# Good Practice in Teaching Biology: What did we learn from Teaching Quality Assessment?

# A discussion meeting.\*

#### Wednesday, 17 December 1997, University of Edinburgh.

# Introduction

#### Simon van Heyningen, University of Edinburgh

The intended function of Teaching Quality Assessment (TQA) is to disseminate 'good practice' in teaching biology; therefore, this conference was organised by the lead assessors in Scotland in order to discuss what university biologists have learned about teaching from TQA in Scotland and Wales (England has yet to be assessed). The focus of the conference was discussion of the *results* of TQA regarding biology teaching rather than the TQA process itself. The overall impression following TQA was good: the image of biologists was that of a teaching oriented community who met frequently to exchange ideas. Is this portrayal, however, strictly accurate? We must determine as well whether we have actually learned anything substantial regarding teaching from TQA, or whether the outcomes are more concerned with logistics and anecdotal knowledge rather than teaching.

The topics for this conference arose from the TQA assessors' impressions and reflections from the TQA exercise itself:

- the advantages and problems of amalgamating departments
- the advisability of the shorter, more general courses suggested by the Dearing Report
- curriculum design, course structure, and outside courses
- the role of employers and non-biologists from outside the university structure
- increasing pressures on equipment, especially within the context of employer expectations that students be familiar with state of the art equipment.
- the emphasis on transferable skills and the difficulties of teaching, assessing and proving that students have developed such skills.

Biology as a subject area is doing well; unlike Physics or Chemistry, recruitment is buoyant and the students are of high quality. This is especially the case for Scotland where students are recruited to either biology as a whole or the faculty, albeit some sub-specialities (molecular biology, for example) still attract small student numbers. The total number of students has increased two-fold from five to six years ago. Although the level of recruitment to biology is certainly positive, it is nonetheless difficult to cope with such large numbers of students within the present funding climate. Within the University of Edinburgh, the strain is particularly apparent in honours courses - whereas previously ten students were the norm, sixty to seventy are now more typical. Some teaching staff are therefore carrying increasingly heavy loads and their efforts, which are vital, are unrewarded by the university hierarchy. With less resources and pressure on all aspects of teaching, the adequacy of traditional teaching methods warrants examination. Although is significant that students are generally happy with biology teaching in Scotland, complacency is best avoided when it is considered that students have no other frame of reference. The question regarding diversity of provision is also worth considering - do universities vary in what they are teaching and the methods employed to do so? It appears that this is not necessarily so, especially within the context of increasing emphasis on graduateness. It is perhaps worth considering whether universities should indeed celebrate and emphasise diversity more.

#### Self-Knowledge and Assessment

#### Professor Sir Stewart Sutherland, Principal of the University of Edinburgh

Self-knowledge is the basic aim of any worthwhile academic within education, teaching and learning - we need to know where we are, what we do, and how to improve it. The purpose of TQA is measuring standards, but how accurate and helpful are these measurements? TQA does, however, provide a baseline and a frame of reference, and, therefore, perhaps a means of gauging improvement.

Perhaps part of the process of improvement, to paraphrase Robert Burns, is learning to see ourselves as others see us, but how important and relevant are the perceptions of those outside the university structure? Certainly the current TQA format does involve those from outside the universities and non-subject specialists, but we need to decide which end of the spectrum we should be at: should assessment of teaching be restricted to self-audit, with selfcorrecting mechanisms or should it be similar to school inspections, with others making the judgements about the quality of university teaching? Why do we need to inspect, or 'assure', ourselves and who exactly is the audience which we are trying to persuade regarding quality assurance? The quality of university teaching is just not the concern of academic researchers committed to teaching and learning, but is also of concern to the government, which sets the benchmarks of quality; local Members of Parliaments (both Westminster and the imminent Scottish parliament); higher education funding councils; schools and headteachers; parents of students; employers and professional business organisations (for example, the CBI, Scottish Enterprise); the press; and general citizens.

Universities' concerns regarding quality insurance began in 1983 when the CVCP set up the Reynolds Committee; the Reynolds Report II, the Academic Standards Group within the CVCP, Academic Audit, the Kerr-Fraser Working Party, and the QAA followed. With larger areas of preoccupation growing exponentially, it could easily lead to more time spent assessing others than in actually teaching. The QAA's task is to determine a way forward regarding this imbalance, ensuring that bureaucracy does not escalate further.

National discussion regarding quality assurance is focused on whether we are to become an entirely self-regulating system with a decidedly light touch, or, conversely, submit to rigorous, heavy-handed inspection. The Secretary of State possesses the power to insist on the right of the school inspectorate to examine all levels of teacher education, including higher education. Will this power extend to other areas? Clearly, if we ourselves are not able to implement satisfactory assurance procedures regarding reasonable accountability, the management of increasing sums of public money, and spending it well, then others will decide for us. The establishment of an inspectorate would imply that universities are incapable of regulating their own standards.

Self-knowledge is the means through which we determine accountability and high quality assurance. It is our responsibility to assert self-regulation and ownership of our systems. Although we need to accept a degree of external input and accountability, we ourselves are in the best position to determine and adopt the most appropriate means to measure standards. Furthermore, responsibility for monitoring, auditing, and checking the system of quality assurance inherently belongs to the universities. Intrinsic within this is the right of universities to determine the levels of attainment requisite for each degree. It is inherent that we convince others that what we are doing is both acceptable in its level and appropriate in its procedures.

Although teaching has certainly improved as a result of TQA, that is not necessarily a reason to undergo TQA again. Other, more appropriate methods are needed in order to move forward. Rather than the heavy bureaucracy or long measures of TQA, future quality assessment might include: short term, short notice visits from external assessors; a system of limited bureaucracy; a system which is minimally expensive both in terms of monetary output and staff time; a lighter, sharper approach which is geared towards individual subject areas. Additionally, feedback from students solicited during TQA proved a valuable source in terms of ways to improve our teaching and there may be scope for such input to increase once student fees are introduced.

What we have learned from the exercise and the positive outcomes from TQA, however, should be highlighted:

- the importance of careful preparation, whether it be for individual lectures, courses or programmes of study
- the usefulness of prepared material disseminated to students
- the strengths and weaknesses of the current system
- the value of team-work amongst colleagues and improved staff communication, with teaching no longer being a solo activity
- by extension, transferring the precepts of team-work to student learning
- the importance of recognising and spreading good practice in teaching.

Self-knowledge, therefore, radically affects behaviour. Although it has instigated changes in how we teach, it should also extend to how we interact with employers and to our perspectives on what a university education should provide. New issues and new strategies upon which to focus should become clearer - for example, other professions have established broad programmes of staff development (medicine, engineering, *etc.*) but, as of yet, there is not a corresponding programme for teachers in higher education.

Whether it is TQA or another system of audit, it is perceived as a game which we are learning to play with increasing panache and style. But it is a mistake to dismiss it once it is over: we need to learn how to absorb what we have learned from audit into our academic culture, to continue and sharpen our programmes of staff development in teaching in higher education.

# Selected points from the following question and answer session

In response to the point that the Research Assessment Exercise tends to overshadow teaching, the Principal indicated that a system of clear, career progression associated with high quality teaching which recognised the balance that lecturers need to strike between their research and teaching responsibilities was needed. Innovative educational issues, developing and

maintaining high quality teaching methods, continuing course development, *etc.*, are all time intensive and should be equally rewarded in career progression. However, a general institutional reluctance to implement this exists. One way forward might be for Faculty to appoint a person whose responsibility is to oversee Science Education, allowing that person to focus fully on the educative process. Teaching and research, however, are not on opposite sides of the spectrum: good teaching and research go hand-in-glove.

Picking up on the point that promotion is still research biased, it was queried what incentives could be provided to encourage staff, especially new lecturers, to develop their teaching expertise. Principal Sutherland pointed out that currently at the University of Edinburgh there is a contractual requirement for new staff to attend a short introductory course on teaching and learning provided by the University's Centre for Teaching, Learning and Assessment. In future such requirements may well be incorporated by the move towards higher education teaching accreditation and the new Institute for Teaching and Learning. The assertion that competence as a teacher is *sine qua non* for a lectureship is most certainly a shift and a change in perspective.

Principal Sutherland suggested that following TQA, natural progression was to move from assessing the process to evaluating the outcomes in response to a question concerning the mechanisms which could be implemented in order to maintain the positive outcomes and improved teaching but without another TQA exercise. TQA measured the quality of the process, but not standards with regard to the outcomes. Focusing on the outcomes might mean re-examining the role of external examiners and relevancy of outside professional involvement, or revising the type of input we ask from them in order to achieve results which are beneficial from our perspective. One aspect which might be considered is whether students are exiting the system better educated and better trained.

# Morning Group Discussions lead by a TQA Assessor

Organisation of teaching: single departments or unitary bodies? Staff resources: how to get the best from everyone, training of teaching (including tutors and demonstrators), role of part-timers.

Convenor: Simon van Heyningen, University of Edinburgh

Biology specific training and how to obtain a greater uptake across different staff categories (lecturers, tutors, demonstrators, technicians) was one of the main areas of discussion during this session. An additional strand of discussion focused on staff management, with a view towards both regulation and creating more of a teamwork approach to teaching, aiming to incorporate all levels of staff more widely and overcoming a rather hierarchical organisation of different teaching roles.

It was posited that perhaps more formal recognition of different levels of teaching staff and their set roles was required in order to maintain and improve quality of provision. This appears particularly pertinent when the wide range of staff categories is considered: salaried and casually paid, teaching researchers who are not members of staff, part-time and full-time staff, postgraduates and post-doctorates. Of course, within this list, there may be a certain degree of overlap. Quality and coherence might be more easily achieved with the creation of

a one year, contracted Teaching Fellow who is employed full-time; this, however, might reduce the number of casually paid postgraduates. Formal recognition of the various roles of teaching staff may also be important in underlining the importance and value of those teaching staff who are employed on short-term contracts or casually.

Delineating roles, however, is insufficient in and of itself, ensuring internal consistency and comparability between all levels of staff is also important. This perhaps particularly applies to assessment, where postgraduates tend to invest more time in marking and providing feedback to students than full-time staff normally do. The often much stricter marking by postgraduates could also create an overall imbalance within a course. The extent to which postgraduates were fully or adequately trained was queried. An additional point raised regarding assessment was that postgraduates, researchers and technicians are usually fairly involved in undergraduate project supervision simply because they are the people predominantly in the laboratories, providing an accessible resource for undergraduate queries. Yet, little or no training is provided for those acting in this capacity, whether *de facto* or otherwise.

Although some queried the adequacy of training for postgraduates, it was widely agreed that training non-academic staff, such as technicians, was under-resourced and too frequently over-looked. Technicians are not only markedly under-trained, but their wide experience with both demonstrators and undergraduates is often not taken advantage of. It is often over-looked that technicians actually do a significant amount of teaching in their own right and, like demonstrators, are key persons in the practical elements of courses. A technician may also be in an excellent position to comment on overall student performance since they tend to have greater access to students and perhaps more opportunities for discussion during practicals. Equally valuable is their ability to provide feedback both on practical design and the performance of demonstrators. The outstanding question, therefore, was deciding what was the best means of both training technicians and incorporating them into the course team. One step forward may be to invite technicians to participate in demonstrator briefings and feedback sessions, thus providing them with a means to act as part of the course team and provide a forum to tap into their knowledge base.

#### Curriculum design and review: core material, specialisation, role (if any) of outside bodies.

#### Convenor: Bill Mordue, University of Aberdeen

In terms of biology as a whole, there was diverging opinion (with a marked difference between Biochemistry and Cellular and Molecular Biology) as to what to look for as essential components of a biology degree. Matters were further complicated by the fact that the role of and questions asked by non-university members of the assessment team was deemed unsatisfactory regarding curriculum design and review. It was also felt that to a certain extent the process was driven by non-academics in terms of both terminology (for example, programme specifications) and frameworks which were not tailored to the discipline. Therefore, TQA did not produce wide agreement concerning curriculum design, but rather served to highlight the differences in approach on both institutional and departmental levels.

Equally difficult to arrive at was a definition of 'curriculum' which was adequate for both biology as a whole and for sub-specialities. Furthermore, the definition of what constitutes a graduate biologist is defined by both an institutional as well as the overall course perspective.

To a certain extent, the specialisations of staff drive the curriculum. This can prove problematic for both large and small universities: the former may provide such wide choice for honours students that the range of necessary core material is therefore difficult to adequately cover in earlier years, whereas the latter may have less breadth and therefore less marketability for graduates. It was agreed that a mechanism that would capitalise on diversity would particularly enhance the provision of smaller departments. Diversity would also allow for both vocationally and research oriented courses to flourish - a point which is perhaps particularly pertinent within the present funding climate and queries concerning the traditional Scottish four-year honours degree.

It was generally agreed that curriculum design began with the exit point (fourth year), articulating what a course is trying to achieve and then working backwards, with the modules offered in the final year indicating the core elements needed to be covered in earlier courses - a task made easier for more restricted subject areas but inherently difficult for biology as a whole. Defining the purpose of each year of study was also considered important before delineating actual course content and deciding when a specific component should be taught. Progressive development was stressed as a key element in course design. The vertical versus horizontal dimensions of course design was also variable. Transferable skills adds an extra layer of difficulty to the whole design process, especially with the emphasis on students emerging from their final year as a marketable product. The trend towards modular courses versus set courses also complicates design, with Directors of Studies having to ensure that students cover not only core needs for specialised modules but also obtain an overall balance. Scottish universities were particularly noted for their very rigorous system of advising and guiding students, as well as for making outcomes explicit.

Identifying core skills across biology was also a difficult task, with some dividing these skills into two categories: subject specific and generic (for example, reading, writing, numeracy). It was agreed, however, that skill acquisition should be embedded within courses rather than taught as an isolated element. Diversifying modes of assessment might be one way of incorporating a variety of skills into the course. Problems encountered with incorporating a wide range of skills was striking the right balance between teaching students how to think like scientists and apply scientific skills and in providing a means for students to learn skills favoured by potential employers, such as how to give a polished presentation. In terms of TQA, the importance of scientific knowledge to the industrial assessors was questioned. The point was made that it appeared that industry was more concerned with the development of logical thinking, the ability to access and apply information, as well as the usual array of transferable skills. Although the general importance of transferable skills was recognised, the over-riding concern was the impression that core science skills were being marginalised by the transferable skills sought by industry.

The TQA guidelines under 'Aims and Curriculum' indicate that 'aims and objectives [should] correspond to the needs of students, society and the economy'. Similarly, under 'Curricular Design and Review' it is indicated that there should be 'regular liaison between the institution and industry, commerce, public agencies, professional bodies and other end-users'. Although links to external agencies, however, tended to be *ad hoc* and have little influence in curricular design, there are a variety of mechanisms already in place: involvement in validation events; external advisory groups/liaison committees; honorary appointments for industrialists/professionals; market research for potential employment for graduates; informal and *ad hoc* links through professional and research links; an entrepreneurship project as an alternative to a honours research project; placement and sandwich schemes. Yet, it was

widely agreed that although consultation has been undertaken with regard to review, it was to little effect. One of the results of TQA is the questioning the role of outsiders, whether we have been consulting the right people, how to best utilise this resource, and the extent to which they should influence curriculum design and review.

# Student development: transferable and professional skills, student centred learning; pastoral care and advice, careers.

Convenor: Steven Smith, University of Edinburgh

The participants in this session broke down to discuss in small groups each of the subheadings listed above; the main theme of each being developing transferable and professional skills. The sub-groups subsequently reported back in a plenary session.

#### Transferable and professional skills

It was generally agreed that it was difficult to decide on the core skills students needed to learn, especially within a diverse and large department. In order to overcome this, one university developed six separate core skill modules which allowed students to choose what was most appropriate for their own needs (for example, plant sciences, physiology, genetics); a separate module on transferable skills was likewise provided. The response to the transferable skills module, however, was mixed: some believed that it was more productive to embed these skills in core teaching. Rather than separating them out as a distinct element, it might prove more productive to teach students how to apply these skills to the subject discipline. These key skills, whether transferable or subject related, should be taught progressively over the years of the degree course, thereby allowing students to both develop their skills and learn subject application on increasingly sophisticated levels. The outstanding question was finding the balance between transferable and specialist skills in an already overcrowded curriculum.

#### Student-centred learning

Both teaching and acquiring professional and transferable skills is time intensive. With limited resources for teaching these skills, the question arises as to how university educators can effectively implement a progressive programme of skill learning and acquisition. One means of doing so would be to capitalise on student-centred learning. Either self-selected or appointed learning groups could be established within the framework of a particular course. With a series of set tasks which integrates skill and subject matter acquisition, perhaps in a problem-solving format, these student groups can provide the means and the inherent ongoing support as students realise that their peers can be a valuable learning resource. Students could be required to keep a log of their meetings, there could be periodic meetings with a staff member, and there might be some scope for integrating these groups with students from a different year. There were, however, outstanding questions about assessment, particularly assessing group work. Student-centred learning might also be one means of overcoming the large variation in the competency or willingness of staff members in teaching transferable and/or professional skills, which can require lateral and/or creative thinking.

#### Academic guidance, pastoral care and welfare

Similar to the other areas under discussion, it was generally felt that sometimes it was difficult to provide appropriate guidance when students themselves tend not to take the skills not explicitly related to the subject seriously. This may reflect a variety of things: perhaps an already heavy work load or the fact that if the skills are non-assessed students may perceive them as of secondary importance. It was agreed that all guidance must be explicit on learning objectives, as well as all aspects of student requirements (encompassing elements such as how to write a report to fulfilling course requisites). A sharp, focused message regarding skill acquisition should be relayed to students through a variety of media, whether it be via assessment tasks, coursework and/or tutorials, staff-student meetings, IT or extra/co-curricular workshops. Additionally, different means of providing support to students should be explored, especially within the context of rising student numbers and already over-extended staff resources. More student centred-learning might be one method which could be examined as a means of providing more support and emphasis on skill acquisition, whilst economising on staff time.

#### Careers and job seeking

The main point made regarding this topic was that the primary objective was to help students to become career oriented, to recognise the importance of developing skills that may not be perceived as immediately relevant, and aware that they themselves need to focus independently on developing job-related skills. Concurrently, it was noted that it is equally important to make clear to students that concentrating on their academic studies and developing the skills sought by industry are not mutually exclusive. Various means of achieving this might be through placement schemes, having students returning from placements share their findings with other students, inviting graduates to share their practical experiences and provide advice to undergraduates, setting up a liaison with career services which would provide biology specific advice to students, either through a series of voluntary workshops and/or individual appointments. It was noted that a successful job placement (perhaps arranged by the student personally) often plays a key role in obtaining future employment. Job placements, however, are not always feasible for every student and therefore it is incumbent on university courses to provide incentives and a means for students to develop and apply relevant skills. Although frequent staff-student contact was perceived as a key element in achieving this, it was felt strongly that it was clearly the students' responsibility to demonstrate levels of attainment. One means suggested, albeit more practical for smaller rather than larger departments, was that students be required to keep a log or diary which would be assessed. Using a variety of means of assessment which integrates a wide range of skills not only incorporates skill development within the academic curriculum, but it also makes this acquisition transparent to future employers.

#### Afternoon Group Discussions

#### Teaching non-biological subjects (chemistry, maths, statistics) to biologists.

Convenor: Roy Burdon, University of Strathclyde

TQA could not judge departments on the quality of non-biological teaching, but it did comment on quality of provision. Whereas non-biological subjects are a necessary component of any biology degree, it was generally felt that they can sometimes lack relevance or fail to meet the specific needs of biology students. In such instances, basic principles and biological applications need to be taught within biology itself, which has implications for an already crowded curriculum. Better communication with outside departments and adapting a teamwork approach to these requisite subjects might be one way of ensuring relevancy - for example, the course might be team-taught by biologists and other subject specialists or there might be scope for consultative meetings during summative course review. Departments with declining student numbers who are trying to establish a broader student base are usually amenable in attempting to incorporate the specific needs of biologists. One university has a course entitled, 'Physics for Life Sciences' which thematically develops topics which meets the needs of biologists; this course, however, is the result of an intensive period of development. Such co-operation and innovation is heavily dependent on departmental personal and can therefore vary tremendously. Another factor might be the ability of biologists to reciprocate in kind.

Biology courses may also have to re-evaluate what non-biological subjects are required and whether pre-requisites should be set for students seeking entry to a biology degree course. Perhaps one way forward might be to develop more in-house courses - for instance, replace a generic chemistry course with one taught by a biochemist. This, of course, may not be a realistic option for smaller departments or generally in terms of already taxed resources. Setting pre-entry qualifications can also prove problematic: not only is it dependent on pre-university provision, but it can also act as a barrier for otherwise highly qualified prospective students, adversely affecting student enrolment. It was questioned whether it would not be more prudent to widen rather than limit access to biology. The advantages of the Scottish educational system in this area are apparent in the greater diversity in schools (both in terms of Highers and Certificates of Sixth Year Studies) and the four year honours degree programme, which facilitates wider provision and innovation.

#### The role of IT in teaching and computer-assisted learning.

Convenor: Ian Stevenson, University of Dundee

Almost all participants in this discussion group used IT or computer assisted learning (CAL) in their teaching. The aims of this session where to discuss the advantages and disadvantages of CAL in higher education, identify further initiatives needed to develop and more widely implement CAL, and to ascertain what CAL will contribute to higher education five years from now.

The interactive nature of CAL programmes is attractive because of the opportunities they offer for individually-paced learning and therefore act as an excellent adjunct to conventional teaching. CAL programmes also provide students with variety, expose them to resource-based learning, can be useful in teaching basic skills (for example, statistic packages), and in itself provides students with a means to develop a transferable skill. Additionally, CAL may also augment or be used in lieu of practical sessions. Students could also use it to initially design an experiment which they later execute in the laboratory. Self-assessment, both formative and summative, is another area where CAL might prove useful; however, there is some student resistance to repetitive self-assessment MCQs. Although CAL can act as an additional means of providing student support and supplementing conventional teaching, it is not a replacement for other forms of teaching.

There are a number of difficulties with using CAL; the foremost of these being the lack of appropriate software and expense. The resource implications of CAL are considerable, ranging from providing adequate computing facilities to developing and keeping software up to date. Too frequently there is a disjunction between software and hardware, with existing hardware already being incapable of running modern software. Finding software which fits your needs is difficult: there is little shared material of sufficient quality for a British degree standard, especially beyond the level of first and second years. Developing your own software, however, might be prohibitively expensive in terms of staff time, especially when considering that most of these programmes are short-term, ad hoc measures. In general, it was agreed that improved authorware packages were badly needed and that the use of digital cameras/videos would enable departments to produce material of high quality. The way forward might be for universities to pool resources in order to create a central, well-funded collection of CAL material, which is consistently up-dated, meets the explicit needs of biologists, and is available for all to draw upon. Various subject consortia could jointly develop constructive CAL programmes - for example, the Biodiversity Consortium, BioNET, PharmaCALogy. Other solutions suggested were to employ postgraduates to write CAL programmes or set it as an assessment option for final year projects.

#### Field work and field courses.

#### Convenor: Alan Pike, University of Dundee

Although the perception of field work and field courses has changed and they are now firmly embedded, assessable elements of a course, there is the growing impression that field work is increasingly under threat. Decreased and restricted funding has been proportionally higher for field work. It is no longer the case that SHEFC ring fences money for field work and it is increasingly difficult to make a persuasive argument that spending on field work is justifiable. Additionally, in some instances, charges for maintaining field stations have been passed on to individual departments. In short, the viability of field work is being undermined. Attempts to work within the funding restrictions has resulted in shortening the length of time spent in the field; what may have once been a field *course* may now be run as a field *day*, albeit students are still being asked to complete the same amount of work within a shorter period of time. There are often implications for staff resources: it is too expensive to employ technicians (especially if over-time must be paid); if demonstrators or postgraduates attend they are often either underpaid or even unpaid, with departments considering it a 'privilege' for these categories of teaching staff to be invited to assist full-time staff who find it increasingly difficult to allocate sufficient time to field work.

Where departments seek to alleviate funding problems by passing some of the costs on to the student, there arises a different set of concerns: where field work is compulsory, the cost must be made explicit in the course syllabus and may act as a barrier to student up-take; when field work is made optional, then up-take may well be restricted to those students who are more financially able. The costs that students are asked to pay for domestic based field work varied throughout the discussion group: 20-30% of the total cost (x8 members), 50% (x2 members), and 100% (x1 member). For work abroad, 60-100% of costs was the norm.

Field work can be implemented in a number of forms - for example, as a free-standing, theory based module or as the practical component of a module. The number of field courses over

the length of a degree is variable, although two courses seemed to be the average. The extent to which field work is used depends on class size, the year of study, the type of course, and the university. Field work could also be set as independent project work. Not only is assessment now much more rigorous, but field work also lends itself to a wide-range of assessment options, such as on site exams, oral presentations, formal reports, short identification tests, formal examinations. Assessing collaborative work in the field is an area which requires careful thought concerning the fairest method of proportioning marks on a group versus individual basis; group-self-assessment may be one method worth examining more closely. The rationale group members provided for fieldwork was equally variable: reasons included it being a necessary component to applied biology or environmental courses, positive student feedback and graduate marketability. Interestingly, pedagogical reasons were not predominant.

Safety was an issue of primary concern. It is proving more difficult to ensure safety for all, at all times during the course of a field trip. It was considered vital that the IoB's acceptable staffing ratio of 8:1 be maintained. Other methods adopted include employing full-time safety officers, undertaking risk assessment exercises (and in the case of independent project work, having students sign a risk assessment evaluation), first aid training, and providing staff with mobile phones whilst in the field. There are increased safety implications for students working independently in the field without staff supervision. Although students are required to work in pairs, it is not always a reliable means of ensuring that safety guidelines are adhered to. Ultimately, liability rests with the university and with such wide safety variables involved in both independent and supervised field work, legal suits can be a possibility .

#### Honours specialisation; how can we keep a strong research basis?

#### Convenor: David Boxer, University of Dundee

The defining characteristic of honours work is an original investigative research project undertaken by the student. Whether this project is by a group or an individual, whether it is wet or dry is immaterial; its inherent value is that it is an unparalleled in-depth learning experience. However, it was recognised that research projects are not appropriate to all students, with regard to both student interest and ability - although it is not always easy to discern which students will excel at and enjoy an investigative project. For some students, actually embarking on such a project may very well provide the spark of interest which had previously been missing from their studies. In light of the differential in student interest, abilities, and career aspirations, a move towards a greater differentiation between degrees which are research based (an honours degree) or otherwise (a general degree) might be one way forward in providing wider student choice and maintaining honours specialisation.

Although honours research is undoubtedly a valuable course component, it also by far the most expensive component as well. Allocations (30% for research, 70% for teaching) by funding councils does influence honours provision. The 30% allocation is certainly a large gearing factor which allows staff to prepare further research applications. Universities who receive this 30% grant are therefore far better placed to provide research opportunities for honours students because they are better resourced: there are generally more full-time staff, more technicians, more, as well as newer, equipment, and better library provision with regard to stock and access. The importance of departmental cutting-edge research on student learning and honours investigative projects is a particularly salient question for universities with a lower research profile and/or less funding. Furthermore, some universities are

diversifying the types of research students are undertaking and moving away from the heavily laboratory based model. Dry projects which are original work (not literature reviews) would take into account both resourcing restrictions and the fact that not all students desire a laboratory based career. By extension, employer requirements may also influence the debate.

Staff research directly influences the types of honours investigative projects undertaken, as well as influencing the undergraduate curriculum as a whole. Since universities are very different in their research bases, this may be one case where diversity can be emphasised and, indeed, maximised. Clear aims with regard to research activities should be articulated and realistic. The aims of honours degrees are: the ability to respond to future academic and industrial developments; to provide students with access to experts and specialised knowledge; to provide students with the opportunity to undertake original investigative projects.

#### How can we make use of expertise and advice from outsiders, including employers?

Convenor: John Craft, Glasgow Caledonian University.

TQA encouraged departments to engage in wider discussions with outsiders regarding curriculum design and review; however, post-TQA this contact has declined and the role of outside agencies is considered a weak area. In light of the non-specific and generally unhelpful nature of their input (for example, commenting on the need to improve students' writing skills but not suggesting any means to do so), it was questioned whether the right people had been invited to participate, whether the right questions were being asked, or if the outside agencies were keen to participate. It appeared that industry was not in the best position to comment on whether the curriculum was achieving its aims, and universities were unsure as to how they would respond to curriculum changes suggested by industry. It is important to recognise - and keep in perspective - the respective roles of both industry and universities. Perhaps universities need to be more selective in seeking external input, and look to industries which are equally at the forefront of research.

The involvement of outside agencies does have its positive aspects: they could be well placed to offer advice on teaching transferable or generic skills; the opportunities provided by sandwich/placement courses are excellent; they can offer sound advice on alternative student projects; and they have a marked interest in the development of multi-disciplinary approaches to courses. External professionals may also be able to contribute to final year modules in assuming an appropriate level of teaching and commenting on the curriculum. There was wide agreement that the opportunities provided by industry in terms of undergraduate placements/sandwich courses was one of the most positive roles which outside agencies play in undergraduate learning - although slightly problematic in that demand for places exceeds supply and that students must be willing to leave their cohort for an extended period.

Graduates can also be a valuable source of feedback from the perspectives of teaching staff as well as current students. Graduates, whether they have taken jobs in industry or research, can provide useful insights in how their course prepared them for their careers. Their comments on the design of their course(s) in relation to their personal outcomes can highlight the positive and negative aspects of the curriculum which those further removed from higher education may not be in the best position to comment on. Graduates can also play an

important role in discussing their experiences in industry with undergraduates, thereby helping them prepare for the expectations of future employers. Graduates, however, are an under used resource.

#### Teaching Transferable Skills

Convenor: Mike Rennie, University of Dundee

The ultimate aims of teaching students transferable skills and appropriate attitudes are to make learning easier and more enjoyable, to further the personal development of the student, and to enhance performances in further training and work. It was commonly agreed that transferable skills should not only be embedded within biology teaching, but should also be incorporated early in the curriculum so that students can develop their skills and use them with increasing sophistication as their course progresses. The types of tools and technical skills to be introduced as early as possible include: IT skills, report writing, essay writing, numerical analysis and statistics. Generic CAL packages may be one means of doing so. Appropriate activities for developing higher level skills should be incorporated throughout the course, geared towards the more advanced subject matter.

Transferable skills, moreover, must be explicitly and actively taught, otherwise students will have difficulty in achieving the set objectives. In teaching these skills, it was felt that not only were other staff (particularly postgraduate demonstrators who can act as a valuable resource) being inadequately used, but also that students did not recognise their peers as an additional resource. Additionally, identifying the best method or context to teach transferable skills is an important part of the process - for example, often certain skills, such as teamwork, can be best developed outside the classroom. Field work can provide a number of opportunities for developing transferable skills in a new environment and in a novel way. It was considered important that objectives of attainment be clearly identified and the outcomes assessed, with appropriate methods of feeding back so that the student can identify how performance can be improved.

The range of skills and attitudes students should acquire include: IT tools; information retrieval and management; personal management; coherent and articulate expression; making judgements; creative thinking; inter-personal skills; adaptability; making applications; self-appraisal; enthusiasm for learning; scholarly concerns; awareness of greater societal concerns. There are outstanding questions, however, as to whether we are teaching the right mix of transferable skills and who should be teaching what. Implications for resources - computers, small group meeting rooms, staff time, library books - is another area not yet fully explored. Although industry has made clear what skills they expect from graduates, their role in helping develop these skills or in providing feedback on how we are teaching them has been somewhat ambiguous.

### **Concluding Remarks**

#### Bill Mordue, University of Aberdeen

In summarising the main themes which had arisen during the course of the conference, it was emphasised that as universities become subject to increasing outside pressures, it is important that we retain control of audit, rather than have audit be externally driven. Setting standards of degree attainment must remain within the province of the universities. Additionally, with universities setting the agenda and determining how outside agencies can be best used, external bodies can play a valuable role in fine-tuning review. An important issue in terms of both internal and external accountability is staff development. TQA has highlighted that staff development is an area which warrants further attention. Like other professionals, teachers in higher education need to regularly up-date their teaching skills and expertise. Staff development should also extend to demonstrators and technicians.

The conference has facilitated discussion on areas where we are doing well, as well on aspects which need improvement. One area of concern is the charges levied on students for field work which is a core component of a course. If students are not similarly charged for practicals, why is it therefore acceptable to charge for field work? This is needs to be addressed critically, especially within the forthcoming context of student fees. Improvement can also be made in provision of CAL and the amount of funding allocated for its further development. Finally, although diversity of provision between biology departments is positive, will greater differentiation between degree programmes translate into a reduction of or the disappearance of final year research projects from a number of institutions? Investigative honours projects are an essential component of undergraduate study and whereas greater student choice regarding project types is welcome (for example, more dry options), research should remain as the hallmark of an honours degree.