ECTN
European Chemistry Thematic Network

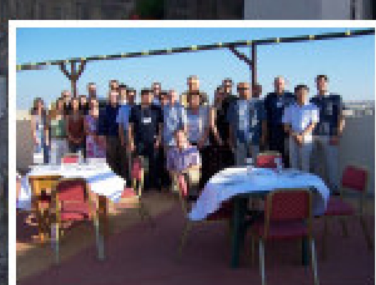
Newly Appointed University Chemistry Teaching Staff

Summer School

Malta

22-27 June 2005

PROCEEDINGS



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Edited by Paul Yates

Foreword

It was my great privilege in June of this year to run the European Chemistry Thematic Network (ECTN)'s Summer School for Newly Appointed University Chemistry Teaching Staff (NAUCTS). These proceedings give an account of what happened when 27 highly enthusiastic chemistry lecturers got together for five days on a Mediterranean island to attend workshops on various aspects of teaching given by a number of experts.

As far as I am aware, this is the first time that an event such as this has been organised on such a geographical scale. I believe that all those who attended would agree that it was worthwhile, and would like to see it repeated. Undoubtedly the model could also be used by other disciplines and in other regions of the world.

I would like to thank all those who contributed to making the Summer School such a success. It could not have taken place without the funding of ECTN, the planning activities of the NAUCTS Working Group, and my colleagues who ran the workshop sessions. Ultimately though, this would have counted for little without the enthusiasm of the participants which was a joy to see. They have written the following accounts of the individual sessions; this is their story of their Summer School.

Paul Yates
Keele
September 2005

European Developments in Chemical Education

Paul Yates[1]

Report by Gareth Cave[2] and Markus Tepner[3]

[1] Keele University, United Kingdom
[2] Nottingham Trent University, United Kingdom
[3] University of Dortmund, Germany

The first session of the ECTN Newly Appointed University Teaching Staff Residential Summer School programme provided an insight into the European chemical community. The session headed by Dr Paul Yates started with a small group discussion, questioning the participants' knowledge of the established European chemical organizations. The format of this discussion group was one of an acronym quiz.

The participants were divided into teams of four to six members. Each team was then shown a list of nine acronyms and asked to identify the European chemical network behind each of them. As an incentive, a bottle of wine was offered as a prize to the team with the highest number of correct answers - a reward that would inevitably help facilitate the icebreaking exercises that were to follow.

Immediately following the group discussions, Dr Paul Yates showcased the different organizations' websites to the group. A synopsis of each of the organizations including their websites is given below:

- **AllChemE** (pronounced phonetically as alchemy)
  Alliance for Chemical Sciences and Technologies in Europe – This is a collaborative venture by five European chemical organizations (CEFIC, CERC3, COST, EFCE and EuCheMS/ECCC) aimed at developing and coordinating the promotion of chemistry and chemical engineering throughout Europe. Specifically, it aims to influence the direction of the European Commission, other European groupings and national bodies. (http://www.chemsoc.org/networks/enc/allcheme.htm)

- **CEFIC**
  European Chemical Industry Council – This, the voice of European chemical industry, is pledged to maintaining and developing a lucrative chemical industry throughout Europe by promoting its social and economic relevance. (http://www.cefic.be)

- **CERC3**
  Chairmen of the European Research Councils Chemistry Committees (sometimes referred to as CERCCC) – This is a conglomerate of European research councils. The committee meets once a year to discuss and coordinate national chemical research within the EU, in order to achieve a more effective use of both national and international resources and raise the visibility of chemistry research in Europe. (http://www.cerc3.net)

- **COST**

European Co-operation in the field of Scientific and Technical Research: Technical Committee on Chemistry – This intergovernmental framework was set in place to support and facilitate joint European scientific and technical research. The chemistry branch now funds networks between 1180 chemistry groups. Examples of some of the actions currently being funded include funding for scientific meetings, workshops, seminars, workshops for young scientists and exchanges of students (short-term scientific missions).
(http://cost.cordis.lu/src/home.cfm and http://costchemistry.epfl.ch)

- **EFCE**

European Federation of Chemical Engineering – Established to support and promote European chemical engineering collaborations, and now represents over 100,000 chemical engineers throughout Europe.
(http://www.efce.info)

- **EuCheMS**

European Association for Chemical and Molecular Sciences (formally the Federation of European Chemical Societies and Professional Institutions) - Promotes cooperation in Europe between over fifty non-profit-making scientific and technical societies in the field of chemistry whose membership consists largely of individual qualified chemical and molecular scientists *e.g* the Royal Society of Chemistry. EuCheMS provides a powerful single voice for chemists and the chemical sciences in Europe through its activities and development of policy.
(http://www.chemsoc.org/networks/enc/fecs.htm)

- **ProChemE** (formally European Communities Chemistry Council)

Professional Chemical Education - the new EuCheMS standing committee on educational, professional and ethical issues. It also takes over the work of the former European Communities Chemistry Council on the European Chemist (EurChem), designation and chemical education and training.

(http://www.chemsoc.org/networks/enc/procheme.htm)

- **ECTN**

European Chemistry Thematic Network – Provides a mode of funding and dissemination of current developments in the analysis and study of chemical education and training across Europe. Consequently it strives to help improve all aspects of education, emphasizing chemistry teaching at university level. A significant new development through this venture is the Eurobachelor, a qualification that will inevitably become common place in university chemistry programs and beyond. Indeed, ECTN are the funding body behind this summer school program.
(http://www.cpe.fr/ectn-assoc/network/index.htm)

- **ECTNA**

European Chemistry Thematic Network Association - The European Chemistry Thematic Network Association is one of the outcomes of the ECTN. The Association was created to provide a sustainable future for the European Chemistry Thematic Network. The aims and objectives of the Association are:

- To implement, consult or supervise programs for the assessment of skills and knowledge in science and engineering, with the emphasis on chemistry.
- To undertake education and training programs, especially those concerning innovative approaches and technologies.
- To operate as a consultant or assessor in programs concerning education and training.
- To provide certification of achievement when assessments have been carried out under appropriate conditions.
- To cooperate with established professional or other associations in the furthering of its objectives.
- To extend the reach of all aspects of education in science and engineering beyond national borders.
- To provide a European framework for first-cycle degrees in chemistry.

(http://www.cpe.fr/ectn-assoc/association/en/index.htm)

Before the session was closed, Dr Ray Wallace suggested that by licensing the term Eurobachelor, the ECTN would be able to profit financially by leasing the name to other academic European communities, thereby putting much needed resources back into the chemical education sector across Europe.

The winning team scored 5/10 on the acronym quiz and was dutifully rewarded with a bottle of wine by Dr Paul Yates and the session called to a close.

Portfolios for students and staff

Jos Koeckhoven[1]

Report by Cora O'Donnell[2] and Malgorzata Brindell[3]

[1] Faculty of Sciences, Chemistry, Utrecht University, The Netherlands
[2] School of Chemistry, Dublin Institute of Technology, Ireland
[3] Faculty of Chemistry, Jagiellonian University, Poland

Jos Koeckhoven discussed portfolios for staff and students, specifically those used at Utrecht University in the Netherlands. A brief history was first given regarding the position of teaching at third level institutions in the Netherlands. Dutch universities are traditionally of the Humboldt-university type: they provide students with academic training by taking part in research. A reputation in research has always been the main criterion for building a career in higher education in the Netherlands thus staff who focus on teaching generally do not benefit in terms of career progression. The marginal position of teaching at Dutch universities is highlighted by the fact that universities are the only educational setting where teachers do not need any form of teaching qualifications.

In 1991, Utrecht University started to simultaneously improve the status and appreciation of the teaching role and the quality of teaching. In 1995, it was decided to establish a training program to improve teaching quality which ended in an official certification called the Teacher in Higher Education (THE) degree, similar to the PhD degree in research. The THE consists of a Basic University Teaching qualification, which was started in 1997 followed by the Senior Teaching Qualification (started 2001). Policies were also changed at Utrecht University in Human Resources to reflect the importance of teaching qualifications and career building; these policies and regulations are known as FLOW. The staff positions and qualifications in FLOW project is presented in Table 1. Utrecht University became the first university with an elaborate control system for academic teaching. New academic staff are obliged to follow extensive tutorials for their "basic" academic teaching qualification.

Table 1. Staff positions and qualifications in FLOW

Research	*Teaching/Research*	*Teaching*
---	**Full Professor** Senior teaching & research Publishes regularly Prominence in the field	---
Senior Research Fellow Senior research PhD Publishes regularly Some experience in university teaching	**Associate Professor** Senior research or teaching PhD & THE Publishes regularly	**Senior Lecturer** Senior Teaching THE PhD desirable Publishes regularly
Research Fellow/Post Doc PhD Some experience in university teaching	**Assistant Professor** PhD & THE	**Lecturer** THE PhD desirable
Junior Research Fellow PhD desirable Master	**Junior Staff Member** PhD desirable Master	**Junior Staff Member** PhD desirable Master

From this background, Jos talked us through the staff portfolio in Utrecht University and outlined how the portfolio was developed over the years. Staff Portfolios were introduced in order to stimulate a systematic reflection on the teachers' own teaching. The capabilities assessed in the staff portfolio are:

- content (the THE possesses a wide and profound knowledge of the concerning discipline and is aware of the place of his/her own teaching in faculty curricula).
- Didactical (the THE graduate is capable of designing teaching programmes from the point of view that they support study programs of students. He/she is capable of performing various teaching activities both for groups of students and individuals and of examining students and evaluating his/her own teaching).
- Organizational skills (The THE graduate is capable of cooperating with colleagues and giving guidance to PhD students participating in teaching tasks).
- General skills (The THE graduate behaves in a committed, communicative and socially and skilful way dealing with students and colleagues and is capable of further developing and reflecting on his/her own functioning).

However, open instructions led to portfolios which differed greatly in structure and content and often lacked essential items. It was found that the preferred portfolio was one that was well structured, clear in the assessment procedure and how the criteria would be applied. The Staff Portfolio now consists of systematic assessment procedures defining faculty criteria and an assessment matrix. The assessment matrix defines which teaching aspect (documents/video) is being assessed by which material by the commission. Lecturers must satisfy the criteria required for the basic teaching qualification that Utrecht has introduced in connection with the FLOW regulation. Some concerns were also outlined – initially staff thought the establishment of a portfolio was not stimulating people to think and to change their own teaching.

Staff Portfolios were concluded with recommendations that feedback is essential to stimulate a systematic reflection on teaching and subsequently by improving it.
The THE qualification shows that staff comply with the required competencies through self evaluation, documents, and evaluations by students and colleagues.

Student Portfolios track that the student has mastered a level in academic development and skills necessary for graduation with a bachelor degree. The student portfolio gives insight into the development of personal process during the degree. There are five targets for the student portfolio

- planning, study progress, modules
- document activities, presentation
- assessment
- reflection
- information tutor, study counsellor

Some examples of Dutch student portfolios were shown. Some difficulties regarding student portfolios were outlined i.e. students found that the concept of academic development difficult to grasp. Student portfolios stimulate reflection by giving concrete feedback on attitude, content, experiments, preparation, experimenting, results, report, presentation, quality. The tutor activates and gives feedback during structured self-reflection activities. The advantages of student portfolios are that it provides a structured environment with clear objectives and clear feedback. Finally, some recommendations were outlined on Student Portfolios:

- maintain academic development in the context of discipline
- highlight the importance of academic development to teachers and ensure they give assessments and feedback
- technical design should be simple
- evaluate the function of courses in the context of academic development.

Promoting learning through Peer Group Work

Bill Byers[1] and Tina Overton[2]

Report by Dr Christine O'Connor[3] and Renli Ma[4]

[1]Ulster University, United Kingdom
[2]University of Hull, United Kingdom
[3]Dublin Institute of Technology, Ireland
[4]Nortumbria University, United Kingdom

The session aimed to help the Summer School participants develop tasks and assessment strategies of peer group work in their own teaching.

The session was introduced by Dr Byers outlining the agenda including group work (a) advantages, (b) problems and (c) factors to consider which was followed by group work in teaching and some exercises.

Dr Byers posed the question ***"Who does group work?"*** in which most of the summer school delegates gave a positive response. A second question was then posed, ***"Do you think chemistry is taught better now than 20 years ago?"***, again a comprehensive positive response was received from the delegates. A third question followed which stated ***"Do you think chemistry students are learning better now?"***, a unanimous negative response was received.

The presentation commenced with a symbolism **[Learning ≠ m(Teaching) + c]**, which represents that students do not necessarily learn what we teach them. He went on to mention that we must get students active to get them to work. By getting students active/ interactive there is a potential to enhance learning. At this stage Dr Byers split the delegates into small groups to discuss the advantages of peer groups.

Comments which were delivered from these groups were:

(i) broadening of horizons of students
(ii) students teaching other students and,
(iii) perspective of both teacher and student.

Dr Byers continued his presentation to highlight the advantages of working in peer groups such as:

- interaction
- exchange of ideas with peers
- tasks approached with more confidence
- enhanced time on task
- promotes friendship
- students develop communication and interpersonal skills
- decreases feeling of isolation.

The presentation continued with two quotes the first being "You can learn more by getting things wrong than you can by getting things right" and secondly "it is not stupid to get things wrong, it is only stupid if you do not learn from your mistakes". He then defined the difference between team work versus group work. Team work is when a task is divided by individuals and each person deals with their section exploring their strong points whereas in group work it involves the groups working together on a task to improve individuals' weak aspects. Problems always arise when working in groups. Some individuals may be described as “hitchhikers” (voice their opinions but do very little), “lurkers” (have little to contribute but will do what they are instructed to do), “know it alls” and “aggressive individuals”, which are self explanatory. Other problems that arise are poor communication, lack of ambition and assessment. Assessment must be focussed on learning outcomes and should drive learning.

Factors to consider in group work were: (a) size of group, (b) selection of groups and (c) clear group goals and accountability. The size of the group is often dictated by the size of the task and the resources available. The selection of the group should be done randomly as students will always want to work with friends so this will reflect the workplace in which you cannot choose who you work with. Nevertheless each group member should know their task within the group goal. Lectures are not the best medium to support group work. ‘Buzz groups’ in lecture breaks creating discussion are much more effective along with laboratory work, tutorials, case studies and role play.

At this point Dr Byers handed over to Dr Overton to facilitate a group work session on managing group difficulties, tutor mediation and the summer school delegates were split into groups. ‘Advantages of developing communication skills within higher education’ was the chosen topic to be discussed through role play in which a tutor, observer, deferential student, enthusiastic student, silent student and overbearing student were assigned per group. The resulting feedback highlighted that the non-responsive students were the most difficult to deal with. The subject matter for discussion would also play a large role in group dynamics.

Dr Byers then circulated a case study which described an accident in a laboratory. The groups were assigned their role as an individual involved in the accident and after discussion a dice was rolled to decide which group would present their angle first and the second role of the dice decided which member of the group would present on behalf of the group to ensure all group members were kept equally engaged.

Dr Overton then gave each person a number and asked them to form groups of the same number. Again a case study on CFCs as refrigerants was circulated and the four groups reported as ‘the CFC production company’, ‘Greenpeace’, ‘the fridge production company’ and ‘the EU commission’. Problems to be addressed were the disposal of old fridges, the cost of solutions and who should pay for this. As can be imagined a heated discussion ensued.

The presentation concluded with Dr Byers stating that teaching and learning should not be just focussed on group work, that alternate methods to approach better learning should be investigated. A metaphor was used to then describe the success of alternate methods of learning and teaching ‘A golf swing can be 90% right and still be rubbish – it only needs small things to go wrong to make it rubbish’.

Practical Classes

Stuart Bennett[1], Bill Byers[2] and Marta Salisova[3]

Report by Jifeng Ding[4] and Julian Zagraniarsky[5]

[1]Open University, United Kingdom
[2]University of Ulster, United Kingdom
[3]Comenius University, Slovak Republic
[4]Manchester Metropolitan University, United Kingdom
[5]University of Soifia, Bulgaria

This session addressed the role of practical work in chemistry programmes. It began with questioning the purpose of practical work. Chemistry is an experimental science and its development and application demand a high standard of experimental work. Developing students' practical skills, reinforcing theory teaching (lectures), applying theory, and learning with fun, etc. were among commonly quoted reasons as why practical work is needed in chemistry teaching.

However, there is often a gap between what is claimed to happen in practical classes and what actually happens. Research showed that students often view science lessons "boring": they have no time to explore interesting ideas but slog through practical exercises which are pointless. Some of the key findings, from student perspective on practical classes, are:

- Too much to handle at once
- Concurrent courses (or modules) and repetition
- Divorce of "experiment" and "theory"
- Limited return on time spent in the laboratory

Lecturers, on the other hand, often treat students in the laboratory as if they already had reasonable or high command of chemistry knowledge (theory). Practical instructions are often written in a way which is not learner-friendly. For example, "… addition of concentrated sulphuric acid", then turning to next page in the instruction, "dropwise…" A good practice in writing a learner-friendly practical instruction is to use flow chart, with a separate card for each box in the flow chart. Thus students will have a clear overview, and knowing where they are, where they are heading to, and why.

A simple demonstration conducted in this session clearly illustrated that our brains need time to process new information. But in a traditional practical class, students read notes/instruction beforehand (which they may not do in reality), follow instructions mechanically to complete the experiment and hand in samples and/or data. This often takes away ownership, motivation, purpose, investigation and fun, etc. from the learners' experience.

In order to maximise the benefit of this costly resource, we need to analyse practical activities in terms of learning outcomes, and move to a wider view of practical work that engages the student not only in the laboratory but also in the development of the activity and its subsequent analysis and communication. Such a translation from didactic student notes to a construct that is student active was explored. One of the alternative approaches to practical work is to give students a problem and let them work out a strategy to solve the problem. In working out the strategy and their own experiment "recipe", they will have to bring in their prior knowledge and experience, read literature, investigate facilities and equipment available, consider the time available, and go through, in their own minds, what they need to do in the laboratory. Such an approach will give students ownership of the practical. They will spend a lot more time in preparation outside the laboratory without risk of divorcing theory from experiment. Laboratory work and time will be only part of their practical, but they will have good quality time in the laboratory, because they are well prepared and know exactly what they want to achieve.

Outcomes of this alternative approach are usually:

- less time spent in the laboratory
- better motivation and retention
- a more critical approach
- develops team work approach

Given that assessment is a driver for student motivation, this is a vital part of the practical experience to get right. Can the shortcomings of current assessment of practical work be removed and a more innovative and realistic set of assessment methods be applied? The irony is that practical in laboratory is a learning activity but is also assessed. Assessment should be considered with desired learning outcomes.

It is a good practice to let students reflect and evaluate their improvement in skills by using pre-laboratory and post-laboratory questionnaires. Problem solving based practicals can provide a better platform to assess a range of skills and abilities, inside and outside laboratory, related to learning outcomes (an holistic approach).

The European Image of Chemistry

Report by Anna-Maria Cardinale[1] and Julie O'Brien[2]

[1]Università di Geonova, Italy
[2]Dublin Institute of Technology, Ireland

The *European Image of Chemistry* was discussed in an open forum evening session chaired by Paul Yates. The main purpose of the session was to consider how chemistry is perceived by the general pubic in the various European countries of the Summer School's participants.

In general, it was felt that chemistry has a poor image, and the participants believe this was something they had always to defend against. Aligned to this, it was felt that the public do not have a good understanding of what chemistry is, believing for example that doctors develop good drugs, whereas chemists are responsible only for the drugs causing bad side effects, pollutants and dangerous waste. They do not see chemists are people who can help solve environmental problems. In addition, many members of the public think that a chemist is the same as a pharmacist.

In order to establish the role the media plays in this poor image of chemistry, members of the Summer School were asked to bring newspaper articles. Participants were divided into small groups, and asked to read the articles and choose those which portrayed chemistry most positively and negatively, and relate these back to the school.

Positive articles included *Chemistry in Our Lives* (a German weekly supplement and website), the Greek *Science Department* weekly, which favours the chemical and pharmaceutical industries and a report from Price Waterhouse Coopers outlining the financial benefits of a career in Chemistry.

Negative articles were more readily available, and included an article on health and beauty products which are 'misselling science', the negative effects of an anti-arthritic drug for which the pharmaceutical manufacturer offered no comment, a disaster in Romania in which a dam broke releasing cyanide into a river, and an article from the Guardian offering *20 Ways to Eliminate Chemicals from out Lives*.

It was felt that there was a lot of hypocrisy, scaremongering and incorrect meta-analysis in the press coverage of chemistry, and that only stories which involved chemistry associated with risk were of interest to journalists. Further to this, it was felt that the journalists writing these stories have no background in science and this leads to inaccuracies.

Participants agreed that it was important to deal with the poor image of chemistry as all across European third level institutes the numbers studying chemistry are in decline. Chemists should be promoting chemistry and concentrating on positive aspects. The ECTN has a group working in this area, and information is available on their website. The ChemInsight website (www.cheminsight.de) offers information on a range of topics such as crime, green chemistry, new materials, research, humour and fun in chemistry, and cultural heritage. It was suggested that using newspaper articles for discussion in chemistry classes may be useful.

European Funding: COST Cooperation in the field of Scientific and Technical Research

Antonio Lagana[1]

Report by Aidan Doyle[2] and Lore Troalen[3]

[1]University of Perugia, Italy
[2]Manchester Metropolitan University, United Kingdom
[3]Malta Centre for Restoration, Malta

Background
COST was founded in 1971 and is an intergovernmental framework that provides financial assistance for the mobility of researchers throughout Europe. Funding is also provided for scientists to meet and discuss research via conferences, workshop meetings, and to cover costs of joint publications. COST currently involves more than 30,000 scientists from 34 member countries and more than 80 participating institutions from non-COST member states and non-governmental organizations.

Member States
Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, The Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, Serbia and Montenegro, Former Yugoslav Republic of Macedonia.
1 Cooperating State: Israel

Organisation
The main parts of COST are:
Committee of Senior Officials (CSO) – For Chemistry Actions, the 2 COST Officers are Dr Hannelore Roemich and Dr Denis Neibecker.
Technical Committee (TC)
Management Committee (MC)
COST National Coordinator (CNC)

Operation
COST is conducted in a “bottom-up” manner, such that its flexible arrangement ensures that Europe maintains a strong international position in the field of scientific and technical research. An Action is a network of co-ordinated national research projects (of at least 5 participants) in fields which are of common interest. The Actions represent mini-treaties between countries, and are defined by a *Memorandum of Understanding (MoU)* signed by the governments of the COST states wishing to participate in the Action. An Action typically lasts 4 years. In order to create or join an Action, the relevant COST Coordinator should be contacted initially, which should then be followed by appropriate lobbying to ensure that the Action is funded.

Running Action in Chemistry
The first Action in Chemistry was created in 1992. Since 1992, 34 Actions have been launched. 20 Actions were evaluated in 2005. 14 Actions are currently running in chemistry, 10 are in the middle of their evaluation. These Actions are focused on various topics such as research on nano-structures, development of new molecules or therapy and health research.

Funding

COST Actions provide only funds for networking and dissemination of research through Short Term Scientific Missions, for example. The only condition to apply for a STSM is that the research groups in the 2 countries which would like to exchange knowledge have to be part of the Action. The research itself i.e. postdoctoral salaries, postgraduate grants, equipment, consumables etc. must be provided from sources of national funding. On average, €80,000 is available per Action, which represents less than 1% of the overall national funding; as a result, COST is considered to be very good value for money.

Presentation Skills

Paul Yates[1]

Report by Silvija Markic[2] and Alexander Zahariev[3]

[1]Keele University, United Kingdom
[2]University of Bremen, Germany
[3]University of Chemical Technology and Metallurgy, Sofia, Bulgaria

"Not to be perfect, but to show skills"

Possession of good presentation skills is a powerful tool for giving the audience the best opportunity of understanding your ideas and conceptions. In this way one can achieve maximum outcomes from your presentation. There are several things that one should take care of before, during and after the presentation.

Planning

At first it is essential that the presenter thinks about the *topic* of the presentation, about the *audience*[1], about the *time* available and about the *situation*. It is also necessary to think about the *structure of the presentation*. Any presentation consists of

- an opening: to capture interest, to introduce yourself, to give credentials and to present the structure.
- a body: to elaborate on key points with examples and explanations, to relate existing audience knowledge and support everything with visual aids.
- and at last the conclusion: that should not be too early, restate the main points, give closing messages and definite end.

It is helpful to use *notes* during the presentation – you can use A4 sheets or A6 cards or use slides and/or overheads for support[2].
Also think about the *language*; use an appropriate level and only use jargon if appropriate. *Before you start* the presentation check the location, see what facilities are available, inform yourself about the timing relative to other speakers and about the breaks.

Before the presentation it is normal to be *nervous*. Excessive anxiety needs to be managed. To reduce your anxiety you should be well prepared, believe in your message, you should never apologise and remember that the audience is on your side. Take a deep breath and try to relax.

You should always (or at least at the beginning) practice the presentation in front of the mirror to identify problem areas and resolve them.

It is good to complete the presentation by using some *visual aids* like flip charts, overhead transparencies, video, powerpoint or other programs, handouts or, if appropriate, objects. The use of visual aids looks professional and helps to structure the talk; it also assists the audience and it

[1] Their background, prior knowledge, attitudes and requirements.

[2] But do not write too much on your slides or overheads because it is mainly for the audience. And don't forget to turn the pages during the presentation, because if you then really need sheets or card, it looks unprofessional if you first have to find the right page.

gives you the opportunity to present technical information[3].

When using visual aids you should use a consistent layout and colour scheme[4], put only one basic idea on each visual, and use an appropriate font of sufficient size. Don't put too much text on the slide[5]; typefaces should be simple and consistent and use appropriate graphics to simplify your message.

Also think about what kind of visual aids you would like to use. The visual aids, however, can have both advantages and disadvantages.

For example, the *handouts* may give detailed guidance, but on the other hand they could also be destructive, since the audience will look at the handouts and will not listen the speaker. In this way the audience may become very passive.

Presentations in *powerpoint* can be easily prepared; it allows fast scrolling and may include video, but it also has disadvantages such as hardware and software problems.

Overhead transparencies are most readily available and allow the speaker to write down and show his instantaneous ideas originated during the presentation.

Finally, using a *flip chart* needs a lot of writing and a small audience in order for the written matter to be easily viewed. It is also appropriate only for one or a few word phrases as well.

Presentation

During the delivery one can read the presentation from a script, recite what one has learned by heart, use slides as prompts or speak from notes.

Think about your *voice*; it has to be heard easily, be clear and free from mannerisms. Don't talk too fast and take care of how you pronounce everything. If necessary do repeat a sentence.

You should project positive and appropriate *body language*: smile, make eye contact, gesture (but not too much) and walk a bit but not too fast and randomly.

As mentioned it can be very effective to use visual aids but don't concentrate too much on them. Face the audience[6], avoid hiding behind equipment, refer to the visual aids and point if appropriate.

After most presentations there will be time for *discussion*. You should think about and anticipate questions and rehearse the answers. Be prepared to initiate audience involvement. On receiving a question, you should concentrate on the questioner, repeat the question, ask for clarification, say if you don't know the answer and stay clam and relaxed. You should avoid rating the question, being impatient or talking down to an audience. If there are difficult questions, you should maintain composure, rephrase a hostile

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[3] Diagrams are preferable to tables; you can use bar charts, line graphs, pie graphs. Don't use more then 10 numbers per slide, provide detailed information in a handout and include only relevant data.

[4] Use colours to highlight important information. A light background with dark front may be preferred. Use a maximum of 3 colours per slide, avoid red and green together and note that some colours project better that others .

[5] Text is usually a list or quotes that are brief and to the point

[6] Their eyes? Are they leaving? Are they leaning back or forwards? How is their arms position and head movement? Do they respond to humour and questions?

question in an objective way and offer to discuss the issue after the talk. If you are not a native speaker and you didn't understand the question, don't get nervous. Hopefully the chairman will translate the question for you or formulate it differently.

After the presentation

You can learn from your mistakes, so you should *review* your presentation. You should focus on your achievement and not on your mistakes.

Think realistically about what you could have done differently and plan how to improve things next time. Ask one or two people for constructive feedback. If there is an opportunity, one should use video feedback[7].

[7] First watch the tape with volume turned down and note visual distractions, then listen to the voice without picture and note volume, speed and tone of the voice. Watch the tape with others and ask for an opinion. Tackle each negative point one by one.

Assessment and Evaluation

Stuart Bennett[1] and Paul Yates[2]

Report by J.J. Keating[3] and Mauricio Palafox[4]

[1]Open University, United Kingdom
[2]Keele University, United Kingdom
[3]University College Cork, Ireland
[4]University Complutense of Madrid, Spain

On the afternoon of Friday, 24 June 2005, the discussion turned to assessment and evaluation.

Assessment

Stuart Bennett began the afternoon session with a presentation and discussion of assessment. The talk began with a list of some key ideas including why should assessments be preformed in the first place, what exactly should be assessed, why should we assess students and the learning methods of students.

At the development stage of any course, in addition to defining the learning objectives and outcomes, the methods of assessment should also be determined. The learning outcomes should include the key areas of knowledge and cognitive, practical and transferable skills that needs to be covered in the course and subsequently assessed. The advantages and disadvantages of assessing students by a closed examination format as opposed to an open non-examination was also discussed.

The design of the assessment is crucial in order to gain a proper picture of what students have learned. All too often, in a closed examination, a particular subject can be examined more than once, whereas large areas of a course may not be examined at all. In many instances, too much emphasis is placed on the learning and regurgitation of facts than the use of cognitive skills, which, in the long term of a career, is often a more important skill.

An analysis was presented based on the type of questions that were asked during several university examinations over a period of time and were compared to Bloom's taxonomy which classifies questions based on increasing cognitive skills. The results of the analysis revealed that very few questions involved original thought from students, with the emphasis based on the regurgitation of facts and calculations.

On the completion of examinations and the awarding of grades, a reflection should take place between academic members to evaluate whether the examination has achieved its purpose in assessing the students in the correct way. Things to be considered should include student feedback, double marking and the use of external assessors who can be critical in a constructive way.

To illustrate how different exam markers have different views of what encompasses a correct or partially correct examination answer, the delegates were asked to mark a real series of answers that a chemistry undergraduate presented in an examination. An answer sheet was also provided to each of us with suggested answers and the marks that were to be awarded for each section if fully correct. It was remarkable to see the variation of marks that each individual would have awarded. While the majority of people varied within 3-4 marks (out of a possible 30 marks), this is equivalent to 10% or the possible difference between one grade and another.

As teachers, we should also consider sitting where the student sits and trying to see what we are attempting to teach and assess through their eyes. Just because we think as teachers we are doing a good job at teaching does not necessarily mean that the students have learned or understand what we have taught. Dr. Bennett gave several examples of the unique nomenclature used in chemistry, including symbols, molecular models and practical work, and showed that by placing a number next to a chemical symbol as a superscript, subscript, as a normal digit, or before or after a chemical symbol dramatically changes the meaning of that state that the chemical exists in. As teachers, we must keep in mind the amount of material we present to students during our contact hours with them including lectures and practicals and not to overload them with complex data. Less maybe more.

Evaluation

Paul Yates then gave a presentation and discussed the subject of evaluation and its place in effective teaching and learning. After defining the term, the sources of information needed to compile a meaningful evaluation were outlined, including self assessment and feedback from both students and university colleagues. Depending on what is being self assessed, various sources of information should be used, including the recorded thoughts of the assessor, attendance and grade records of students, and the more time consuming analysis of events by visual or audio recordings. Analysis of the views of students can also be a useful exercise, with the data again available from this group in a number of forms. Examples include student questionnaires and by simply asking them. Colleague feedback can be a bit more daunting for less experienced teachers, but can be very rewarding. An evaluation can additionally be performed by critically observing your own colleagues and have them critically observe you.

Crucially there is no point in performing an evaluation if the information that has been gathered is not analysed and used constructively. One must determine what is the desired outcome of the evaluation and, once evaluated, what needs to be done next. Evaluations of courses should result in continuous improvement of that course.

The attendees were then divided into groups and asked to determine the five key questions that should be asked in a student questionnaire. With such a limited number of questions, it is important to ask open ended questions so that the maximum amount of information can be extracted. Suggested questions included: “If this course was run again, what would improve and how?”, “How well have the learning objectives been met?” and “What aspects of the course were the most enjoyable?” Each group was then set a further task to evaluate a course experience questionnaire which has been developed as a standard evaluation of students thoughts about courses they have taken. The questionnaire is now being used internationally, with minor adjustments. Each group critically evaluated the questionnaire and had many reservations about using it for evaluation of science based subjects, including the fact that there were no questions with a laboratory or practical based emphasis and that it is being introduced into the United Kingdom in the near future.

Widening Participation

Pascal Mimero[1]

Report by Maria A. Petrova[2] and Oliver Tepner[3]

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The European Chemistry Network (ECTN) has created an internet-based tool, the EChemTest, to enable individuals to evaluate their level of competence in chemistry, whether or not they have followed formal courses at school or university. EChemTest contains the areas organic chemistry, inorganic chemistry, physical chemistry and analytical chemistry.

The online version of EChemTest refers to the full question database and is free of charge. Payment is only required if official certification by the ECTN is required. Additionally there is a Windows demonstrator with a sample of each test available. Most of them are translated into 21 European languages. It provides a means for the:

- professional worker: of progression at work, of self-evaluation for motivation and starting a formal course or taking a national examination;
- student: of evaluation of the chemistry knowledge as well as the understanding of chemistry in a foreign language to undertake a period of study in another country, or to evaluate competence at a European level;
- citizen: to pursue life-long learning.

EChemTest is a one hour test composed of up to 30 questions of different types, taken at random from a large question bank (over 2800 questions) covering the European Core Chemistry Program at three different levels equivalent to:

- a person at the end of compulsory education (General Chemistry 1);
- a person at the beginning of University studies (General Chemistry 2);
- a person at the end of the Core Chemistry Syllabus at the University level as defined in the Chemistry Eurobachelor (Analytical Chemistry 3, Inorganic Chemistry 3, Organic Chemistry 3 and Physical Chemistry 3).

The test consists of 30 questions and it starts with 15 questions at the introductory level (basic concepts, “by heart” knowledge) followed by 10 questions at the intermediate level (logical thinking) and finally 5 questions at the advanced level of difficulty (complex problems, problem solving). A variety of question types, e.g. multiple choice, multiple response, numeric, selection and graphical hot spot, are possible as well as *multimedia calls* e.g. calculators.

Before taking any of the EChemTest chemical tests it is recommended that one checks the various types of question and the way to answer them by attending the *Training Test*.

The software affords detailed analyses of the responses to questions, so both the tested person and the ECTN can evaluate competence in chemistry. By collecting statistical information e.g. it is possible to get a feedback of individual improvement from one session to another immediately. The result obtained can be compared to knowledge of the three defined levels. Furthermore the ECTN is able to get a survey of chemical knowledge across Europe. When considering collaboration within European research projects and the introduction of Eurobachelor this aspect is really important.

In addition, EChemTest is supposed to assist the ECTN member institutions in training and assessment of students. It is headed by Dr. Pascal Mimero (ESCPE Lyon, France). Detailed information is accessible via www.echemtest.net or www.cpe.fr/ect/test/en/ect.htm.

Context and Problem-Based Learning

Tina Overton[1] and Iwona Maciejowska[2]

Report by Kamilla Malek[3] and Stanislav Strašík[4]

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[4]Comenius University, Bratislava, Slovakia

Nowadays, the education in a specific field of study tends to be delivered to a larger number of people then it was in the past. Generally, it is considered that education opens greater possibilities for employment and career to those people. Naturally, only a minority of students may wish to find employment in the same subject that they were studying, especially when chemistry is considered. The majority of them will, perhaps, be employed in a more-or-less different job, however, they can still profit from the skills gained during their study. To achieve this effect, however, it requires revisiting the traditional teaching approaches.

Another point of view is that an employer usually requires employees to apply their knowledge in solving practical situations encountered in their job rather than just possessing a stock of theoretical knowledge. Quite often it involves such skills as the ability to work in a group, self-evaluation, creativity, planning the necessary steps, project designing, report writing etc. These skills are usually referred to as transferable skills. The aim of education, after all, is not just providing information to the people but also preparing them for their future work under the conditions of the modern world.

One such approach having the potential to meet the above requirements is context based learning which belongs to a group of so called open teaching methods. This approach organises the curriculum around real life scenarios. It usually starts with applications and only then develops the necessary knowledge and skills required to solve the given problem. It also starts with macroscopic phenomena and then proceeds to microscopic ones.

More specifically, the problem based learning (PBL) further develops this idea and puts well designed real life problems into the centre of the teaching and learning process. Actually, no lectures are needed; the students are encouraged to strive to find a meaningful solution themselves. They have to recognise what knowledge or skills are necessary to succeed and they have to gain them. The key point of this approach is to design a series of successive problems that are able to lead a student through the learning process to meet the expected outcomes. The role of a tutor is no longer supervision but rather facilitation of the learning process. The

main factors playing a role in PBL are as follows:
Group work. Small groups, usually of four to twelve students, provide the best framework for developing and testing the level of understanding of the problems. They also model a real working environment and teach the students to work efficiently, choosing a good problem solving strategy, communicating with each other, dividing up tasks and organizing their cooperation. By these means, the students are placed in a professional role so that they can, from the very beginning, prepare themselves for their future jobs. This style of working is considered to be more attractive for the students than traditional learning.
Problem solving. As the problems in PBL are usually quite complex and furthermore they are encountered before all relevant knowledge and skills have been acquired, solving them in general requires thought and enquiry. The students are expected to make appropriate judgments, approximations and deal with excess or omitted information. The knowledge gained by an active process of finding out and doing is in general deeper, retained longer and characterised by links between different subject areas. The problem solving approach also stimulates the higher-order thinking skills (e.g. analysis, synthesis) rather than memorizing as does the traditional teaching-learning style.
Discovering new knowledge. In order to find a meaningful solution, students will have to seek new knowledge. From the very beginning, the students must decide what they know and what they need to know in order to continue. Typically, they will divide up the tasks to be done and afterwards share the obtained knowledge or skills within the group. This will help them to develop the required understanding of the problem.
Based in the real world. Designing a meaningful problem from real life should help to get students engaged. It can be based on information obtained from newspapers, magazines, different books or history etc. The relevant contexts for teaching chemistry may be environmental, forensic, pharmaceutical, analytical or industrial problems. However, the problems must come out from the expected student outcomes and the curriculum must be designed with respect to that, too. It is a good strategy if the problems are open ended because it allows the problem to be explored from different viewpoints. If the problem has a closed solution, students tend to focus on obtaining that solution in order to gain full marks.

Writing a PBL problem is quite different from writing a problem for a work sheet or an end-of-chapter exercise. One usually starts with choosing a concept or a principle which is to be taught in the course and writes it in the form of tutorial style question or a homework. Along with it, the list of all learning objectives must be compiled. The transformation to PBL problem starts by appropriately structuring the narrative around the problem. It should contain the hook (initial opening paragraph important in engaging students), the scenario putting the students into a particular role, the well chosen set of indications (triggers) helping the students to start and focus on the correct learning objectives and, finally, the necessary initial information needed to start solving the problem.

In PBL much more space is left for students` activities than for a teacher`s intervention. However, the group need not always proceed effectively because for example the students cannot find a right way or they have chosen a wrong solving strategy or even because they have difficulties working together. These are all examples of situations where the tutor should intervene but not as supervisor rather as a facilitator promoting the learning process by suitable questions or suggestions. Otherwise, there may be quite long periods of time when the teacher need not say anything. This time can be used for making some notes for students assessment or listening to the students` communication to control the process flow.

The assessment in PBL should be adapted to this specific learning activity as well. Usually, the stress is not laid only on the final product worked out after successful passing through the problem but equally on the problem solving process or the skills development aspect. It is also necessary to decide whether each member of a group should obtain the same mark or whether each individual's approach will be taken into account. Whatever assessment rules are created, the important point is that the students must know them in advance.

As the PBL is not a brand new approach, some research on its performance has already been done. It has been found that the PBL students perform as well as or slightly worse than students from traditional courses on conventional examinations of knowledge. However, they are superior with respect to their approach to study and learning, long-term retention of knowledge, motivation, use of resources, key skills and subsequent success as postgraduates.

There is a lot of information to be found about PBL in different works. The interested readers are referenced to some resources listed in Appendix to this document.

APPENDIX

Introductory resources on PBL:

The National Center for Case Study Teaching in Science
http://ublib.buffalo.edu/libraries/projects/cases/ubcase.htm

The University of Adelaide's Advisory Centre for University Education
http://www.adelaide.edu.au/clpd/materia/leap/leapinto/prob_based_lrng.pdf

The San Diego State University Distributed Course Delivery for PBL
http://edweb.sdsu.edu/clrit/home.html

PBL e-journals and articles issued by:

The University of Sanford Center for Problem-Based Learning
http://www.samford.edu/pbl/index.html

University of Delaware
http://www.udel.edu/pbl

Queens University Ontario, School of Medicine
http://meds.queensu.ca/medicine/pbl/pblhome.htm

Other web site resources:

University of Maastricht
http://www.unimaas.nl/default.asp?taal=en

The Maricopa Center for Learning and Instruction
http://www.mcli.dist.maricopa.edu/pbl/problem.html

The (former) LTSN Generic Centre
http://www.hss.coventry.ac.uk/pbl/links.htm

The Problem-based Learning Initiative at Southern Illinois University (PBL in medical education)
http://www.pbli.org/core.htm

Project LeAP (PBL in physics and astronomy)
http://www.le.ac.uk/leap

McMaster University in Canada (PBL writing problems)
http://www.fhs.mcmaster.ca/pbls

The Problem-Based Learning Directory (the University of Brighton)
http://interact.bton.ac.uk/pbl

Other printed resources:

'The Challenge of Problem-Based Learning' by David Boud & Grahame Feletti, Routledge Falmer, ISBN 0749425601 (1998).

'Problem-Based Learning in Higher Education : Untold Stories' by Maggi Savin-Baden, Open University Press, ISBN 033520337X (2000).

'PossiBiLities: A Practice Guide to Problem-based Learning in Physics and Astronomy', edited by Derek Raine and Sarah Symons (Project LeAP), The Higher Education Academy Physical Sciences Centre, ISBN 1-903815-14-2 (2005), http://www.physsci.heacademy.ac.uk/Publications/PracticeGuides.aspx.

Using the Web in Teaching and Learning

Julia Dickinson[1]

Report by Gábor Magyarfalvi[2] and Stanimir Stoyanov[3]

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[3]University of Sofia, Bulgaria

The topic of this session was the experience Manchester Metropolitan University gained in the use of online resources in teaching Chemistry. The emphasis was on specific software used for this, namely WebCT.

This suite provides a full virtual learning environment with different levels of access. Lecturers and tutors can easily manage courses, upload course materials, assess student achievements, track the activity of the students and provide feedback if needed. There are lots of tools integrated in the software allowing the teaching staff to track the actions of every student, such as dates of access, history and distribution of content visited, etc. On the other hand, students can create areas and practice tests unseen by the tutors. There are various communication tools built into WebCT – message boards, email, calendar, chat, etc.

Although the online materials are more easily tailored to individual courses than textbooks, the lecturers have to be familiar with the basics of web page production. This obstacle can be avoided either by posting the original files (Word, PDF), or by using the web pages output by familiar software (e. g. MS Office can save as web pages). This type of teaching and learning was first introduced for Level 2 Inorganic Chemistry. The students were not very pleased, but the interesting result was that they had higher marks at the end of the term. The following year e-learning was introduced for Level 1 Organic Chemistry and Level 3 Bioinorganic Chemistry. The conclusion was that use of the web is very well accepted from the students when it is started in the first year and they then have no complaints about using it later.

The unpopular Information Management course for the first year students has benefited greatly from being delivered online. Students with widely varied backgrounds were able to improve the computer skills they needed when it was suitable for them. This made the opinion of the students about this course more positive, since web based teaching allows the students to work at a pace of their own. The lecturer can set deadlines for the course, and interestingly it was found that the students are more likely to adhere to the deadlines checked by the computer.

The course Health and Safety Induction was also well suited to be made completely online. Only those students can participate in the laboratory sessions that have previously answered correctly all twenty questions of an online quiz taken from a database with 400 questions.

WebCT can administer several forms of assessment. In addition to the multiple-choice, answer matching and short answer questions that provide immediate feedback, paragraph and essay type questions or the upload of project files are also available. General or individual feedback is possible even if tutors need to check the answers. The advantages and disadvantages of using the web in teaching and learning chemistry can be summarized as follows:

Advantages:

- Flexibility for student learning – especially important for employed students.
- Immediate feedback for students.
- Initial time investment gives long-term resource – once the course is converted online, it can be used in the following years with small changes and additions.
- Course management and real time tracking of the student's activity.
- Increased observance of deadlines.

Disadvantages:

- Requires University support – expensive software, computers and computing staff and a lot of effort.
- Assumes prior student IT experience and personal management skills – students set their own pace of learning.
- Problems with traditionalists – many lecturers and students prefer more personal methods of teaching.
- Authenticity of student work (this problem also occurs with traditional methods).
- Accessibility problems – students must have a personal computer with access to Internet and all the necessary programs and plug-ins.

Supervision

Ray Wallace[1], Bill Byers[2] and Iwona Maciejowska[3]

Report by Annamaria Lilienkampf[4] and Renata Wietecha-Posluszny[3]

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[4]University of Helsinki, Finland

Supervision can be defined as running and organising group work, tutorials, workshops, examinations, laboratory classes, projects, and work based training (placements). All of these require different skills from the supervisor. Situations vary from one-to-one supervision to managing a large group of students. Although demeanour in class can be misleading, it gives students a preconception how one is as a supervisor.

Supervision of a project student requires an ability to relate to that person. The supervisor has to create a balance between the needs of the student and the academic requirements. On the other hand research supervision often demands quite different qualities. A research supervisor should be able to provide the drive and initiative to the project and to challenge and motivate postgraduate students. Demanding and enthusiastic research supervisors can create conflicts but are more likely to get successful results from student projects. Supervisors who let their students exercise their initiative usually gain more respect from their students. What postgraduate students think of their supervisor can have a big impact on their performance. A research supervisor should be in touch with the literature, review student progress regularly and pay attention how problem situations are handled.

Placements students are undergraduate students working as an employee in the chemical industry. The placement period can last up to a year and it can create a challenge for the supervision. For the student the placement can provide an opportunity to improve their skills, to get a feeling what it means to be a professional scientist, and possibly to create a future job opportunity. Most problems the students face during the placement are associated with accommodation, money, relationships, and home. From the supervisor the student placement year requires special skills and administration. Above all, the students might be located in another country. In the United Kingdom two visits are required to the work place, in addition to regular telephone and email contacts. The supervisor must collect information on the work to be carried out and monitor the progress. It has to be taken into account that during the placement the students are employees of the company and compromises are often required. At the end of the placement a full assessment should be done. Teachers can take supervising a placement year as not only a challenge but as a good opportunity to get new ideas, make contacts in industry and a possibly to establish research collaboration.

An ideal supervisor is a leader by example. The aim is to provide knowledge, competence, confidence and trust for the students. All supervision requires good interpersonal skills and lateral thinking. Originality in supervision is always inspiring.

Widening Participation/ The Many Roles of the Teacher

Iwona Maciejowska[1]

Report by Constantinos Athanassopoulos[2], Sarah Cresswell[3] and Patrick O'Leary[4]

[1]Jagiellonian University, Krakow, Poland
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[3]University of Strathclyde, United Kingdom
[4]National University of Ireland - Galway, Ireland

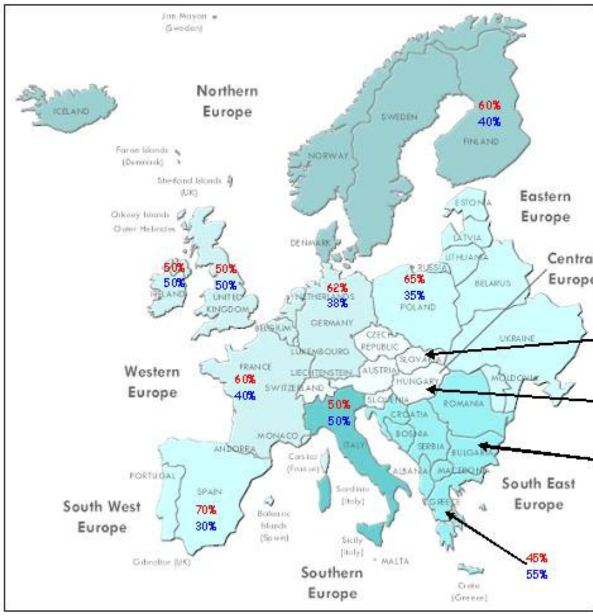
In this session two topics were explored in a discussion moderated by Iwona Maciejowska.

The participation in chemistry education of students with disabilities was discussed first. A number of exercises were conducted to highlight the particular difficulties faced by students with physical and visual impairments in lectures and laboratories. Participants wearing blindfolds attempted to negotiate a path around a room with a guide and discussed their feelings of disorientation, the need for trust in their guide and the particular added difficulty of performing this process through a foreign language (as a visiting student may have to do).

Participants also attempted to reproduce a diagram while wearing devices which severely limited sight and/or limited their ability to write. The diagram contained unfamiliar symbols and was deliberately poorly prepared leading to predicable confusion and frustration. This effectively demonstrated the difficulties faced by students with such difficulties recording an unfamiliar subject and highlighted the importance of good clear notes.

A discussion of the level of support and participation for students revealed a wide diversity of provision across the E.U. In some countries no provision is made and it is almost impossible for a person with even a moderate disability to study chemistry. In most universities a disability office is in existence to provide for the needs of disabled students but studying chemistry is difficult or impossible. In some universities technological support is provided in the form of laptops and electronic readers as well as scribes and extra time at exam time. The most accessible universities were those in G.B. Facilities include, wheel chair accessibility including the laboratories and fumehoods, induction loops in the lecture halls, notes available in larger font and on coloured paper for the visually impaired, scribes and extra time at exam time and exams which can be conducted in small rooms. The school agreed such provisions should be more widely available.

Widening participation concluded with a brief survey of the gender ratio of the students in the university chemistry departments. Generally the number of female students is greater across the institutions represented which was thought to be surprising given the gender ratio at lecturer level which was



Map to show the percentage of female/male students studying chemistry

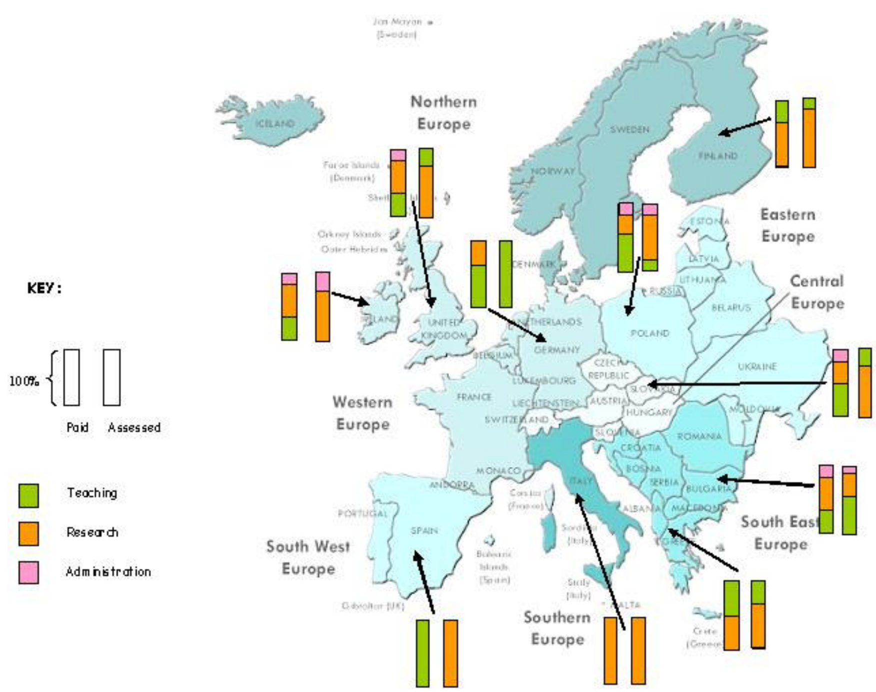
Key: 50% female students
50% male students

This of course impacts on the time available for teaching and the importance attached to this role.

Paul Yates raised the possibility of many universities splitting the teaching and research into Schools and Institutes. This, while strengthening research, will limit people outside the institute's ability to research and, in line with the promotion criteria above, thus limit the possibility for progression for lecturers who fill the teaching role.

thought to be significantly favouring the male.

The many roles of the teacher portion of the session again took the form of a survey. The school was asked to consider what was the situation in each country regarding to the ratio of teaching : research : administration. This was considered both for what people are paid to do and also what the expectation is to achieve promotion. In general though there was quite a variation in the specific ratio one trend was clear. The amount of research required to gain promotion in almost all countries is higher than that required by the post.



Networking and Conclusions

Paul Yates[1]

Report by Constantinos Athanassopoulos [2], Sarah Cresswell[3] and Patrick O'Leary[4]

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This session was moderated by Paul Yates. The aims which were outlined on the first day of the summer school were revisited.

Objectives

- To achieve more effective learning and teaching
- To learn about on line learning
- To question everything we do in teaching

In the opinion of the participants these objectives had been met during the summer school. The number of new techniques which had been described during the course of the school was also highlighted.

In discussing the dissemination of the results of the summer school the participants discussed in small groups how they would bring the ideas expressed in the school to the attention of their collegues and the wider academic community. Ideas included,

- Organising short workshops for the staff of the department.
- Making the proceedings available to other staff members and to specialist teaching units within the university.
- Putting the ideas into action in courses which involve other staff members.

It was agreed that everyone would try one such activity prior to the second questionnaire being circulated in November and would post the results on the Yahoo discussion group. In addition the email address of all participants is to be circulated to allow for continued co-operation.

A subgroup of the summer school in the area of organic chemistry has set up a forum for contact on specific teaching issues. The group will seek to co-operate on the development of context and problem based learning in the area of organic chemistry. The existence of such a group may allow for more general co-operation on both teaching and research in the future.

In conclusion the group agreed the summer school had been considerable benefit to both participants and moderators and the success of the school was best demonstrated by the definite belief within the ECTN members present that the school should run again.