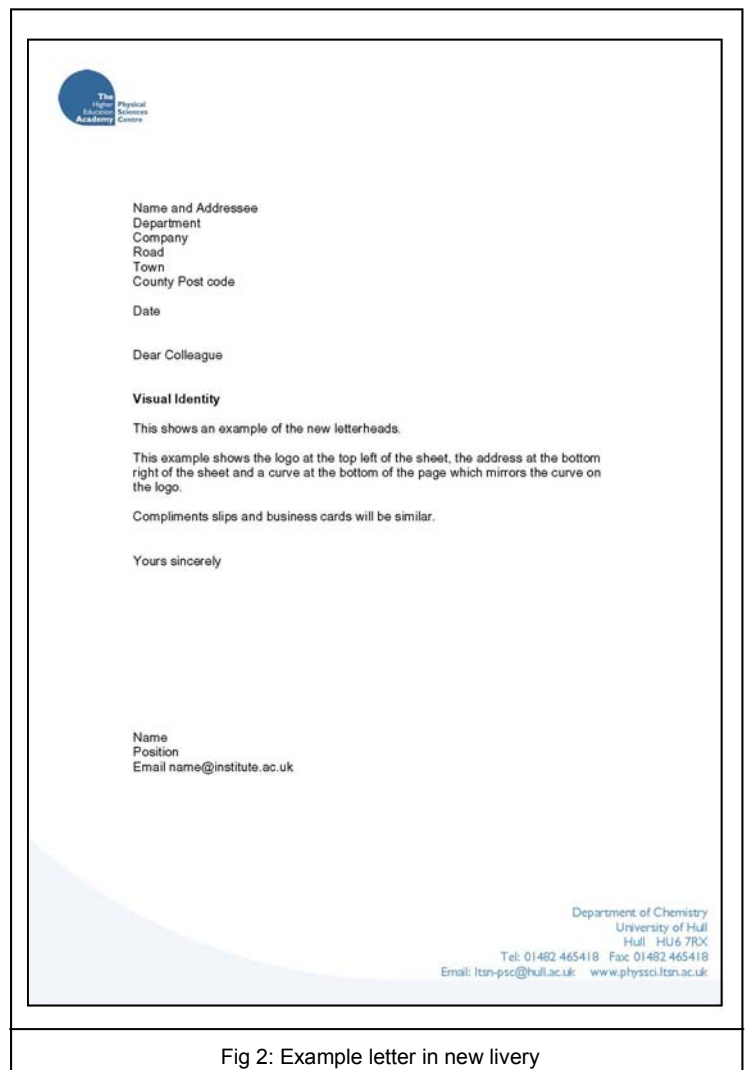


Fig 2: Example letter in new livery

This is a collaborative LTSN/SEMATA project funded largely by HEFCE

Richard Smith
 Director, Science and Technology SEMTA: The Sector Skills Council for Science, Engineering and Manufacturing Technology. Formerly CEO of the Science, Technology and Mathematics Council which merged with the engineering body EMTA in 2001. Earlier career profile included senior manager within the Qualifications and Curriculum Authority and seconded to work with British Railways Board on rail privatisation.

Forensic Science

In terms of public perception forensic science is arguably one of the most fascinating areas of science within our society. It captures the imagination of millions through documentaries, television serials and is mentioned virtually everyday in the press or on TV. It is possibly one of the highest profile applications of science known and does not suffer from the negative image of other applications of science such as GM crops and animal experimentation. People are intrigued by the work and the natural instinct in many of us takes over as we keenly observe the often complex battery of techniques deployed to arrive at a result which can be defended in court. The fact that an individual's liberty could depend on the outcome gives the exercise a dramatic dimension.

Given such prominence it is hardly surprising that forensic science degrees have become popular with universities and students in recent years. There are currently 350 forensic degree courses offered by UK universities and student numbers continue to grow. Forensic science has attracted young people to study science, who would have perhaps chosen another subject. A high proportion of them express a desire to work in the field after graduating. These are some of the findings from SEMTA's report into forensic science which was published in September. Commissioned by the Higher Education Funding Council, SEMTA, the sector skills council for forensic science, set out to examine why forensic degrees were so popular and in particular, to explore employment expectations of graduates. The work was also commissioned in response to employers' concerns that young people could well derive false expectations in terms of realistic employment opportunities.

The report, based on a limited study, took into consideration the views of students and lecturers sampled at universities throughout the UK. The study also sampled the views of employers directly involved in forensic work together with those in more general science occupations. Our findings showed that young people were attracted by the subject and many expected to follow a forensic related career on graduation. Most students preferred the forensic modules in their course as opposed to science modules which some found too difficult. As mentioned earlier, some students were attracted to study forensic science as opposed to other subject areas which is a success in its own right.

From an employers' perspective there was much confusion about forensic science degrees. Many were unaware of them, others were dubious about content and those directly involved in the profession remain strongly in favour of pure science degrees such as Chemistry or Biology as principal entry requirements. While forensic science degrees are popular with universities and their students, much needs to happen to convince employers both in the profession and those within the wider science community that these degrees will provide both the science content and analytical problem solving skills needed in industry today. The general feeling, particularly from the profession, is the need for greater emphasis on pure science in the degree content. Universities should be encouraged to use their marketing literature to point to career opportunities in forensic science, pharmaceuticals and biotechnology.

The report also raises a number of issues in relation to government policy on Higher Education. The introduction of top up fees, the 50% participation target for higher education and a funding mechanism which some see as encouraging numbers rather than quality is not the most effective approach to maintaining the high quality science base needed to sustain economic growth. Universities are facing commercial pressures and will market products which attract the numbers of students needed to remain economically viable. Pure science simply does not sell courses; forensic science on the other hand attracts students.

The essential equation is one of supply and demand. To survive universities need to think of more imaginative ways of staying in business. Students are not attracted by pure science, which is a wider issue that needs to be addressed in schools/ community and by policy makers. Employers need more people with pure science, analytical thinking and problem solving skills. So do forensic science graduates cut the mustard? According to our study the answer is far from conclusive but indications are that students with hybrid degrees generally lack sufficient science knowledge, problem solving and analytical skills needed by industry.

So what is happening next? SEMTA in partnership with Universities UK will take forward the recommendations in this report with employers, government and universities with the aim of ensuring that graduates possess the skills and knowledge needed by industry. ■

Steve Walker
LTSN Physical Sciences
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Liverpool University

The Chemistry Box

The Problem

Many Physical Science departments are struggling to attract sufficient numbers of suitably-qualified students. This has led to the complete closure of a number of departments, a merger with cognate disciplines for some, or relegation to a "service teaching" role for others. Despite this dramatic fall in capacity, there is still a shortfall that is a major cause of concern for all but a handful of institutions. Furthermore, virtually everyone is worried that the most able students are not opting for a science-based subject as career choices.

Surveys

Surveys show that Physics students are most influenced in their choice of planned honours school by their enjoyment of the subject (87%), success in examinations (74%) and their teachers (27%). Demonstrations (9%), parents (9%), the media (4%), and their peer group (3%) were much less important. The message is clear (Norman Reid in "Getting Started in Pedagogical Research in the Physical Sciences", LTSN Physical Sciences Practice Guide) –

School experience is the dominant factor – the quality of the school syllabus and the quality of the teachers is critical.

The principal area where we may have an influence, as academics, is in the perception of career opportunities.

Nick Jagger, in a substantial document (The Right Chemistry: The choice of chemistry courses and careers, Institute for Employment Studies) re-iterates and expands on this. Some of his many points, aimed at University teachers are –

Build on the public's positive attitudes to the products of chemistry.

Re-claim topics such as nano- technology for our own.

Encourage teachers to use appropriate materials.

Understand students' career aspirations and publicise remuneration.

Develop new curricula, and be aware of changes in education.

Cooperate, not compete, when responding to funding problems.

A Partial Solution

Create a portfolio of stimulating resources in the Physical Sciences illustrating :-

- Wide Career Opportunities - inside and outside of science
- Importance to society and individuals
- Relevance to everyday life
- Fun and Enjoyment with plenty of hands-on activities

These resources will be made available to teachers both physically and via visiting academic speakers.

The time constraints of teachers implies that these materials must fulfil their purpose using the fullest descriptions to minimise preparation and supervision requirements.

The Chemistry Box

- A collection of Chemistry experiments ranging in difficulty from ones requiring little supervision to "demonstration-only" versions.
This is available now and currently contains 60 experiments.
- Spreadsheets downloaded from Government Statistics covering Remuneration and Employment. Presented via 'PowerPoint'.
These are available now.
- Practical resources such as structure-drawing software.
A distribution licence has been obtained allowing any bona fide chemistry student to install 'IsisDraw'.
- PowerPoint presentations summarising government surveys covering public attitudes to science and the qualifications of university entrants.
These are available now.
- Case Studies (All PowerPoint presentations)

The series is introduced by establishing the critical role in society occupied by the chemical industry. Entitled 'Waking without Chemistry' it is a light-hearted look at what would happen to a typical school student's morning routine if the chemical industry had never existed. It briefly points out the massive effect of chemistry on our lives by looking at semiconductors, power, food, clothes, cosmetics, transport and medicine. This introduction will naturally lead on to more detailed monographs such as:-

The Chemistry Box

- Atoms and elements-the building blocks of chemistry (e.g. semiconductors)
This is available now.
- The chemistry of the car
- Discovering the secrets of the nucleus-from photography to medicine
- The arithmetic of chemistry-concentrating on difficult concepts
- An introduction to organic chemistry-the power of hydrocarbons
- Petroleum
- Acids and bases
- Oxidation and reduction
- Solids, liquids, and especially gases-the states of matter
- Surfactants-soaps and detergents: cleaning up with chemistry
- The environment-the meaning of pollution
- Energy, food, fats, and oils
- Carbohydrates
- Proteins and the chemistry of life
- The chemicals of food-minerals, vitamins, and additives
- Poisons, toxins, hazards, and risks-what's safe and what isn't
- Polymers and plastics
- Cosmetics and personal care
- Medicine and drugs

■ Computer assisted learning modules (all available now)

- Chiral molecules
- Diastereomers
- Conformations
- Projections
- Carbonyl compounds
- Aromatic substitution
- Alkenes and alkynes
- Alkyl halides
- Introduction to spectroscopy
- NMR spectroscopy
- Atomic structure
- Descriptive trends in the Periodic Table
- Numerical trends in the Periodic Table
- VSEPR theory
- Molecular energy storage
- Elementary radioactivity
- Gaseous equilibrium thermodynamics

Tools

- Chemical calculator
- Periodic Table database
- Molecule viewer
- Glossary

Help with....

- Algebraic manipulations
- Tables and graphs
- SI Units

Moles

- Definitions
- Images of moles
- Molar mass (easy, more difficult)
- Molar quantities (easy, more difficult)
- Element percentages (easy, more difficult)
- Empirical formulae (easy, more difficult)
- Reactions (30 different reactions)
- Solutions
- Volumes
- Titrations (solid and solution)
- Mass calculator tool

Kinetics

- Introduction
- Concentration-time curves
- Instantaneous rates
- Initial rates
- Half lives
- Integrated rates
- Reaction mechanism simulations

The Maxwell equation

- Formula properties (plus simple calculations)
- Temperature effects
- Activation energy effects (inc. catalysis)
- Simulation of chemical equilibrium

The Chemistry Quiz (An infinite number of numerical problems)

- Volumetric calculations
- Algebraic manipulation
- Thermochemistry calculations
- Particles & waves
- Spectroscopy calculations

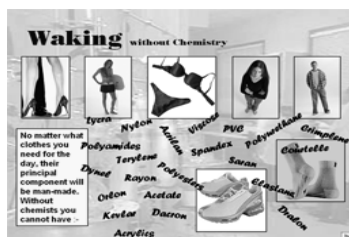
Complete with its own calculator

Spectroscopy

- Mass spectrometry, mechanism and problems
- Infrared spectroscopy, mechanism and problems
- NMR spectroscopy, chemical shifts, coupling constants and problems
- Combined problems (IR + MS, IR + NMR, MS + NMR, MS + IR + NMR)
- Training videos for the interpretation of spectra in all three techniques (50 minutes)

Particles and Waves in Chemistry

- Electromagnetic waves
- Wavelength and frequency
- The electromagnetic spectrum
- Radiation energy
- Atomic spectroscopy
- The spectrum of hydrogen
- Diffraction
- De Broglie equation
- Photoelectric effect
- Interference. ■



Robert Lambourne
Head of the Department of Physics and Astronomy at the Open University, where he has contributed to undergraduate textbooks on general physics, introductory astronomy and mathematics for physical scientists. He is secretary to the Physics Education Division of the European Physical Society, a member of the American Association of Physics Teachers, and the Chair of the IoP's Higher Education Group.

and

Raymund Jones
Senior Tutor in the School of Physics and Astronomy at the University of Birmingham and a member of the Theoretical Physics Research Group in the School. He is Chair of the University wide Welfare Tutors' Forum and serves on a number of University Committees advising the University on its welfare policies and other related issues. He has initiated a number of innovations associated with the delivery and assessment of teaching within the School. His research interests lie in Condensed Matter Theory and Statistical Mechanics. He is Secretary of the Higher Education Group of the Institute of Physics.

The Institute of Physics Higher Education Group

A new Group, devoted to Higher Education, has recently joined the corpus of Groups and Divisions that recognize and reflect the interests and concerns of members of the Institute of Physics. In this article we outline the aims and aspirations of this new Higher Education Group (HEG), provide details of the Group's plans for the immediate future, and describe how you too can become involved in this important new enterprise.

The Institute of Physics (IoP), the professional body for UK physicists, has long had a strong interest in all aspects of physics education. This is reflected in the structure of its Boards and Departments which are charged with the formulation and enactment of IoP policy, and in the quite separate arrangement of Groups and Divisions that reflect members' interests but do not directly determine policy. In this latter sphere, a great deal of valuable work has been carried out, over many years, by the Education Group, the Committee of which has traditionally included university physicists along with school teachers and teacher trainers. Many readers will already be familiar with the Higher Education (HE) events that the IoP's Education Group has organized, and with the many opportunities it has provided, through its annual residential conferences and other gatherings, for all those with an interest in physics education to meet and to exchange ideas and information. Now however, following a proposal from a group of university physicists, and with the support of the Institute's Education Department, the Institute's Council has approved the establishment of a new Group, entirely devoted to Higher Education, but constituted in such a way that the important links between the various levels of education that the Education Group sponsored will be preserved and possibly even strengthened.

The need for a separate Group devoted to HE was made clear by the inaugural meeting of the Group, held at the IoP's London headquarters on 24th March 2004. The following are just some of the topics that were raised by the 30 or so attendees in a very lively and constructive discussion.

- Recruitment and retention of undergraduates
- Training and professional preparation of postgraduates, including issues associated with training accounts and the teaching role of postgraduates in laboratories, problems classes and tutorials

- The training and induction of new academic staff
- Developments in HE pedagogy and (university level) physics education research
- Welfare issues relating to students at all levels in HE, including health and disability
- Government and HEFCE initiatives and their impact (e.g. the Centre of Excellence for Teaching and Learning (CETL) initiative)
- The impact of IoP initiatives, (e.g. the proposed bursaries for physics students)
- The problems associated with plagiarism
- School/university interface issues, including student support in problem areas such as mathematics
- The significance of the Bologna declaration and other issues surrounding European integration, including student exchanges and the recognition of UK qualifications, particularly the integrated Masters degrees, MPhys and MSci.

In addition to a list of topics, the meeting also considered the ways in which the Group could most usefully contribute to the discussion of these topics, many of which are already the subject of ongoing debate. In some cases it was felt that a meeting or meetings would be the appropriate forum, but in others it might be better to facilitate information exchange through a newsletter, a listserver (like the very successful Physics Teaching New & Comment (PTNC) system used by school teachers) or a website. There was also a strong feeling that, as it develops, the HEG should aim to create links between communities with similar interests, such as Admissions Tutors, Welfare Tutors or Directors of Teaching. The potential contributions of students were not overlooked either. An issue raised by several contributors was the importance of providing opportunities for students (particularly postgraduates) to become involved in the work of the HEG as well as being the subjects of some of its discussions.

The Institute of Physics Higher Education Group

Following this very positive start, a Group Committee was formed. This has now held two meetings, as a result of which various actions have been taken to further the Group's aims. An HEG website has been established which will carry meeting announcements and minutes, along with more general news items, such as the recent and very welcome announcement that Derek Raine (University of Leicester), a member of the HEG Committee, has been awarded one of the prestigious National Teaching Fellowships. Arrangements have been put in place for the production of a printed Newsletter that will be sent to all members of the Group, and, initially at least, also be made available to all interested physicists working in HE. The Newsletter is being edited by Dimitra Darambara (University of Surrey), who would welcome contributions. In addition, a number of one-day meetings are also being planned. The first meeting is scheduled for 20th October 2004, at the University of Birmingham, and carries the title 'Physics through Projects'. This will be followed by a second meeting, due to take place on 15th December 2004, at IoP headquarters in London, with the title 'Student Skills at the School/University Interface'. This second meeting is being organized jointly with the Education Group, partly through the good offices of John Williams (University of Sheffield) who sits on the Committees of both Groups. It will include the HEG's first Annual General Meeting, as well as contributions on the skills that students can be expected to have on entry to university, the efforts being made to assess those skills and the positive steps that are being taken to remedy any deficiencies. Other events in the pipeline include a discussion of The MSci and the European Dimension, a meeting on Assessment in Undergraduate Programmes and co-sponsored sessions on Problem Based Learning and Computational Physics.

The number and range of the planned activities testify to the energy and enthusiasm that exists within the HEG. Individuals with strong links to LTSN have been notably supportive, and Physical Sciences Subject Centre Director, Tina Overton (University of Hull), has already shown herself to be valuable and active co-optee to the HEG Committee. Other members of the Committee, apart from those already mentioned, include Eamonn Cunningham (Dublin City University), Helen Heath (University of Bristol), Danny Atkins (Quinetic), Mick Brown (Cambridge University), Gareth Jones (Imperial College, London) and our latest recruit, Jason Wye, who will provide another link with the Education Group, which he will Chair from November.

We hope that members of the HEG will find the planned programme stimulating and worthwhile. We also hope that it will attract others to join the Group so that they can influence future programmes and continue receiving information about HEG activities even when the publicity announcements associated with the HEG's inauguration are distant memories. For IoP members, joining the Group is easy and it's free during this first year of the Group's operation. Letters with tear-off membership strips have been sent to the heads of all UK university physics departments, and those visiting the HEG website can join on-line by clicking on the "Join the Group" link. Naturally, we hope that the existence of the HEG, with its strong professional focus and determination to address practical issues of wide concern in a positive but down-to-earth fashion, will appeal to many, including some who are not currently members of the IoP. The Group Committee are certainly determined to do all they can to meet the wants and needs of the HE Physics Education community (both within and without the IoP) and to help that community to make clear its concerns, achievements and hopes for the future.

The HEG website can be found at <http://groups.iop.org/HED/>. ■

'An issue raised by several contributors was the importance of providing opportunities for students (particularly postgraduates) to become involved in the work of the HEG'

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Streaming Video: Some Practicalities

Background

There are a number of difficulties in using videos and animations in learning and teaching packages, e.g. students lose them, fail to return them on time, and damage VHS tapes, CD-ROMs and DVDs. Additionally, it is not always possible for students to obtain access to such materials when they want them, e.g. laser video discs can only be accessed on site, the download times for video material from the Internet can be very long especially at certain times of the day, and material taken directly from the Internet is often not specific to the student's needs.

An answer to these difficulties is to deliver, i.e. "stream", the video and audio material appropriate to the course, subject to copyright clearance and licensing, on the institution's Intranet. A number of sources, e.g. British Universities Film and Video Council (<http://www.bufvc.ac.uk>), have described and discussed the background to this topic in considerable detail and the names of commercial companies, which can provide "streaming" services, are available via the BUFVC web site.

At Southampton we have delivered the videos on "Practical Laboratory Chemistry", produced by the Chemistry Video Consortium (<http://www.chemistry.soton.ac.uk/cvc/>), over a local 100Mbps network by two routes. In this Technical Note we shall not discuss the theoretical aspects of "streaming" (see above) but rather we shall describe our practical experiences, which we hope will be useful.

"Practical Laboratory Chemistry" Videos

"Practical Laboratory Chemistry" was produced in CD-ROM format in 1999 from a video series "Basic Laboratory Chemistry" (1995/96; 19 VHS tapes/laser video discs with bar code booklets; 9.5 hours video; Betacam SP quality, i.e. broadcast quality). The series of CD-ROMs (19 discs; obtainable from Viewtech Educational Media; (<http://www.viewtech.co.uk>) corresponds exactly with the original videos and comprises more than 80 experiments and techniques covering all aspects of basic practical Chemistry. The videos (Betacam SP) underwent compression (MPEG1) to produce the videos for the CD-ROMs with resulting

SVHS/VHS quality and where the user can access full programs or parts of programs. For example, "Solvent Extraction" comprises: choosing a separating funnel, safety points, the ratio of sample to solvent, extracting with less dense solvents, washing with brine solution, extracting with denser solvents and drying extracts.

Delivering "Practical Laboratory Chemistry"

"Practical Laboratory Chemistry" has been delivered in two ways:

1. By loading the CD-ROMs directly onto a dedicated server which can be downloaded by Southampton students and staff via the University of Southampton Network. This Network is accessible to Southampton users from anywhere but cannot be accessed by external Internet users. These MPEG1 files provide pictures at VHS quality (see below) and can be played at "regular size" and at "full screen". The latter provides images which are acceptable for large screen projections, e.g. in a lecture theatre. The files are quite large, e.g. from approx 10MB to 260MB. The first demonstration (see below; 7m 20s video; B1.mpg) corresponds to 145MB.
2. By re-encoding the MPEG1 files to Windows Media format, uploading them onto a Windows Media Server on the Southampton University Network, and restricting access to University staff and students. In this case the file size is much smaller. The second demonstration (7m 20s video; B1.wmv), which is the same clip as the first one, corresponds to 21MB. These files, however, still give acceptable "full screen" pictures and for projection in a lecture theatre.

The minimum conditions and configurations for play back under both regimes are: Windows Media Player 6.4; Pentium 90MHz processor; 16MB RAM; 16-colour display card; 16-bit sound card; headphones or speakers; LAN connection; Windows 95.

Use the links below to see examples of the same video clip under the two regimes:

"Progressive download" (http://dept.chem.soton.ac.uk/plc/B2_1.mpg)

"Streaming" (http://www.iss.soton.ac.uk/development/e.media/media/B2_1.wvx)

Streaming Video: Some Practicalities

Technical Specifications

The technical specifications of the two regimes are:

“Progressive download” via a Dedicated Server

Host system:

Custom built server commissioned
1999/2000 based on
Single Pentium PIII Processor 500MHz
528MB Memory
Asus Dual processor motherboard
Intel Pro100 + Server Adapter NIC
Adaptec 29160N Controller
2 x IBM DDYS-T36950 N Hard Drives
36GB each

Software:

Novell Netware v5.1 sp6 NDS v8.85
Novell Enterprise Web server v5.10f

Set up cost/time:

Time to build and install server and upload files approx 3 days
Cost for server hardware approx £1000
Novell Netware software provided to departments at no cost

“Streaming” via a Windows Media Server

Media files suitable for streaming were re-encoded from MPEG1 files using:
Media Cleaner XL v6.0.3 service pack 2
(available from <http://www.discreet.com>)
installed on a Dell 350, Pentium 4, 1GB RAM, running Windows XP.

Video Codec: Windows Media MPEG-4
Video V3, 350kbps, 320x240
Audio Codec: Windows Media Audio 9,
32kbps, 44kHz, mono.

Uploaded to Windows Media Server 2003
Standard Edition running on a Viglen PC
with Pentium III, 2GB RAM.

Set up costs/time:

Download MPEG1 file from website: 15s per file,
applying encoding settings and metadata in CleanerXL: 30s per file,
encoding time: 7min for a 7MB file,
upload to Server: 10s,
configuring Publishing Point: 30s,
applying security permissions: 30s.
The 98 files in this series took approximately 17 hours to process.
Dell 350: £1044
CleanerXL: £525
Viglen server: £450

Concluding Remarks

Either system can be used to provide courseware material for any subject. Such material can be enhanced by being incorporated into a courseware management system, e.g. “Blackboard” and “WebCT”, to enable the inclusion of background theory, quizzes and worked examples in the case of the original “Practical Laboratory Chemistry” CD-ROMs. In this way resources customised to actual needs can be produced rather than students having to plough through irrelevant materials.

The two systems can also be used to help with the management of an institution’s archive of “master” images because when users access the “master” images there is always the possibility that the “master” material can be damaged. Accessing the same material for reviewing purposes via a “streaming” system, while the image quality is lower, the access time is faster and the “master” images are not degraded. ■

‘In this Technical Note we shall not discuss the theoretical aspects of “streaming” ... but rather we shall describe our practical experiences’

Paul Chin
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'we are working closely with bidders to explore ways of ensuring that the good work undertaken by CETLs is shared with the rest of the physical sciences community'

Centres for Excellence in Teaching and Learning (CETLs)

What are CETLs?

In January of this year, HEFCE put out a call for bids for the anticipated Centres for Excellence in Teaching and Learning to 'reward excellent teaching practice and to invest in that practice further in order to increase and deepen its impact across a wider teaching and learning community'. HEFCE funded higher education institutions and directly funded further education funded institutions with at least 500ftes were allowed to bid for a share of £315 million available for five years from 2004/05 to 2008/09, which includes £140 million for capital in the first two years of funding.

In the bidding document HEFCE stated that a bidder could define their own area of excellence, which could focus on a specific subject discipline; theme, such as problem based learning; or a cross disciplinary focus such as widening participation. Based on the size of the institution, they were allowed to submit up to 3 bids and be the lead in a further collaborative bid, or substitute one or more single bids for additional collaborative bids. So there are no hard and fast rules about what format a CETL should take other than that it should be focussed on promoting and further developing excellence in teaching and learning.

HEFCE intend to fund about 70 CETLs and have a graded funding structure based on the size of institution. Table 1 shows how the funding is calculated. The funding is based roughly on numbers of fte students the CETL will directly apply to, with a guide of a funding ratio of £1000 per student. So an institution with £200,000 per year will be expected to have an impact on at least 200 students.

Table 1: CETL funding grades

Recurrent funding	£200,000	£350,000	£500,000
Capital funding	£800,000	£1.4 million	£2 million

Bidding process

The bidding process is two stage and stage one has already been achieved, with official bids having to be submitted by 23rd April. At this stage bids had to make their case for excellence, evidenced by scholarly practice and a good track record of excellence in the choice of their CETL topic. An assessment panel looked at all the bids and individual bidders were allowed to request a specialist reviewer if

they felt this would help evaluate their specialist bid with greater insight.

At stage one there were 259 bids received from 126 institutions and the bids successfully through stage 1 were notified at the end of June/beginning of July. There were 106 successful stage 1 bids, of which 24 were collaborative bids. Table 2 summarises the remaining timetable for the bidding process.

Successful Stage 1 physical science bids

Many bids were collaborative and more were cross disciplinary so it is pleasing to see that four bids specific to the physical sciences were successful at stage 1.

University of Bristol
Bristol ChemLabS (Bristol Chemical Laboratory Sciences)

Nottingham Trent University
Centre for Effective Learning in Science (CELS)

Open University
The Open University Institute for Distance Teaching in Mathematics, Science and Technology

Open University
Centre for Excellence in Innovative Physics Teaching

However, this does not mean that there will only be four potential physical science CETLs as many more may have a positive impact for our disciplines. For example there are a number of elearning bids which, if successful, could also offer many benefits for the teaching of physical sciences.

Higher Education Academy involvement with CETLs

Within the bidding criteria HEFCE asked that all bids build in capacity to work closely with the Academy and the associated subject centres. As the Physical Sciences Centre within the Academy we are working closely with bidders to explore ways of ensuring that the good work undertaken by CETLs is shared with the rest of the physical sciences community.

Centres for Excellence in Teaching and Learning (CETLs)

This is a very important aspect of CETL work as it ensures that aspects of teaching and learning that have a proven record of excellence can be shared with the whole of the academic community through the support of the Academy. This will ensure that whilst HEFCE can only fund a limited number of CETLs, all of HE will benefit.

Another component of the stage two bidding process is that bidders have to develop a plan for sustaining the activities of the CETL after the initial 5 year funding ends. This means that potential CETLs have to show that their activities are embedded into their every day operations and are not seen simply as a short term project. This makes involvement with the physical sciences centre even more beneficial as we will be able to continue to promote the good work of CETLs for a very long time to come.

Further information

You can find further information, including all the guidelines covering the submission of stage 2 bids from the HEFCE web site at:

<http://www.hefce.ac.uk/learning/TInits/cetl/>

or from the Higher Education Academy site at:

<http://www.heacademy.ac.uk/CETLs/>

which also offers information about the Northern Ireland process and a list of frequently asked questions. ■

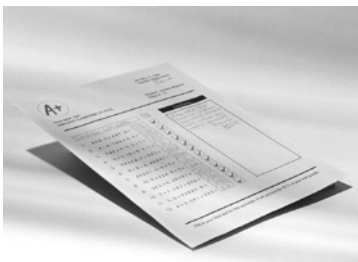


Table 2: CETL timetable

by midday, 29 October 2004	Submission of applications for second stage bids
January 2005	HEFCE Board decisions on successful CETLs Announcement shortly thereafter
March 2005	Signed contracts, funding of CETLs commences

Working with Scotland and Wales

Although the funding councils for Scotland and Wales are not involved in the CETL process this does not mean that colleagues in both countries will not be able to benefit from this work. Whilst colleagues in Wales and Scotland could not bid for CETLs our centre has a UK wide remit, so they will still be able to tap into the work of the CETLs and benefit from any resources and good practice that develop over the coming years.

CETLS in Northern Ireland

The funding council for Northern Ireland has decided to provide its own support for CETLs, with a bidding process similar to that of HEFCE. The Northern Ireland process differs in two respects from the HEFCE scheme: there is no capital expenditure element; and it is a threshold scheme and consequently it is possible for all bidders to meet the requirements. There is potential however, for the work of the CETLs to overlap and share good practice and the Academy will help support CETL work across the UK.



Tina Overton
LTSN Physical Sciences
Chemistry Dept
University of Hull

This is an extract from our annual report submitted to our executive management group.

[we are] developing significant resources to help academics take part in successful Reach Out activity'

Addressing HE priorities: 1 - projects

Widening participation

Widening participation (WP) within the physical sciences is inevitably tied to recruitment as competition for those students studying chemistry and physics increases. The focus of our activity in this area has been to focus on the prospective students, to raise their aspirations in science and to focus on curriculum development in order to offer courses which may be more appealing to non-traditional students.

a) Projects

Three projects relevant to widening participation commenced in September 2003:

1. School Teacher Fellows in Chemistry
Prof David Cole-Hamilton, Chemistry Department, St Andrews University
2. Developing an Undergraduate Module in Public Science
Dr Graeme Jones, School of Chemistry & Physics, Keele University
3. Widening Participation: Physical Sciences
Dr Paul Taylor, Department of Chemistry, University of Warwick

b) Events

A workshop on 'Student Support and Retention' was run in Scotland to address WP issues and also the Scottish Quality Enhancement agenda.

One of the successful development projects from the 2002 round presented five departmental seminars on 'Widening Participation in Chemistry' (Dr Paul Taylor, Chemistry Department, University of Warwick).

c) Resources

Two of our Consultants have each spent approximately 1 day per week for the past year on developing significant resources to help academics take part in successful Reach Out activity. The work on these Chemistry and Physics Boxes is ongoing and they will be launched next spring.

Employability

Our Employability project has already produced a Briefing Paper and Toolkit and electronic card sort exercise. The major outputs from the project, a Practice Guide and comprehensive Resource Pack, will be disseminated during July/August 2004. The pack will provide student handouts and tutor guides for approximately 20 activities which relate to the development of career planning, communication, CV writing and interview techniques for physical scientists. The pack has been further developed to include video resources on interview techniques. The resource will also include a section on professional practice and will clearly link to the development of PDPs. The pack will be made available to other Subject Centres for customisation. There has already been plenty of interest from the physical sciences community and we have run several very successful departmental workshops for students and staff.

We have also engaged in the Student Employability Profiles project, being run by the LTSN Generic Centre.

Entrepreneurship

Although we have not tackled this issue specifically this year, we do have some resources available on our website in the form of the report of one of our Development Projects 'Developing Business & Entrepreneurial Skills for Physics Students' by Derek Raine (University of Leicester).

Addressing HE priorities: 2 - geographical coverage

What are we doing outside England?

Activity in Scotland

We have 15 Departmental Representatives from a possible maximum of 18.

One of the eleven Development Projects funded this session is in Scotland.

One workshop on Student Support and Retention was held in Glasgow and a departmental workshop took place in St Andrews. A separate visit on employability at St Andrews also took place.

A total of 89 academics from 7 institutions in Scotland attended LTSN Physical Science events during 2003/4 with a further 22 attending the workshop at Glasgow, 19 at the event in St Andrews and over 27 students at the St Andrews employability visit.

We have commissioned two Practice Guides from a colleague at Glasgow University.

One of our Special Interest Groups is organised by a colleague from St Andrews University.

The Chair of our Advisory Committee is from St Andrews University.

Activity in Wales

We have eight Departmental Representatives from a possible maximum of eleven.

A total of 110 academics from institutions in Wales attended LTSN Physical Science events during 2003/4.

We held a workshop on the use of VLEs at Cardiff which attracted 25 participants.

We also ran employability visits at Cardiff and Swansea and held a Creative Science residential event at Gregynog, University of Wales.

One member of our Advisory Committee is from the University of Cardiff.

Activity in Northern Ireland

We have two Departmental Representatives from a possible maximum of three.

One of eleven Development Projects funded this session was based in Northern Ireland.

A total of 9 academics from institutions in Northern Ireland attended LTSN Physical Science events during 2003/4. ■



Roger Gladwin
LTSN Physical Sciences
Chemistry Dept
Liverpool University

"The address is <http://www.physsci.ltsn.ac.uk/>"

New look web site

Our new look web site is now operational. By now most of you will have had the opportunity to use it, but just in case...

The web is now mounted on our own server over which we have full control. The address is <http://www.physsci.ltsn.ac.uk/>.

For those of a technical background, this is a database-driven, Content Management System web site and is designed for ease of maintenance and with future-proofing in mind.

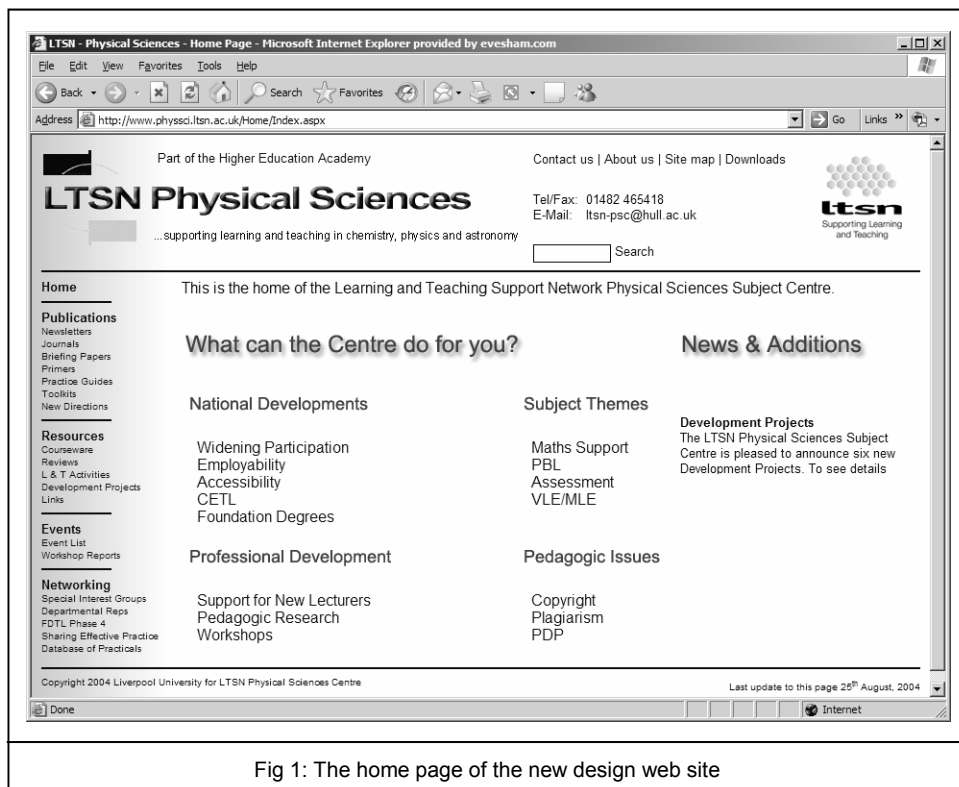


Fig 1: The home page of the new design web site

This is the same as our previously published web address but due to the setup on the University of Liverpool's server this defaulted to addresses that began with <http://dbweb.liv.ac.uk/ltsnpsc/>.

Anyone who wishes to use this web but has bookmarked the dbweb.liv.ac.uk address should change to the new address. In the short-term we will be setting up a redirection to the new pages but over time this will be withdrawn by the university.

The home page is now thematically oriented (under the headings: national developments, subject themes, professional development and pedagogic issues) so users should be able to find the help and resources they need more easily. Over time this facility will be augmented as resources become available. For those used to the previous web site we have retained the left hand menu with access to most of the web pages and at the top of the page there is a link to a site map for everything else!

The tools used include Microsoft .NET technology and Microsoft SQL Server: the web site is mounted on a Microsoft Server 2003 system.

Garry Pilkington, our web developer, is responsible for the background design, with the front-end user interface being a team effort from all those in the Centre.

We hope this web site is useful and we welcome comments on its usability and content. ■

The Centre has recently distributed a set of resources designed to help students of the physical sciences develop skills for employment.

The authors are...
Paul Chin, Della Grice and Tina Overton
LTSN Physical Sciences
Chemistry Dept
University of Hull

'The aim is to provide academics with a range of easy to implement activities that develop undergraduate key skills in an employment context'

Employability Resources

The Employability Resource Pack has now been distributed by the Centre.

The pack is a structured resource that can be used as a complete module or as individual exercises to support other career-based activities. The aim is to provide academics with a range of easy to implement activities that develop undergraduate key skills in an employment context. The resources have been designed specifically for the physical sciences community. The direct relevance of the activities to the physical sciences enables students to re-

These relate to the five sections of the resource pack:

- Starting out
- Skills development
- Achieving results
- Finding information
- Looking forward and maintaining professionalism

The activities are designed to be used in an informal workshop style. Some of the activities are individual student activities and some require group work. Depending on the type of activity, students may be

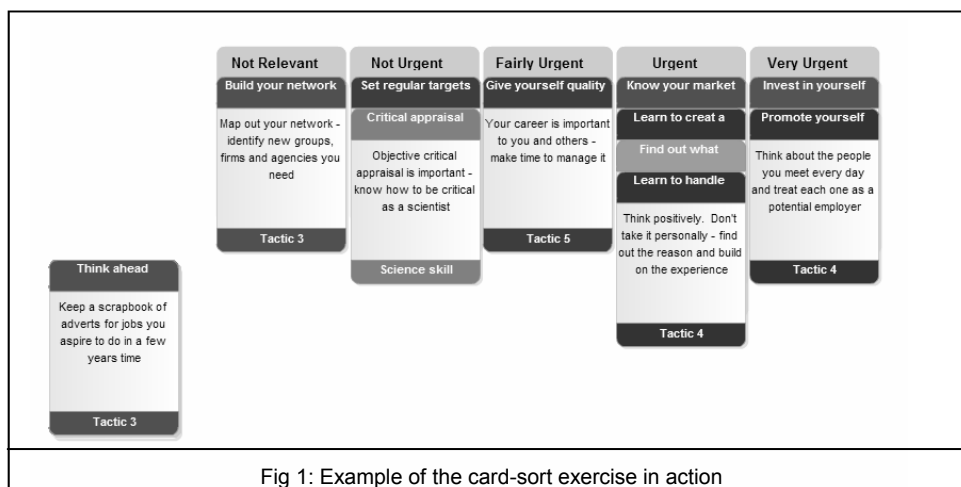


Fig 1: Example of the card-sort exercise in action

late their skills development to their studies and see the links to future employment.

A Tutor's Guide accompanies each activity. The guide outlines the aim and nature of the relevant student activity and, where applicable, a suggested assessment scheme is included. The student activity sheets clearly set out what is required and contain any relevant additional information as handouts.

The activities are divided into five main categories:

- Considering career options and which skills employers are looking for
- The skills that are needed to obtain interviews and secure employment i.e. CV
- Writing and interview technique
- Developing communication and presentation skills
- Getting the most benefit from careers services and recruitment fairs
- Thinking ahead in a professional way

required to prepare work outside of a time-tabled session. The resource has been successfully trailed with second and third year students.

The pack is also accompanied by a CDROM with all the resources for ease of copying (within FE/HE in Great Britain and Ireland), other useful resources on employability from the Centre, an electronic version of the card-sort exercise and some video materials on interview techniques. ■

New Development Projects

The Development Projects funded by the Centre in 2004 to 2005 are:

Enterprise Skills for Physics Undergraduates

Dr Douglas Halliday, University of Durham

Chemistry in Contemporary Society

Prof Richard Henderson and Dr Bob Groves, University of Newcastle

Industrially Sponsored Context Based Undergraduate Chemistry Practicals

Dr David McGarvey, University of Keele

A Resource for Introducing Molecular Modelling into the Undergraduate Curriculum

Dr Patrick J O'Malley, UMIST

Supporting and Retaining New Students in the Chemical Sciences

Dr Elizabeth Page of University of Reading and Dr Adam Bridgeman of University of Hull

Computer Aided Assessment and Feedback

Dr Gareth Price, Prof Ian Williams, Dr Simon Bedford, Dr Andrew Burrows, Dr June Mercer-Chalmers and Ms Clare Goodfellow, University of Bath

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Events —2004—

- Physical Sciences and Philosophy across Disciplines, 27th October, University College, London
- Helping Chemists to Tackle the Maths Problem, 17th November, London
- Using technology for effective and efficient assessment, 1st December, Loughborough

Good Bye

We have been fortunate in the past in that a high level of staffing was possible, in part, because of the accumulated underspend and additional funding from previous years. However, we are now in the situation where we only have baseline funding available. This means that we cannot maintain the level of activity that we have delivered this year and it has become essential that we reduce our expenditure on staffing. We have had to make some very difficult decisions in the past few months.

One of our consultants, Ashley Clarke, is retiring from Leeds and originally had planned to finish his involvement with the Centre at the end of this year. However, instead he will be winding down his level of activity with us during the period up to summer 2005 by which time the Physics Box project on which he is working should be completed.

Our part-time secretary, Jane Mottram has worked for us on a number of projects since 1989. Until recently she had been co-funded by LTSN and TLTP money from the Chemistry Courseware Consortium. The latter funding has now

run out and as she decided she needed a full time post she is moving to another position in the University of Liverpool.

Della Grice was employed as a Development Officer at Hull to address our Employability project. That project has now been completed successfully. Unfortunately the funding finished in June and we have been unable to support an extension to her contract.

Our part-time Development Officer at Surrey University, Simone Richardson has been working with the Centre since 2001 on a renewable contract. Sadly, again because of funding restrictions we have been unable to extend her contract.

We wish them all well for the future and thank them for their many contributions to the work of the Centre.

This reduction in staffing from approximately 7 ftes to 5 ftes will have inevitable consequences on our level of activity and engagement next year but we hope to continue to provide our range of core activities for the physical sciences community. ■

Contact us or visit our web site for details.