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Innovative learning & assessment

SHARING IDEAS 3

Edited by Angela Towle

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The King's Fund Centre is a service development agency which promotes improvements in health and social care. We do this by working with people in health and social services, in voluntary agencies, and with the users of these services. We encourage people to try out new ideas, provide financial or practical support to new developments, and enable experiences to be shared through workshops, conferences, information services and publications. Our aim is to ensure that good developments in health and social care are widely taken up. The King's Fund Centre is part of the King's Fund.

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Acknowledgements

I should like to thank all those who contributed towards the preparation of this report through their presentations at the conference, participation in the discussions and provision of the summaries of their own experiences and ideas. It was unfortunately not possible to include all the individual summaries which were submitted, but I have endeavoured to include all the major ideas they contained at some point in this report.

I particularly wish to thank my former colleagues in the Enterprise Team at the City and East London Confederation (CELC) for the help and support they have given me and for their good work in the cause of medical education.

Executive Summary

In higher education in general, and in medical education in particular, the pressure to change and innovate has clearly increased over the last few years. The major sources of discontent with the traditional way of teaching, learning and assessment, which are driving the process of change, relate to both the content of the curriculum and to the process of the education. Pressure for change in medical education comes from:

- problems with factual overload and didacticism in the curriculum;
- the new emphasis on professional and personal skills development;
- changes in the practice of medicine;
- influences from higher education.

None of these pressures is new, but what is remarkable is the way in which, at the present time, all these various forces are acting synergistically, strengthening the case for change and creating the conditions in which innovation can flourish.

The climate of opinion in medical education seems to have changed from a prevailing view that change was necessary but unlikely to happen, to a belief that the chances for substantial change are greater than at any time in the past. It is a climate in which innovation is being stimulated and encouraged as never before. Some of the factors which have contributed to this new situation are:

- the new recommendations on undergraduate medical education issued by the General Medical Council (GMC);
- the King's Fund Centre's enquiry into medical education and its subsequent efforts in facilitating change;
- the Department of Health's funding of the Undergraduate Medical Curriculum Implementation Support Scheme (UMCISS);
- government-funded initiatives in higher education such as Enterprise in Higher Education (EHE) and the Teaching and Learning Technology Programme (TLTP) to integrate new technologies into higher education;
- academic audit and quality assessment exercises in higher education.

As a result of some of these initiatives, new ideas and new people with a broader experience of higher education and health care, and with a wide range of skills in education, staff development, facilitation and the management of change are being brought into medical schools.

A variety of new initiatives are being developed. Some are in response to the new GMC recommendations, with their emphasis on the reduction of factual content, integration (both vertical and horizontal), active, student-centred, self-directed learning and early clinical contact. Some are related to the acquisition of skills which have not previously been formally taught in the curriculum (including intellectual, communication and management skills) and the assessment of competence. Others are related to the need for teaching to follow patient care as the diagnosis and management of many conditions moves out of the

hospital into the community and general practice. Yet others relate to the use of new technology, such as computer-assisted learning.

This report documents particular problems and some possible solutions relating to four aspects of innovative learning and assessment: self-directed learning, computer-assisted learning, the assessment of competence and evaluation. In addition, the potential problems and possible solutions in relation to the broader issues of introducing, supporting, disseminating and adopting innovations in medical schools are considered. Despite the variety of current innovations, there are a number of common themes in the issues which they present. These include the importance of: information and research; sharing and networking; staff development; recognition and reward for teaching; institutional support; and resources, especially money.

INFORMATION AND RESEARCH

There is currently much research that can be used to indicate which particular combination of teaching methods and assessment procedures is most likely to achieve the learning outcomes required on a particular course. There is a large body of research on the assessment of competence in both higher education and in relation to medicine. Innovators should ensure that they are well informed and that their ideas are based on sound educational principles in accordance with the research evidence which is available. They should also seek expert advice on the planning and evaluation of their work, for example from staff in the medical education unit. They should consider planning innovations as experiments or action research which can be published.

SHARING AND NETWORKING

The extra work which will necessarily be involved in curriculum change can be reduced by the sharing of ideas, expertise and resources. Such sharing can occur through face-to-face contact and networking, through the development of consortia or through the creation of databases or clearing houses. Such initiatives require organisation and resources to bring people together or to facilitate the exchange of documents, and one or more bodies willing to take on the responsibility of co-ordination. The sharing of developments and materials will be promoted if there is a system of peer review to ensure quality.

STAFF DEVELOPMENT

Innovation involves doing something new and, in order to either plan or implement successfully, it is likely that some form of staff development will be required. Many good ideas fail because their implementation depends on people who have not been adequately prepared either in terms of their attitudes or skills. While small-scale innovation may be developed by a small group of like-minded and committed people, when it spreads wider the initial philosophy and practice may become attenuated or lost unless there is a programme of staff development for the teachers, plus on-going monitoring and support.

RECOGNITION AND REWARD FOR TEACHING

The low status and priority of teaching in medical schools is well known. If innovation is to be encouraged, supported and maintained, both extrinsic and intrinsic rewards must be provided so that the innovators do not become discouraged and demotivated. Extrinsic rewards would ideally include the allocation of protected time for educational development

and the possibility that excellence in teaching and educational research might be valid criteria for academic promotion. Intrinsic rewards are derived from the motivation and enjoyment which come from working with a group of colleagues who have similar interests and complementary skills, and could be reinforced by the kind of networking and sharing outlined above.

INSTITUTIONAL SUPPORT

Innovations should be planned with the full knowledge and backing of the central curriculum planning group in the medical school, to ensure not only that they are appropriate to the needs of the institution, but also that there is commitment to continue after the experimental phase, especially if there are cost implications for the school. Without this support, it is likely that the innovation will ultimately fail, however successful in the short term.

RESOURCES

Expertise, time and money are all limited, hence the need for sharing. However, there is still an urgent need to make more funding available for medical education research and development and for curriculum evaluation. Appropriate administrative and financial management systems are required within medical schools to support education, ideally with a specific budget for educational development. A review of the funding of medical education, especially the allocation of the Service Increment for Teaching and Research, is much needed.

Finally, it is important that the ideas, creativity and enthusiasm in undergraduate medical education are sustained beyond this particular round of curriculum change. The world in which doctors will be practising is changing too rapidly for the curriculum to become fixed as in the past. Medical education must be continually evolving and innovation must likewise be continually encouraged and supported.

CHAPTER 1: Introduction

This report arises out of a conference held at the King's Fund Centre on 26 November 1993 on Innovative Learning and Assessment. The conference was the third in a series entitled 'Sharing good practice' which is designed to highlight key issues through the presentation and discussion of selected case studies, to indicate new areas for development, and to identify constraints and problems and propose solutions.

Chapter 2 describes the impetus for innovation in medical education in terms of the pressures for change (problems with factual overload and didacticism in the curriculum; the new emphasis on professional and personal skills development; changes in the practice of medicine; and influences from higher education) and the different events and influences which have been acting synergistically over the past couple of years to create the conditions in which innovation can flourish as never before.

The illustrations of innovations in teaching, learning and assessment which are described in Chapter 3 include summaries of oral and poster presentations given at the conference plus examples of work in progress selected from those provided by conference participants. They are grouped into five sections, dealing respectively with:

(a) curriculum and course development;

(b) self-directed learning and skills development;

(c) alternatives to traditional clinical teaching;

(d) computer-assisted learning; and

(e) assessment.

This report is not designed to be a comprehensive record of innovative learning and assessment in UK medical schools, but it does indicate some of the variety of innovations which are being tried or planned. The intention is not to define correct or preferred methods, but to underline the importance of sharing and to provide a source of inspiration and ideas, as well as to draw out some of the lessons which have been learned.

Similar innovations are no doubt being tried in medical schools other than the ones represented here, so it should not be inferred that these are the only schools in which such developments are taking place. They merely reflect the renaissance of activity in medical education which has occurred over the last few years and has touched even those schools not renowned for innovative curricula and where teaching has received scant attention in the past.

Given the hard fact that education is not the top priority in most medical schools and that resources of time, money and expertise are limited and in great demand, it is important that the ideas and lessons learned from educational developments are shared widely. Referring to the case studies, the report also attempts to highlight potential problems and possible solutions (Chapter 4) in order to make a series of suggestions for future research and development, informed decision-making and effective and efficient use of limited resources.

CHAPTER 2: The impetus for innovation

Innovations in the teaching of medicine to undergraduates relate both to the content of the curriculum and to the process of the education. Traditionally, the medical curriculum has focused on the teaching and testing of knowledge through largely didactic teaching methods. It has frequently been criticised for encouraging rote learning and the recall of facts, most recently by the GMC (1993) in their latest recommendations on undergraduate medical education. Such criticisms are not confined to medicine and have been levelled at much of higher education in the UK (Entwistle, 1992): 'Current degree courses often require students to cover syllabuses loaded with detailed information, while assessments test the use of that information within a comparatively narrow academic context'.

THE PRESSURES FOR CHANGE

In higher education in general, and in medical education in particular, the pressure to change and innovate has clearly increased over the last few years. The major sources of discontent with the traditional ways of teaching, learning and assessment which are driving the process of change are outlined below. None of it should be new or surprising to anyone who has read the innumerable reports and papers which have appeared over the last twenty years or so, from the UK (Lowry, 1992), North America (Enarson and Burg, 1992) and elsewhere, outlining what is wrong with medical education. What does seem to be new is the remarkable way in which, at this present time, the various forces are all acting synergistically, strengthening the case for change and resulting in an apparently unstoppable momentum.

1. Factual overload and didacticism

In their latest recommendations on undergraduate medical education, the GMC identify the gross overcrowding of most undergraduate curricula as the key problem. They point out that: 'The scarcely tolerable burden of information that is imposed taxes the memory but not the intellect. The emphasis is on the passive acquisition of knowledge, much of it to become outdated or forgotten, rather than on its discovery through curiosity and experiment'. They suggest that the traditional dissociation between the preclinical and clinical parts of the course has been a significant factor in perpetuating the overload.

It is becoming increasingly apparent that medical education must be a lifelong activity. It is impossible to teach undergraduates a body of knowledge which will last a professional lifetime. The expansion in scientific knowledge and the need to incorporate new subjects in order to meet the needs of future practitioners constantly increase the pressure on an already full curriculum, decrease the motivation of students, and have produced dependent not independent learners. Moreover, much of what is currently taught will become out of date (as knowledge advances) or obsolescent (for example, because some tasks which are currently done by doctors will, in the future, be performed by other health professionals or with the assistance of computers or robots). Therefore, the challenge is two-fold: to reduce the content of the curriculum so that students are less overburdened and feel more motivated to learn and continue learning; and to change the educational process so that students become active, independent learners and develop the skills to continue their own education.

The solutions that the GMC proposes to these problems are:

- the introduction of a 'core curriculum' and 'special study modules' which allow students to study areas of particular interest to them in depth;
- true integration of the course, both vertically and horizontally, i.e. interdisciplinary synthesis, not just simply co-ordination or synchronisation of departmentally-based components;
- reduction of didactic teaching and the adoption of learner-centred and problem-oriented approaches.

Cases 1 and 2 describe curriculum developments at two medical schools which are designed to respond to the new GMC recommendations. Many of the cases describe initiatives which promote active learning and student choice, either as a fundamental philosophy in new courses (for example, Cases 7, 20, 21) or by revising traditional courses (Case 11) or by types of teaching sessions such as laboratory practicals (for example, Cases 10 and 13).

2. Professional and personal skills development

In the past, both teaching and assessment have emphasised knowledge rather than the acquisition of skills and professional attitudes. While undergraduate medical education cannot provide all the knowledge which a doctor will need, it can and should provide appropriate settings and opportunities for the acquisition of a number of key general competences which will be required throughout a professional lifetime (Towle, 1991).

Over the last few years, greater efforts have been made to extend the scope of teaching and assessment of professional skills in medical schools. One example of the new emphasis is the increasing importance of communication skills training, prompted in part by the growing number of patient complaints which can be traced back to failures in communication. Several of the cases in this report summarise innovations in communication skills teaching (for example, Cases 3, 4 and 33). There is a general trend to make the teaching of history taking and examination more structured (for example, Cases 5, 17 and 18), and to properly assess clinical competence, for example through the use of the Objective Structured Clinical Examination (OSCE): see Case 31 for a general review and Case 36 for an example.

However, there is still a tendency in medical education to consider professional skills mainly in relation to the basic clinical skills of history taking, examination and the performance of specified practical procedures rather than taking a broader view of competency; like that, for example, promoted by Enterprise in Higher Education (EHE) and described below, with its emphasis on transferable skills and personal development. It is only recently that the need for the development of intellectual, transferable skills such as problem-solving, critical thinking, independent learning, and skills in research, teamworking, management, informatics, learning and self-evaluation has been specifically addressed in undergraduate medical curricula. Although the acquisition of such skills is beginning to be specified in aims and objectives, their achievement will require new types of learning opportunities and activities, and testing the students' abilities will require new forms of assessment. Many such learning and assessment methods have been developed through EHE and are being introduced into medical schools which have access to Enterprise funding. These include the use of project work, learning contracts, peer and self-assessment, profiling and records of achievement, and workshops to encourage reflective learning. Examples of these types of innovations are described in Cases 3, 6, 7, 9, 15, 16, 30, 33 and 34.

A potential pressure for change in this direction which has only just begun to emerge, is the proposed extension of the National Vocational Qualification (NVQ) programme to higher professional level training. Although the National Council for Vocational Qualifications (NCVQ) recognise that licensing individuals to practise, and defining the requirements of this, will always be the responsibility of the appropriate professional body, NVQs may nevertheless be a means of providing evidence of the competences demanded by such bodies. Since NVQ statements of competence include core skills such as problem-solving, communication, personal skills and use of computer technology, they may well focus attention yet further on this particular aspect of undergraduate medical education. Case 32 describes an innovation in the assessment of competence which has been 'informed' by the NVQ model of competence, 'but has not been constrained by it'.

3. *Changes in the practice of medicine*

Changes in the practice of medicine are affecting both the content and the process of education. In relation to content there is, for example, a new or increased emphasis on subjects like communication skills, rehabilitation, health promotion, health policy and informatics. Some of these result from the changing pattern of health and disease (for example, the ageing population and the shift from acute, curative medicine to chronic disease and disability); some stem from the way medicine is being revolutionised by new technology; some arise from the need to practise cost-effective health care for both communities and individual patients. The teaching of many of these 'new' subjects crosses the traditional discipline boundaries and requires new styles of collaboration between teachers as well as new methods of teaching. They may also require new knowledge and skills from teachers in both the subject area and in the method of teaching, as shown in Case 21.

In relation to process, some of the more noticeable changes in the practice of medicine which are acting as a stimulus for change are the move of much patient care into outpatient clinics, community sevices or general practice; the shorter length of inpatient stay; the increasing amount of day case or short-stay surgery; and more specialised case mix in hospitals, especially the main teaching hospitals (Towle, 1992). Such changes are one of the main spurs behind the various initiatives to move varying amounts of clinical teaching 'into the community', surveyed by McCrorie *et al* (1993). Several cases in this report describe the move of teaching into outpatient clinics (Cases 17 and 18) and general practice (for example, Cases 19 and 22).

4. *Influences from higher education*

A further impetus for innovation in the medical curriculum has come through government-funded initiatives across higher education. Mention has been made already of EHE, funded by the Department of Employment (see point 2 above). Another major initiative is the Teaching and Learning Technology Programme (TLTP), funded by the Universities Funding Council (see Case 26 for a description of the TLTP projects in medical education). One of the main purposes of such initiatives is to promote the sharing of ideas and resources. Two specific examples of this sharing in medical education are the establishment of the Enterprise Medicine Network and the TLTP consortium of six medical schools, headed by Dundee. A number of the cases describe innovations which have been stimulated or supported by EHE or TLTP, for example Cases 2, 6, 15 and 34.

As in medical education, recent attempts at improving the effectiveness of teaching and learning in British higher education have focused partly on ways of achieving traditional goals more effectively and partly on the need to introduce additional goals. There are

continuing attempts to encourage methods of teaching which support deep, active approaches to learning but also, particularly through EHE, those which will promote in students the development of additional transferable skills, such as problem-solving, initiative, interpersonal relationships and communication (see point 2 above).

One of the major concerns in higher education today is that teachers and administrators find themselves teaching larger classes because of government pressure to teach more students at lower unit costs. They therefore face the challenge of not only teaching large numbers of students but doing so at the same time as government and employers are requiring students with transferable skills which require active and flexible learning methods. The kinds of solutions which are being proposed to resolve this dilemma (for example, interactive lecturing and computer-assisted learning) have much to offer medical schools, with their traditionally large classes and new requirements to teach interactively in ways which promote active and deep student learning.

CREATING THE CONDITIONS FOR INNOVATION

Over the last two or three years, medical education in the UK has come to life. The climate of opinion seems to have changed from a prevailing view that change was necessary but unlikely to happen, to a belief that the chances for substantial change are greater now than at any time in the past. It is a climate in which innovation is being stimulated and encouraged as never before. The reasons for this are various and difficult to tease out, but must include the following 'events' and influences.

1. The GMC have issued new recommendations on undergraduate medical education. The first draft appeared in Summer 1991 and was followed by over two years of discussion, consultation and visits to medical schools until the publication of the definitive recommendations at the end of 1993. During this time, schools were seriously challenged to review their current teaching and many began planning curriculum changes based on the new recommendations.

2. The King's Fund Centre conducted a national enquiry into the future of undergraduate medical education (Towle, 1991) which demonstrated that there was widespread dissatisfaction with the current situation and a consensus about what kind of changes were required. Taken together with the GMC recommendations, a momentum and direction for change were established. The King's Fund Centre has continued to support change in medical education by promoting the sharing of ideas and information through a newsletter, conferences, workshops and informal networking, providing grants for development work and sponsoring a medical education prize.

3. The Department of Health has recently supported the process of curriculum change through the Undergraduate Medical Curriculum Implementation Support Scheme (UMCISS) in which each medical school has received funding for one or more facilitators to help with the implementation of the new GMC recommendations. Initially funded for one year (1993-4), funding has now been secured for a second year, and hopefully money will be forthcoming for a third.

4. Government-funded initiatives in higher education, such as EHE and TLTP, have brought new monies and ideas into medical schools (see above).

5. Academic audit and quality assessment exercises in higher education have raised the profile of teaching by focusing attention on teaching standards and excellence and the need for staff development. Although the change in culture is gradual, there is at least a hope that it will lead to a recognition of the importance of the teaching function, appropriate

resourcing for this function, and rewards for the work of those who achieve excellence in teaching (Elton and Partington, 1991).

One of the most encouraging features of the new activity in medical schools is that much of it is coming from people not previously heavily involved in medical education, and so perhaps more hopeful of the possibilities of change. Some of these people are from departments formerly on the 'fringes' with minor influence over educational policy or practice, such as academic general practice, who now find themselves given broader responsibilities and new opportunities. Some of the innovators are new into medical education, bringing with them a broader view and experience of higher education and health care, and new skills in education, staff development, facilitation and change management. The UMCISS facilitators are examples of these latest recruits into medical education. This 'new generation' seem to be less isolated in their medical schools, and more eager to share ideas, network and collaborate. If their enthusiasm, creativity and expertise can be utilised, supported and developed by medical schools, and their positions made secure, they will be invaluable resources both for the present and the future. It is encouraging to note that over the past year many medical schools have created lectureships in medical education and established medical education units which will be a base for innovators and a focal point for innovations.

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CHAPTER 3: Examples of innovative learning and assessment

This chapter comprises case studies submitted by conference participants (some were also presented at the conference in the form of oral or poster presentations). They have been grouped into five broad categories, although some cases fall into more than one category, for example community-based initiatives, described in the section on alternatives to traditional clinical teaching, could also include elements of self-directed learning, skills development and innovative assessment methods.

A) CURRICULUM AND COURSE DEVELOPMENT

Cases 1 and 2 summarise curriculum developments in two medical schools. The remainder describe new courses which have been developed. They illustrate some of the diversity of experimentation in medical education which was apparent at the conference, but there are several common themes, such as an emphasis on communication skills, student-centred learning and relevance to the future needs of the students after graduation.

B) SELF-DIRECTED LEARNING AND SKILLS DEVELOPMENT

The theme which unites these cases is the philosophy that medical education should be based on active, self-directed learning in order to motivate students, increase their ability to continue their learning throughout their professional career, and should promote the development of a wide range of professional and personal transferable skills.

C) ALTERNATIVES TO TRADITIONAL CLINICAL TEACHING

As traditional ward-based teaching becomes more difficult and less appropriate for the basic training needs of undergraduates, so greater use will need to be made of outpatient clinics and general practice. These cases describe a variety of developments as alternative models to traditional clinical teaching.

D) COMPUTER-ASSISTED LEARNING (CAL)

Computers in medical education may be used in relation to curriculum content (medical informatics and information management as topics in their own right) or process (using computer technology as a way of helping students to learn about any topic). Case 26 provides a review of CAL in medical education, and the remaining cases illustrate the application of computers in medicine.

E) ASSESSMENT

Innovations in teaching and learning must be supported by appropriate assessment procedures. Case 31 reviews recent trends in assessment. The following cases describe the introduction of new assessment procedures, especially with an emphasis on finding new ways to assess competences which are not usually formally tested in the undergraduate curriculum.

a) CURRICULUM AND COURSE DEVELOPMENT

CASE STUDY 1

CURRICULUM CHANGES AT SOUTHAMPTON

CLAIR DU BOULAY, SOUTHAMPTON

THE NEED FOR A CURRICULUM REVIEW

Southampton Medical School was founded just 21 years ago. The first two years of the curriculum are integrated, systems-based and include early patient contact and psychosocial sciences. The third year is a clinical year with a basic science examination at the end. The fourth year is devoted to a study in depth and, in the fifth year, students do clinical attachments in hospitals throughout the Wessex region.

In the early days there was an atmosphere of innovation and a 'pioneering' spirit. Unfortunately, in the early 1980s, a slow but inevitable curriculum drift took place that particularly affected the first three years. The first year became filled with blocks of basic science and the integrated systems courses were relegated to the second year only. The course was didactically taught and heavily timetabled.

The aims of the third year are three-fold:

1 To begin to learn the basic clinical skills of history taking and physical examination;

2 To reinforce basic science in the clinical context;

3 To appreciate the effects of disease on patients and their families.

In the third year it was found that there was inappropriate clinical teaching, which was out of keeping with the aims of the year. There was a lack of clinical teaching by consultants and wide variations in the quality and type of teaching between attachments. Students were confused and disorientated during their first few weeks on the wards and were inadequately prepared by the short introductory clinical course. Many students had difficulty relating their clinical experiences to basic science, and clinicians concentrated on clinical management rather than reinforcing basic science. Students were under great stress.

CURRICULUM CHANGE

In 1987, a major review of the first three years of the curriculum took place. Several key structural and educational changes were recommended. In the first two years, fully integrated systems courses were reinstated. The psychosocial sciences were integrated with each other, and where possible, with the biological sciences also, and early patient contact was increased. Teaching methods were reviewed and lectures were reduced to ten hours per week. Tutorials and a learner-centred approach were encouraged

In the third year, a six-week clinical foundation course was introduced. Small groups of students could begin to learn basic clinical skills with individual clinical tutors and received feedback and appraisal. Nursing attachments, hospital orientation and

communication skills would form an important part of this introduction. The main clinical attachments were reduced in length to accommodate the foundation course. A scientific basis of medicine course was designed to maintain the thread of basic science throughout the year. Special study modules were introduced into the medicine attachment.

EXPERIENCE IN IMPLEMENTING CHANGES

In the first and second years, a major effort has been made to increase communication between disciplines, departments and individuals. This has led to a few exciting developments such as combined pathology and anatomy problem-solving practical classes. However, the School of Biological Sciences is still organised with heads of disciplines and there are problems with full integration and lack of vertical threads. This is also true for the psychosocial science departments. There is still resistance to moving towards a learner-centred approach, with a tendency to want to cover everything and give lectures.

In the third year, the clinical foundation course has been a success and the students feel more comfortable and orientated in the hospital setting. Their basic clinical skills have improved and the feedback shows that the majority of staff and students feel that objectives 1 and 3 are being met. However, objective 2, the reinforcement of basic science in this clinical year, is proving difficult to implement. Many clinical teachers, traditionally trained, are uncomfortable with teaching basic science on the wards. When basic science teachers are involved in the third year, the students often complain of repetition.

The students are resistant to the idea of active learning and feel insecure if they are not having lectures. This attitude is partly fostered by the culture of the first two years.

ASPIRATIONS

We are working within the philosophy of the GMC recommendations and would like to see a seamless, integrated first three years with clinical and basic science teaching going hand-in-hand. We would like to develop a core curriculum with modular choices in basic science and clinical spheres. We need more emphasis on vertical threads such as communication skills and personal development of medical students, and the staff with the appropriate skills to run such courses. We need staff development to encourage the implementation of a more learner-centred approach and to foster the spirit of learning which is still lacking in this medical school. We also need resources for administrative back-up and rewards for teachers.

CASE STUDY 2

CURRICULUM DEVELOPMENTS AT ABERDEEN

GWEN CHESSELL, ABERDEEN

A CHANGING ROLE

As a medical educationist working across departments in the Medical Faculty, I am heavily involved in curriculum development and other aspects of teaching and learning in the Aberdeen undergraduate medical course. My original remit was to co-ordinate developments to support undergraduate and postgraduate medical education; this included learning support facilities for postgraduates studying for examinations of the Royal Colleges. The experience gained by Aberdeen from this innovation formed the basis for the development of present teaching and learning initiatives.

Now, however, my work is steadily directed towards the undergraduate curriculum. I am a member of the Board of Studies in Medicine, of the Faculty Curriculum Committee, of the Core plus Options Working Party, of the Teaching Technology sub-committee and of the newly formed Curriculum Development Group, which will be implementing the new proposals. My particular concerns and interests lie in effective student self-learning, appropriate assessment of students and evaluation of courses, and the implementation of change generally.

RESTRUCTURING THE CURRICULUM

Following the restructuring of the Aberdeen medical curriculum, student self-learning has been introduced, where appropriate, in a phased development leading to the reduction of didactic teaching in the lecture course. Further reorganisation of the curriculum is currently being planned as part of the move towards a medical degree course based on 'core plus options (special study modules)'. The Faculty of Clinical Medicine has had some success in breaking down departmental barriers and integrating courses. The definition of a core curriculum is being approached by looking at 'body systems' with vertical integration throughout the preclinical and clinical course.

The Faculty of Clinical Medicine is also within the EHE programme and, in addition, is a member of a government-funded consortium of six UK medical schools. This consortium is seeking to introduce interactive student learning (principally based on CAL) into medical curricula as a means of raising and maintaining learning standards. The first element of Aberdeen's contribution to this initiative has just been completed by our recently appointed development officer, whose additional remit will be to act as a staff development resource, particularly for NHS staff who contribute heavily to teaching medical students but are much less involved at the planning level.

We recognise that all these initiatives will have implications for the formal assessment of students and that assessment must fit with learning outcomes and learning activities. Probably our biggest challenge is with the 'core plus options' developments. Additionally, we are looking at ways of making our assessments of clinical experience and competence much more reliable and objective.

Enthusiasm and goodwill are abundant but the principal problem facing us in trying to implement developments is time. All developments are taking place against a background of getting into place full monitoring procedures to take account of all that happens during the medical curriculum, both at faculty and departmental level. These procedures are made explicit to the students whose involvement is also recognised as important.

CASE STUDY 3

COMMUNICATION AND LEARNING COURSE

JOHN WEINMAN, UMDS

AIMS

The *Communication and Learning* course is designed to enable students to:

- identify their existing skills as learners and communicators and to build on these;
- practise reflection on themselves as learners right from the start of their education in medicine;
- identify and appreciate the importance of communicating well with patients, staff and other students from the beginning of their time in medical school;
- gain experience and understanding of the way in which effective learning and effective communication are interdependent.
- have opportunities to work with a patient from their first week onwards at medical school in order to give relevance to other aspects of Phase I of the course and to demonstrate the importance of acquiring good communication skills;
- practise a range of learning and communication skills such as building a relationship with a patient, interviewing, note taking, report writing, collaborating with a partner, meeting deadlines, integrating clinical and basic science learning.

The course seeks to help to motivate students to become lifelong learners and caring professionals and to foster growth in students' ability to communicate and empathise with patients and others. It is designed to counteract the tendency towards erosion in medical students' ability to communicate that has been identified in a number of research findings.

The development of appropriate attitudes to provide a foundation for skill building is emphasised throughout the course. The students are offered a learner-centred approach so that they experience the importance of receiving and giving respect and care.

SUMMARY OF THE COURSE

The course was offered for the first time in 1992. It covered half of the first week of Term 1 and a number of sessions throughout the rest of the year.

The aims of the course are given above; objectives were presented to students at the start of each session.

- Week 1 involved plenary and small group work which was intended to help students to identify and reflect on themselves as learners and communicators. They engaged in pair and small group exercises designed to enhance their communication skills. The week culminated in pairs of students interviewing a patient. They met with a senior consultant and one of the course organisers to feed back on this experience.
- Subsequent sessions during the year focused on students' experience of learning during the term, interviewing one of their peers, a second patient interview, preparation for revision and preparation for examinations.
- Staff development and briefing sessions were offered to staff in preparation for the role of facilitator to the small groups.

- Sessions focusing on communication and/or learning occur throughout the following year.

The course:

- Involves the students in identifying their existing skills through structured exercises and reflecting on these. This is different from many courses which assume knowledge of the students' starting point. (It is unusual for medical teaching to consider the learner with the same care that is given to the teaching of the subject.)
- Recognises that communication is a skill which is central to the learning process and to vocational training. Therefore teaching of communication begins in the first week of the first term of the medical course.
- Uses a series of carefully structured practical exercises, so that from the outset students experience their training in communication skills as being related to actual tasks.
- Links written work and oral communication by requiring students to produce written reports of the practical exercises they undertake.
- Requires students to use a word processor to produce the final version of the written tasks.

CONTENT AND PROCESS

The content of the first term of the course is outlined below. Day 1 is given in detail to convey the nature of the course.

Day 1, Term 1, Year 1 (half-day)

Short plenary preparation for tasks in pairs.

The task involves the speaker describing his/her strengths as a learner and a communicator and attempting to reach conclusions about his/her preferred style with reference to learning and communication. The listener is asked to listen actively, clarify, summarise and help the speaker to develop a clear picture. At the end of the task, s/he checks the accuracy of this summary with the speaker. Finally, the speaker gives feedback to the listener about what s/he did and how this affected the process. The pair then exchange roles.

This exercise is followed by small group discussion focused on an identification of: a) varieties of approaches to learning; b) key ingredients of 'active' listening.

The learning is consolidated at an individual level by students completing reflection sheets which contribute to their portfolio.

A plenary session emphasises key points which emerged from the pair and small group work and offers suggestions on learning strategies.

Finally, the students complete a Learning Styles Questionnaire. These are subsequently scored and returned and suggestions are made to aid development of appropriate strategies.

Day 3, Term 1, Year 1 (half-day)

A plenary session introduces preparatory work for the patient interviews.

A video demonstration provides examples of processes such as establishing rapport.

Students then work in trios, as observers, listeners and speakers. The task involves each of them in turn exploring their experience of illness.

Small group discussion follows to help the transfer of learning from the work in threes to the patient interview situation.

A plenary discussion on recognising and accepting emotional responses completes the session.

Day 5, Term 1, Year 1 (one day)

Students are carefully briefed about the patient interview and reminded of the work they have completed in preparation for this.

The task is explained and given to the students in written form also. Students are asked to: elicit the patient's view of their medical problems; ask about the effects of these on their life; explore the patient's previous experience in talking with doctors; and, at the end of the interview, ask the patient for advice about what sort of doctor they should strive to become and what qualities the patient would like their doctor to possess.

Students are paired and given their interview time.

They meet with their patient in pairs for about half an hour in total.

Notes of the interview are written jointly immediately after it.

In the afternoon, students meet with one of the nominees and a clinician (100 students on each campus) to discuss the patient interviews.

During the next few weeks students are asked to produce a word-processed version of their interview and submit it for comments by the nominees.

Further tasks

During the first term each student is asked to practise the communication skills of establishing rapport, active listening, facilitating, checking and summarising in an interview of another first-year student. The aim of this is to continue skills building, to help students reflect on their learning experiences in Term 1 and to establish a pattern of exploring emotional as well as intellectual issues arising in a new learning environment.

During the second term there is a further session involving a patient interview conducted by students working in pairs. The emphasis in this session is on history taking. Students are required to take a history of a patient's medical problems and of the effects of these on their lives. This session is preceded by a practice session in which students work in pairs and trios, using listening skills to elicit real histories and role play information from each other. Following the session with the patient there is an opportunity to reflect on and discuss the experience in a small group tutorial. There are additional opportunities for students to reflect and feedback on the rest of their teaching and learning during the first two years of the course.

In the third term of the first year, the first major examinations are held and the *Communication and Learning* course focuses on these in a number of ways. An early small group session provides an opportunity for students to identify any concerns and learning needs in relation to the forthcoming examinations. They also reflect on their existing skills

in examination preparation and the extent to which these are still appropriate. Arising from this are a series of workshops designed to meet the needs expressed by students. In addition to workshops on particular topics and on examination techniques, there is a session on stress management related to examinations.

In the first term of the fourth year, the majority of time allocated to *Communication and Learning* is given to the Department of General Practice in order to give students insights into primary health care and to provide experience of observing GP-patient communication and communicating with patients in their own homes.

STAFF DEVELOPMENT

A feature of the course is the involvement it offers to preclinical teachers who have had little or no experience of working with small groups, other than in tutor-led, traditional style tutorials. These staff facilitated the small groups which were an important feature of the course. In order to enable them to do this, the nominees ran a briefing session and a staff development session prior to the start of the course. The staff were able to contribute to the design of the course, thus gaining some ownership of it. Sessions in which they practised group work skills gave them the confidence and ability to fulfil the tasks required of them. They report that the skills which they acquired not only made their work on *Communication and Learning* satisfying, but has also made a significant contribution to their ability to work effectively with tutorial groups during other parts of the medical curriculum.

ASSESSMENT AND EVALUATION OF THE FIRST WEEK

An 18-item questionnaire was completed by each student at the end of the week. Evaluation of the course was also conducted in small groups via discussion and in the final plenary session. In addition, feedback on student reactions to the course was solicited during each meeting. Most importantly, as indicated above, students were asked to asssess their own learning achievements and further learning needs throughout the course. The aggregate student evaluations of the course showed that the course was rated above average in all items on the two dimensions sampled, i.e. usefulness and enjoyment (5 highest, 1 lowest); 10 of 18 items were rated 3 or above for enjoyment.

Staff evaluations collected first via one-to-one interviews and then in a group discussion with those who facilitated the groups, indicated that the course was seen as highly successful and an innovation which should be continued and expanded in future years. (Detailed evaluations from both students and staff are available.)

Staff not directly involved in the course view it as having made a positive contribution to the students' willingness to participate actively in their learning. Clinical staff see it as an important way of establishing relevance, achieving early contact with patients and emphasising the importance of effective communication from day one of the medical course.

CASE STUDY 4

DEVELOPING A BASIC COMMUNICATION SKILLS COURSE

CARL WHITEHOUSE, MANCHESTER

Manchester is a large medical school with 275 students in each clinical year. In 1990 it was decided to divide the students for most of their clinical teaching, with one-third being attached to each of three 'base hospitals'. These base hospitals were asked to begin the attachments with a ten-week course on basic clinical skills. One of the three base hospitals decided that this should include a week that was devoted to an integrated introduction to communication skills and history taking. The Department of General Practice was invited to participate in this, but the emphasis was to be on teaching tutors in medical and surgical firms to provide the detailed tutorial input.

After a brief introduction to the hospital (two days) the students spend a week on a nursing attachment. The communication training week follows immediately after this. The basic outline has stayed the same over the four years, although there has been development in the methods used, especially as the tutors have become used to the concept of using student role play.

AIMS OF THE COURSE

The objectives of the course (1993) are as follows. At the end of the introductory course students should be able to:

- make effective contact with patients, gain their confidence and feel comfortable with that contact;
- listen effectively and question in such a way that s/he can effectively elicit a comprehensive medical history (in a reasonable time);
- elicit the patient's views and expectations, showing respect for the patient and understanding the importance of fully involving patients in their own health care whenever possible;
- record findings in a succinct, lucid and structured manner.

SUMMARY OF THE COURSE

The course covers four days which are followed by further experience of role-play sessions on firms. Days 2 and 3 are devoted to learning about the formal structure of history taking in a medical interview, including writing and presenting a complete history. Lecture room sessions in the morning are followed by individual opportunities to take histories in the afternoons.

The important innovation is that this is set up in the context of a number of sessions looking at communication skills and particularly attitudes. On Days 1 and 4 the emphasis is on the patient's view of what happens when they are involved in an interview. The students are asked to interview a patient during the nursing week about their difficulties in talking to health care staff. The experience of the interviews is used as the basis for the early discussions which look at what patients bring to the consultation (their ideas and concerns)

and the problems of language in the consultation (introduced by a brief game in which students identify different interpretations of words such as 'fit', 'stroke' and 'virus').

Students are then encouraged to try out different approaches of doctor-patient communication using very simple scenarios in role play sessions, facilitated by tutors attached to their firms (groups of six). Each firm identified a tutor who might come from either the medical or nursing professions, and would be available to run further sessions and monitor development during the remaining weeks of the introductory course, providing individual feedback on achievement of objectives at the end.

On Day 4, a session using a simulated patient and a number of role-playing professionals, showed how patients often have different agendas when they meet different professionals. The aim of this session is to help students discern that patients do not always give a mandate to explore certain areas, and at the same time to show that patients may perceive students as having an important role in their care (as 'listeners' or even 'advocates').

Evidence so far is that students have enjoyed the sessions and the communication skills tutors have developed considerable skills in the use of role play and feedback.

FUTURE PLANS

The success of this approach has led to the concepts of maintaining a specific 'communication skills tutor or mentor' to guide and monitor development in this area, and a 'skills laboratory' with video-recording and playback facilities to enable students (using role play or simulated patients) to continue their audit of their communication skills.

CONSTRAINTS AND SOLUTIONS

Under the original plan there were insufficient hospital medical staff members with the time and inclination to look at communication issues and attitudes as well as formal history taking skills. Although at first this was managed by using external medical people (from general practice and psychiatry), the current approach has been to use other hospital staff (eg. nurses such as breast-care nurses on surgical firms). This has helped to identify communication issues and patient orientation as 'mainstream' matters.

CASE STUDY 5

A STRUCTURED INTRODUCTORY CLINICAL COURSE

JOHN COOKSON, LEICESTER

The undergraduate course at Leicester remains fairly traditional, with two years spent in preclinical subjects and three in clinical. The introductory clinical course has been a seven-week attachment to pairs of medical and surgical firms for instruction in history taking and examination. Over the years a number of problems have been identified with this course.

- Aims and objectives are insufficiently detailed to be helpful to staff or students.
- Excessive clinical commitments of senior teaching staff led to cancellation of teaching sessions or delegation of teaching to juniors.
- Marked variability between different firms in the range and depth of material covered.
- A general reluctance to teach communication skills and history taking in sufficient depth. This point was addressed by inserting a week's attachment to the psychiatry department. This was unpopular with students and suggested that history taking was not important for 'ordinary' doctors.

SUMMARY OF THE COURSE

In one of the teaching hospitals, a more structured course has been developed over the last few years which has now been piloted in the other two hospitals this year. The main features are:

- formal aims and objectives;
- a timetable;
- plenary sessions of all the students (about 35) in the hospital;
- the use of locally prepared videos illustrating the examination of the normal subject;
- the use of audiotapes to teach history taking skills;
- attachment of lecturers in psychiatry to each teaching firm for the audiotape sessions;
- a preliminary meeting of teachers before the start of the course to discuss aims and methods;
- ward-based demonstrations of history taking and examination skills followed by opportunities for students to practise on their own.

The main advantages of the scheme are:

- the aims and structure of the course are clear to students and staff;
- the plenary sessions enable the more theoretical aspects to be covered with economy in teaching time;
- as the lecturers in psychiatry have all been formally trained in teaching consultation skills, they pass on their skills to the firm teachers, both consultants and junior staff;

- the course provides a non-stressful introduction to patient care and the start of a 'bag of tools' for the apprentice doctor;
- history taking skills are given due weight and can be assessed directly by the teachers.

EVALUATION

This is performed in three ways: i) a feedback session for students at the end of the course; ii) a feedback session for staff; iii) a student diary exercise.

The comments from staff and students are generally favourable. The main problem areas have been identified as availability of teaching staff, insufficient co-ordination between different teachers on the same firm, use of audiotapes too soon in the course when students lacked confidence in history taking, the lack so far of any objective measure of student achievement, and encroachment on final-year teaching time.

CASE STUDY 6

INNOVATIVE LEARNING AND ASSESSMENT IN PHYSIOLOGY

ELAINE WHITTAKER, LEEDS

The undergraduate curriculum at Leeds is undergoing major reorganisation in response to local and national awareness of the problems of factual overload and the use of teaching and assessment methods that encourage passive learning.

AIMS

In our new medical physiology course we have several aims.

- To teach a knowledge base relevant to the study of medicine.
- To help our students develop the skills that they will need to practise medicine, such as the ability to handle data, solve problems, and make decisions.
- To encourage our students to take a greater responsibility for their learning experience.
- To develop assessment methods that are appropriate to the skills taught.

CURRENT PRACTICE

New approaches to learning and assessment include the following.

1. Problem-solving skills/computer-based learning

Students are introduced to the importance of learning problem-solving skills from the very beginning of the physiology course as they carry out problem-solving exercises in association with lectures on body fluids and compartments. The first tutorial assignment requires the students to complete a workbook that includes several problems, such as the effects of ingestion of water or saline on body fluid compartments. Students are encouraged to work through a series of similar problem-solving exercises included on the computer program *BODY FLUIDS* (Rush College, Chicago, USA) before attempting the tutorial assignment.

A number of other problem-solving exercises and interactive tutorials, using commercial programs, are made available to students at the appropriate stages of the course.

Learning experience: integrating information, problem-solving, decision-making.

2. Clinical relevance

Several clinicians contribute to the physiology course. For example, a gastroenterologist completes the gastrointestinal physiology lecture course by giving a clinical lecture, *When things go wrong*, during which students learn to integrate and apply their knowledge of basic physiology to solve simple clinical case studies. Several physiology practicals also include clinical problem-solving exercises.

Learning experience: integrating information, problem-solving, decision-making.

Students take responsibility for developing an informed view of two areas concerned with women's health issues: i) *in vitro* fertilisation, where rapidly changing technology has medical, ethical and socio-economic implications; ii) hormone deficiencies and replacement therapies, and their effects on health. Students develop an informed knowledge base through the completion of a workbook that requires them to integrate information from specialist texts, a video and their lecture notes.

Learning experience: active learning, student-directed learning, making judgements.

3. Assessments

Students are given assessment proformas (modified from the Oxford Centre for Staff Development, Oxford Brookes University) for use with a number of written and oral assignments. The proformas give detailed guidance on preparation of assignments, including academic content and presentation; more detailed proformas give guidance on how assignments will be marked, indicating the weighting of different sections. The assessment proformas ensure that students receive detailed feedback on assignments and help to achieve consistency of marking between tutors. For some assignments, students self-mark so that they gain a better insight into their performance and the assessment procedures. Continuous assessments are predominantly Multiple Choice Question (MCQ) format.

Learning experience: integrating information, critical analysis and interpretation, written and oral communication skills, self-evaluation.

FUTURE PLANS

1. Computer-based learning: problem-solving skills in a clinical context

The Department of Physiology is a member of the BioNet TLTP. BioNet is committed to introducing information technology (IT) into medical and science biology courses. As part of that commitment, BioNet members are developing software using the authoring language, *ToolBook,* so that software can be freely exchanged between sites and updated and modified to suit local needs.

In Leeds we are developing interactive tutorials and integrated clinical case studies in gastrointestinal physiology, endocrinology and reproductive endocrinology. The programs will help students to integrate and apply knowledge, solve problems and make decisions in a clinical context. The format for the clinical case studies will be based on the Biochemical Case Studies developed by Dr A Booth, Department of Biochemistry and Molecular Biology, Leeds.

Professor Tim de Dombal (Director, Clinical Information Science Unit, Leeds) will also be collaborating in developing clinical case studies in gastrointestinal physiology, and as part of the clinical problem-solving exercises students will retrieve clinical information from the *Telogastro* computer package (EC AIM project).

A self-access database of physiology MCQs, together with explanations, is also being developed in *ToolBook*; the questions can be used for formative self-assessment and revision or summative assessments.

2. Collaboration with Barcelona Medical School

We have EHE Funding to visit and assess the medical physiology course run by the Department of Physiology at Barcelona Medical School. They are successfully running a medical physiology course that closely integrates problem-solving exercises and text-based clinical case studies with lectures, seminars and practicals. We hope to incorporate some of their practices into our curriculum.

PROBLEMS/CONSTRAINTS/BARRIERS

Most of the commercial software programs are becoming dated and there are no facilities for updating and modifying the material; the development of in-house software is, however, very time consuming. Owing to the lack of rewards for good teaching, there is little incentive for staff to become involved in innovative teaching in medical education.

CASE STUDY 7

DISEASE, SOCIETY AND SEXUALITY COURSE

ELENA MOSES AND RACHEL WOOLRYCH, CAMBRIDGE

SUMMARY OF THE COURSE

The Part 2, Anatomy B course at Cambridge, *Disease, Society and Sexuality,* is a third-year option for medical undergraduates. It was conceived and developed five years ago by a group of teachers in the Anatomy Department who were keen to make improvements within the structure and organisation of preclinical medical education. They were concerned to design and deliver courses which were more relevant to the needs of patients and doctors and which were student-centred in style, minimising the harmful effects of competition and enhancing the positive aspects of collaboration. Particular attention was given to diminishing the following: the overloading of students with factual material (much of it seemingly irrelevant to their needs); the generally passive, uncritical and often haphazard way students learned; the inadequate delivery of technical, research and communication skills; and the lack of teaching of assessment skills so essential for later work in clinical audit.

Professionals in other fields were consulted in the initial process, particularly those with person-centred learning and group work skills. Trainers at Cambridge Health Promotion and AIDS Services and other non-medical staff have been involved in the planning and delivery of the course.

The course uses HIV/AIDS as its core subject material and it is interdisciplinary in its focus, giving a holistic approach to disease and illness. The disciplines that influence the course content are immunology, pathology, virology, genetics, developmental and reproductive biology, psychology and behavioural science, epidemiology, ethics, law, sociology, anthropology, history and gender studies.

The course is available as a third-year option to 18-20 preclinical students who have completed their 2nd MB course and who have yet to embark on clinical training. The formal teaching consists of 16 one-day workshops, 74 lectures, 22 teacher-led seminars and nine journal clubs delivered over two eight-week terms. Students have access to a course library of over 600 books, many pamphlets, videos, student dissertations from previous years, two *Applemac* computers and video equipment.

LEARNING PROCESSES

The teaching environment is set up to facilitate three different styles of learning, all of which can operate within the various teaching settings.

Student-centred learning

The first and fundamental learning style takes a student-centred approach. This starts with students negotiating and contracting with one another as to how they will work. They refine this process and learn about individual and collective responsibility through exploring, drawing out and defining, from a personal point of view, how knowledge and emotions have shaped their values, attitudes, intellect and behaviour. Exploration includes examination of the irrational as well as the rational and how the former can be worked through with the aid of counselling skills into positive, intelligent outcomes.

This process is started and mainly delivered through workshops which introduce a new topic each time. These have included dealing with change, loss and bereavement, prejudice and oppression, and sex and sexuality. Each workshop session embraces activities designed to build up trust, confidentiality and risk taking, with exercises constructed to simulate specific situations (sometimes using actor patients) and/or to draw on students' own life experiences.

We have been careful to recognise the potential danger in encouraging students to delve into painful aspects of their past. This is discussed at the outset and measures are taken to minimise the distress this can cause, while maximising the provision of facilities for the students to be able to work through painful experiences and feelings, should they surface, and to convert them into useful learning. In order to do this, we include the teaching of mutual support skills and the setting up of support partnerships; we have a good student:facilitator ratio to tap into the personal and group dynamics. The evaluation reports, which the students write within 24 hours of each workshop, also assist us in our ongoing asessment of the effects of this experiential component. Additionally we have resources available to us at the University Counselling Service which students can access confidentially.

Problem-solving approach

The second learning style can be called a problem-solving approach. Questions needing answers, or doubts and confusions needing clarification, can arise in workshops, seminars and lectures. Students are given assistance by staff to consider how they might obtain the information they require and strategies for overcoming difficulties when they encounter them. 'Skills development' pairs are set up in which students approach problem-solving in different ways, feeding back to one another, sharing and working collaboratively.

Giving and receiving feedback is an important part of this 'skills development' process and we encourage student feedback on how we run the workshops. At the end of the second term students deliver workshops themselves, demonstrating the skills they have acquired. Here, they not only have opportunities to choose particular themes for mutual exploration along personal and professional lines, but they also conduct self-evaluations and receive feedback from peers and teachers on their organisation, management and presentation skills, and the relevance of the topics and processes chosen. Project work is another major part of the course which, with the assistance of a supervisor, allows them to develop their skills in exploration, communication, questionnaire construction and analysis, time and resource management, written presentation and word processing.

Lectures and seminars

The third element of the course is a set of lectures and seminars juxtaposing scientific with ethical, clinical, social and legal apects of the topic. Even this essentially didactic process turns into an interactive one between students and teachers.

EVALUATION

Our experimental project has become the most popular third-year option and external examiners' reports and the exceptionally good examination results have consistently attested to its success, demonstrating that academic rigour need not be sacrificed for innovation.

In the four years that the course has been running there has been obvious scepticism and criticism from some members of staff and students alike. However, despite the difficulties, the success of Anatomy B has already inspired changes elsewhere in preclinical education. Anatomy A, another option which can be taken in the third year is now run differently, having a problem-solving rather than a lecturing orientation. Students are assigned problems and work collaboratively in small groups throughout the year.

FUTURE PROSPECTS

While there are plans to take 2nd MB Anatomy (Years 1 and 2) in this direction, these are dependent on finding additional funding. The major problem is one of resourcing the high student:teacher ratio necessary to create these learning environments. Extension of student-centred work has been possible within one department but its application in an integrated manner to the rest of medical education in the university is hampered by the fact that there is no undergraduate preclinical department or faculty. To extend the Anatomy B style of teaching across the board would require a full-time appointee to lead the initiative. The appointment of a preclinical Dean could ensure the overseeing of such a scheme and would also be an important step in integrating preclinical and clinical work.

Establishing integration has proved easier in other medical schools. However, succeeding in this does not automatically mean providing student-centred learning. We believe that the methodologies we use in Anatomy B are still relevant and useful to other medical schools and, to this end, we are preparing a manual for publication that contains detailed examples of the sorts of learning exercises that can be used.

CASE STUDY 8

HOW TO BE AN EFFECTIVE HOUSE OFFICER COURSE

JENNIFER EATON, BRISTOL

In January 1993 the University of Bristol included a new one-week course in the final-year medical curriculum, designed to prepare the students for their role as house officers. The course was organised by the Department of Postgraduate Medicine.

In planning the course we asked house officers, then in the middle of their first house jobs, to suggest topics. We also drew on the experience gained by the postgraduate clinical tutors in organising the pre-registration core curriculum teaching throughout the Region. Both groups emphasised the importance of a basic 'hands on' approach.

SUMMARY OF THE COURSE

There were four main elements in the course: clinical teaching, practical skills training, generic skills teaching and shadowing.

Common clinical problems such as 'the breathless patient', 'the patient with chest pain' and 'the confused patient' were covered, together with topics such as post-operative pain relief and intravenous fluids. All speakers were asked to make their sessions as informal and interactive as possible and to approach their subject from a practical, house officer's point of view. Speakers were chosen for their communication skills and were drawn from all grades of medical staff, including senior house officers (SHOs) who were often more 'in tune' with the problems of house officers than their more senior colleagues. In spite of our request to avoid the esoteric, some presentations were rather too theoretical and in future years we shall attempt to make the speaker's brief even more explicit.

In a session devoted to communications, a ward sister, a GP, an SHO and the Trust Chairman discussed the nature and importance of relationships in the working life of the house officer. The session with the ward sister proved particularly popular and valuable; the importance of teamwork and asking for help whenever needed were stressed and many students clearly found this reassuring.

Time was also devoted to breaking bad news, medical ethics and law. There was some overlap with topics already covered in the medical curriculum and this will be corrected next year. A session on career development included an explanation of the *New Deal*, as well as advice on writing CVs and on sources of help and guidance. The discussion on stress and time management was felt to be too general and not sufficiently focused on the particular problems of the house officer.

Each student was offered the opportunity to shadow a house officer for one afternoon during the week and, if they had already been appointed to a post in Bristol, they were placed with the appropriate firm. The limited time available and logistical problems diminished the value of this shadowing exercise, although the idea was welcomed by the students. It will probably not be formally repeated next year although the value of shadowing will be stressed.

In terms of practical skills, students were given the opportunity to practise resuscitation and syringe pumps were demonstrated. However, the nature of the main venue, a large lecture theatre, limited the amount of small group practical training that could be offered. In future years it is hoped that a more flexible venue, including a number of seminar rooms, will be available. This will also allow a greater diversity of teaching styles, but will, of course, place a greater demand on the resources of the postgraduate department.

EVALUATION

The atmosphere during the course was very positive, with many students expressing their support and appreciation for the concept. No formal attempt was made to measure attendance but it was estimated to be 60 per cent of the year overall. Of those students returning evaluation forms, over 90 per cent found the course to be 'very' or 'reasonably' worthwhile and enjoyable. Eighty per cent would recommend the course to their friends. Those elements which were most appreciated included the practical base of most of the lectures and the fact that problems were approached from the house officer's point of view. In answer to the question 'How has the course helped you?', comments included: 'put house jobs into perspective', 'made me think more positively', 'reassuring to know I can ask for help', 'given me more confidence'.

When the students were asked to suggest additional topics for next year's course, ideas included tax and personal finance, dealing with the aggressive patient, teaching skills and a more detailed analysis of the house officer's day. In consultation with the regional clinical tutors, the experience gained from the course will now be used in the planning of future induction programmes and pre-registration core curriculum teaching.

b) SELF-DIRECTED LEARNING AND SKILLS DEVELOPMENT

CASE STUDY 9

DEVELOPMENT OF A TEACHING AND LEARNING SUITE

DAVID BULLIMORE, LEEDS

Proposals for change in undergraduate medical education, including greater student numbers, a reduction in factual overload and greater self-learning, are leading to changes in the way that student teaching is taking place. Recently, there has been an emphasis on computer-based learning (CBL), the setting up of clinical skills laboratories and emphasis on the development of communication skills. These elements often seem to be being developed in parallel rather than being integrated.

DESCRIPTION OF THE SUITE

At Leeds, we believe that development of a *Teaching and Learning Suite*, with an emphasis on the integration of the above three elements, has many advantages. Not only are the advantages of the various teaching methods combined, but the various elements learned will be integrated appropriately. In addition, we believe that the combination provides a stimulating learning environment for the student and develops good study habits. The *Teaching and Learning Suite*, which is to be developed from January 1994, consists of an arc of six rooms to be used for a linked clinical skills laboratory and CBL facility. There is an adjacent shared space consisting of a flat-floored lecture room and a communication skills room divided by a one-way mirror and wired for sound and video recording.

The proposal is to devise workshops which can be run largely by using collaborative learning techniques which incorporate aspects of CBL, clinical skills acquisition and communication skills and group working practice. It should be emphasised that at this stage this is 'proposed' rather than 'actual' as the space for the *Teaching and Learning Suite* is not available until the start of 1994.

USING THE SUITE

An example is perhaps the easiest way to demonstrate the underlying philosophy. For instance, at the end of a workshop related to meningitis, the student would:

1. Be aware of the clinical presentation of various forms of meningitis.
2. Understand how to perform a lumbar puncture.
3. Understand cerebrospinal fluid (CSF) changes involved.
4. Be able to plan appropriate therapy.
5. Be aware of modern developments in, and limitations to, prevention and therapy.

6. Understand anxieties of parents and relatives.

7. Have improved their ability to use *Medline* on CD-ROM (compact disc-read only memory).

8. Have improved their communication, group working, presentation and teaching skills.

9. Have achieved other objectives as determined by the student or group.

Facilities provided include the following (an indication as to which of the above objectives the facility is mainly linked to is provided in brackets).

- Mannequin for lumbar puncture (2).
- VHS videos of a) expert clinical discussant on meningococcal meningitis (5) and b) YTV video of interviews with relatives of patients with meningitis and subsequent studio panel discussion (5,6,8).
- Summarised histories of fifteen cases of meningitis or suspected meningitis and treatment regimes (1,3,4).
- 'Mock' case histories, colour prints of meningitic CSF in counting chamber and 'CSF' samples for sugar estimations for match and diagnostic exercise (1,2,4,7).
- Literature on prevention by vaccination and public health measures related to forms of bacterial meningitis (5).
- Medical texts and access to *Medline* on CD-ROM (7).
- Frames on meningitis from *Grave's Videodisc,* either direct or in *ToolBook*-linked CBL program (1,3).
- Actor (or role play) for parent of child in mock case (6,8).
- OHP and whiteboard facilities (8).
- Some refreshments halfway through the session (1-9!).

Working as a group the students are required to plan the afternoon's learning. They are given approximate times required for the various sections by the facilitator and are made to understand that there is too much for any individual to cover in the afternoon and that they will have to work co-operatively. The facilitator provides guidance on planning the timetable, an indication of 'must know', 'should know' and 'nice to know' knowledge, and support for skills training using the four-stage silent run-through technique (for lumbar puncture in this case). The learner has ownership.

Initially the workshops will be set up in about a dozen topic areas. Examples relate to basic ophthalmology and ENT, intravenous infusions, the finding of a breast lump, concepts of surgical asepsis and catheterisation.

PROBLEMS

Problems to be overcome include staff development to accept and use the facility in an appropriate integrated way, student development work towards collaborative and self-directed learning, providing security of equipment, and funding the staffing. In addition, at some stage there is going to have to be a transition such that the *Teaching and Learning Suite* becomes the place where a particular skill or area of knowledge is taught rather than being duplicated elsewhere in the course.

CASE STUDY 10

STUDENT-LED ORGANISATION OF PRACTICAL TIME IN PHYSIOLOGY

STEWART PETERSEN AND LAURENCE HOWARD, LEICESTER

Until recently, practical classes offered to students of physiology at Leicester were of a traditional type, with students rotating through a series of structured practical sessions, guided by highly prescriptive practical schedules. Student questionnaires identified a feeling of tedium and lack of control with this arrangement. Accordingly, practical time on human physiology has been used for a process known locally as *Enterprise in Physiology*.

DESCRIPTION OF THE INITIATIVE

Students are presented, shortly before the course begins, with a long list of physiological measurements which may be safely made upon themselves or their colleagues using the equipment available in the laboratory. Each measurement is attributed a mark which can be obtained if it is made correctly. After a day or two of deliberation, groups of students get together to submit their 'bids' to make some or all of the measurements. In effect, they bid for a maximum mark of their choice. They then have to organise their own time in the laboratory to ensure that they can make the measurement they have bid for.

The laboratory is open for two days each week and groups of students may book blocks of time on specific sets of apparatus. Instructions are provided for the safe use of equipment, but they do not necessarily provide the final steps of calculation or interpretation needed to obtain the measurements in the bid sheet. The 'correct' answers are not provided, but they are, of course, available in the literature should the students look for them.

The students must decide for themselves how much time to book for any particular activity in order to guarantee that they can meet their bid. Some choose to bid for relatively few marks and spend the time making sure that they get the measurements right. Others bid for many marks and risk not being able to complete the measurements satisfactorily.

Severe mark penalties are imposed for non-completion of a measurement or reporting of results which are obviously non-physiological. In either case, the mark that would have been awarded had the measurement been completed correctly is deducted from the total of marks already obtained. A student who bids for high marks, and measures little, can therefore end up with negative marks.

The laboratory is staffed throughout in order to ensure safety and to provide academic encouragement, but the students are left to work out many things for themselves and advised only to seek help with specific queries.

EVALUATION

Student feedback has improved considerably since the introduction of the new structure. Over 60 per cent of students now rate the practical time at the highest extreme of a five-point scale for interest, educational value and (surprisingly perhaps) organisation. Initial problems with student understanding of the bidding process have now been overcome with better written instructions and initial briefing and there are now no negative features in student feedback.

We believe that the general principle of giving students a list of tasks to choose between, together with some incentive to complete them, and then leaving the students to organise their own time, is a principle which may be extended into other situations.

CASE STUDY 11

A SELF-DIRECTED LEARNING EXERCISE ON THE TOPIC OF BLOOD

PETER McCRORIE, CELC

Having successfully run for three years a week-long self-directed learning (SDL) exercise on cells and pathogens, built around a sub-theme of AIDS, for first-year medical and dental students (Term 1, Week 1), it was decided to develop a second SDL week for the same set of students on the topic of blood.

PROCESS OF DEVELOPMENT

A preparatory workshop on SDL was attended by 15 basic medical science staff and six facilitators. The participants were assigned to one of three small groups and asked to come up with suggestions for SDL tasks for the blood week. Existing learning objectives were provided and access to resources was specified: as patients, TV and video equipment, colour photographs, textbooks, laboratory apparatus. Groups met for 90 minutes to develop a 'solution' and then gave a ten-minute presentation of their proposals. Two of the groups came up with original and stimulating presentations; one group came up with a course with double the original number of lectures!

On the second day, groups reconvened to sketch out some ideas for assessing their particular blood module. Participants did not find this activity very easy as they were not *au fait* with modern approaches to assessment, but after an impromptu session outlining the principles and possible approaches to assessment, they were able to come up with some suggestions. A final session dealt with the implementation of SDL – the key to success. Poor implementation can lead to brilliant ideas failing and good implementation to mediocre ideas succeeding. Groups were given the task of generating a checklist of key factors which need to be addressed for successful implementation of SDL.

Following the workshop, a small group (two biochemists, two physiologists, a clinical anatomist, a statistician and two clinical haematologists) met to plan the actual course for the 1992 intake of students. There was blanket opposition to the loss of all lecture material, but nevertheless a substantial amount of SDL was introduced. The resulting format is described below.

DESCRIPTION OF THE COURSE

Students were provided with detailed learning objectives for the four overview lectures (red blood cells, white blood cells, platelets and clotting, blood groups and transfusion) and for the four SDL exercises.

1. The first exercise was on anaemia. Students were given a choice of method for carrying out this SDL activity – **either** working their way through three case histories (macrocytic, microcytic and haemolytic anaemias) with the help of a textbook **or** working their way through a CAL exercise *(Sheffield Bioscience Programs)* on one of the 40 microcomputers in the multidisciplinary laboratory.

2. For the second SDL, each student was supplied with a booklet of 22 colour photomicrographs consisting of photographs of microscopic views of various blood films and bone marrows. For each photomicrograph they were asked to identify and label a number of items. Also associated with each was a series of questions for them to answer. Three of the photomicrographs represented the blood films from the three anaemic patients considered in the first week. Other photomicrographs supplied included blood films from patients with sickle cell anaemia, leukaemia, multiple myeloma and glandular fever.

3. The third SDL exercise was on coagulation disorders and drugs affecting the coagulation process. Students were given a case history of a patient with a clotting disorder (haemophilia) wrongly diagnosed as thrombosis; they were required to interpret results from blood tests and coagulation screens. They were also given some simple true/false MCQs specifically on anti-coagulants and platelets.

4. For the fourth and final SDL exercise, students had to imagine they were cast away on a desert island and were invited to set up a blood transfusion service there. They were asked what eight problems they might have to deal with and what precautions they would have to take in order to prevent their occurrence.

The SDLs were backed up by tutorials where students presented their findings to a facilitator. They were also backed up by three clinical demonstrations on anaemia, leukaemia and haemophilia. On each occasion, a consultant haematologist brought along two or three patients to talk to the students about the history of their illness.

Hospital phlebotomists took a small sample of blood from most of the students and measured the standard blood parameters on each. This information was fed back to the students and the data were used for a statistics practical the following week. The students' blood groups were ascertained and these data were kept for a dry practical on the genetics of blood groups planned for the following year.

At the end of the week the students took an MCQ examination on the material covered during the course; this was formative and used for feedback only.

EVALUATION

The course was regarded as a partial success by both staff and students. Only about a half to two-thirds of the students actually carried out the SDL exercises, though most attended the lectures. This caught several students out in the summer examinations since there were two questions on blood in one of the papers which could only be answered fully with the knowledge gained solely from the SDL exercises. Everyone agreed that there were too many photomicrographs to annotate and that some of the cells students were expected to label would have given trouble to a haematologist of 30 years' experience! Few were able to use the computers because of difficulty of access. The assessment was probably too difficult, though perfectly fair and amazingly imaginative considering it was in an MCQ format! Next time, the assessment questions will be handed out at the beginning of the course, students being required to hand in their answer sheets at the end of the week.

Further staff development has since taken place and lecturers have been encouraged to abandon their lectures and instead hand out the information to students in the form of an interactive workbook, akin to the Open University course books. It is hoped to try this out in the first re-run of the course in January 1994.

CASE STUDY 12

IMPLEMENTING PROBLEM-BASED LEARNING IN A TRADITIONAL CURRICULUM

ANTONIO RENDAS, LISBON, PORTUGAL

EXPERIENCE OF ONE INNOVATIVE LEARNING INITIATIVE

Problem-based learning (PBL) was introduced in our medical school (Universidade Nova de Lisboa) in 1988. This method was applied in pathophysiology, a single discipline of the third year of medical studies (which have a total duration in Portugal of six years). The purpose of the innovation was to develop in the students an integrated approach to understanding the basic mechanisms of disease and its manifestations. During the first two years we used 'short cases'. These were replaced in 1990 by the *Problem-Based Learning Modules* (PBLM) produced by the Department of Medical Education of the Southern Illinois University School of Medicine (SIUSM). Our links with SIUSM also included the organisation of two workshops in Lisbon to analyse the method (1990) and to train tutors (1992).

The introduction of this innovation occurred at the same time as a sudden and unexpected reorganisation of the medical curriculum in our medical school which placed all the theoretical part of the teaching (mainly lectures) between October and December, followed by the practical period lasting from January to June. In the case of pathophysiology, our period of teaching changed from the whole academic year to one month for each one of the six groups of 12 to 20 students.

Our main educational activities to implement PBL were: i) a review of all the PBLM in order to adapt each one to the learning objectives; ii) the establishment of an evaluation strategy which covered knowledge, skills of problem analysis and degree of satisfaction.

FUTURE PLANS

In the immediate future we plan to stimulate the use of PBL by other preclinical disciplines and to verify if our students are applying the methodology in the clinical years. In the long term, we expect PBL to play a very important role in the way students will learn basic medical sciences relevant to medicine without the boundaries artificially created by disciplines.

MAIN PROBLEMS/CONSTRAINTS/BARRIERS

- Despite being heavily publicised, this innovation is still isolated from the traditional curriculum.
- The short duration, one month, of the practical period.
- The large number of students, even though we divided and subdivided them to form groups of six to nine.
- The lack of rooms for small group teaching.
- The limited group of trained tutors.

POSSIBLE SOLUTIONS (LOCALLY AND NATIONALLY)

Within pathophysiology, we expect to be able to return to a teaching period lasting the whole academic year. Within the medical school, we expect to establish an office of medical education to promote this and other innovations. Nationally, we expect PBL to be used in the preclinical years.

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CASE STUDY 13

MAKING MICROBIOLOGY INTERESTING

GILLIAN ORANGE, DUNDEE

Microbiology usually features in the medical curriculum somewhere between the preclinical subjects of anatomy and physiology, and the more intensive clinical teaching of medicine, surgery and obstetrics. Microbiology is seen by students as another laboratory-based subject that is imposed on them when they are hoping to move away from laboratory-based teaching and on to clinical teaching. Students often fail to see the relevance of microbiology to clinical practice, and yet the treatment of infection is part of most clinicians' daily work. A sound knowledge of how to diagnose and treat infection is important for any doctor entering a clinical specialty.

DESCRIPTION OF THE INITIATIVE

In 1988, our department decided to try to make microbiology more interesting for medical students. The following philosophy was adopted.

- We aim to teach students enough about microbiology to enable them to function safely and effectively as house officers or GPs. They should know how to recognise, diagnose and treat serious infection such as epiglottitis, meningitis and endocarditis. Students are not expected to know details of how laboratory tests are carried out, but they must know which specimens to take, what tests to request and how to interpret the reports received from the laboratory.
- Bacteriology, virology and mycology are largely integrated throughout the course.
- Microbiology is now taught in 'systems' such as respiratory tract infection, urinary tract infection, infection of the CNS, instead of 'staphylococcal infection'.
- At the students' request, the course is arranged such that the 'system' being taught in microbiology coincides with teaching on the same system in the co-ordinated systematic course (i.e. lectures in medicine, surgery and therapeutics).

Formal lectures have been retained and last for a maximum of 40 minutes each. These provide a basic framework of facts on which the student is expected to build. The most important change in the course was to present the practical class teaching almost entirely in a 'case history' format. Students are taught only basic laboratory techniques such as how to prepare a Gram-stained film or how to examine a urine for pus cells and bacteria. The student is given a short history of the patient from whom the specimen was taken and, by answering a few questions, the student is expected to appreciate the clinical significance of the result obtained. A significant part of each practical class is spent on a self-learning exercise. Students are given five or six short case histories in their laboratory handbooks and, for each case history, there are exhibits such as microscopy slides, laboratory reports, culture plates or photographs to help the student reach the diagnosis. The case histories are as simple as possible with no extraneous or misleading information and are of the 'typical' case. Students are encouraged to read their textbooks and to come back to view the exhibits during the week if they do not know the answers immediately. Once the student has made the diagnosis there are follow-up questions to be answered, such as 'What treatment would you recommend?' and 'Should the patient be barrier-nursed?' These case histories form the basis for discussion in the tutorial groups held during the following practical class.

MAIN PROBLEMS/CONSTRAINTS

- This type of teaching requires a considerable commitment of staff time.
- It requires good practical class accommodation, which we are fortunate to have at the moment.
- Tutorials are held in the classroom as there are no tutorial rooms nearby; this is not ideal.

FUTURE PLANS

- An extensive review of the medical curriculum is under way at Dundee University in order to embrace the recommendations suggested by the GMC on medical student teaching. We are uncertain how this will affect our teaching in medical microbiology.
- We are experimenting with CAL to reduce the amount of staff time.
- We have prepared one study guide on the topic of meningitis which was well received by the students and hope to prepare more of these.
- We have started to integrate our teaching with clinical infectious diseases by holding joint lectures on some topics.

CASE STUDY 14

INNOVATIONS IN CHILD HEALTH TEACHING

MITCH BLAIR, NOTTINGHAM

DESCRIPTION OF THE INITIATIVES

1. Sign-posted problem-orientated teaching (SPOT)

This involves providing the medical students with a problem in the form of a written clinical case scenario or cameo and an attached list of essential reading references. Most of these are linked to pages of the course textbook, *Essential paediatrics*. Our aim is to arm the students with focused knowledge which they then apply to the problem in small groups. This has been particularly useful in the teaching about the child with disabilities. The resulting feedback is better informed and the sessions are much more enjoyable to supervise.

2. Network webs

This is a technique which I use to stimulate students to think beyond the purely clinicopathological aspects of child health by getting them to connect pieces of knowledge to build up their ability to think in non-linear ways. I often ask them which area of medicine they wish to pursue and then link a subject to their own area of interest. One student mentioned neurosurgery as her preference and we spent some time talking about subdural haematomas in children, their causes and treatment. We then focused on child abuse as a cause and how the abuse may have been prevented, covering the cost of operation and rehabilitation compared to the cost of effective preventive intervention. We then moved on to the definitions of prevention and different examples of each, including immunisation. She then explored immunology in more detail and its relationship to growth, etc. I like the students to draw out the connections on a large piece of paper which they can take away and use to *viva* each other. It is an interesting technique in preparing students for that particular type of assessment and teaches them how examiners tend to think under examination circumstances.

FUTURE PLANS AND PROBLEMS

1. Use of student-maintained video teaching aids

We are exploring the possibility of students using video cameras to record key clinical situations and encounters in order to build up a library of material. Part of this is stimulated by the need to have a wider repertoire of teaching material at different times of the year. Paediatrics is quite a seasonal subject in terms of the types of cases seen at different times of the year. The largest barriers to this are insufficient technical back-up, the need to nest sections of the videos in suitable computer packages (e.g. question and answer mode or 'what if...' scenarios), and ethical issues of filming children.

2. Mid-course student appraisal

This has been suggested as a way of detecting students who are experiencing some difficulties early in the course (ten weeks) and helping them. We are intending to use a student-held logbook to help with this. The problems we are experiencing concern how much of the logbook should be signed up by the teachers, the allocation of adequate numbers of supervisors/personal tutors, and how formal the appraisal should be.

CASE STUDY 15

DEVELOPING SKILLS IN MEDICAL UNDERGRADUATES

JOYCE GODFREY, SHEFFIELD

SKILLS DEVELOPMENT PROGRAMMES AT SHEFFIELD

Over the past three academic years, two programmes concerned with skills development have been produced at the University of Sheffield, the *Personal and Academic Development Programme (PADP)* and the *Clinical Development Programme (CDP)*.

The programmes respond to:

- both the GMC (1993) discussion document and the King's Fund report (Towle, 1991);
- the need to enhance quality in teaching and learning outlined by the Quality Assessment Division of the Higher Education Funding Council (HEFC);
- students' requests for increased feedback on their progress (key finding of a comprehensive evaluation in the medical school);
- the underpinning need to produce competent and reflective practitioners.

The *PADP*, aimed at helping undergraduates focus on their personal and academic skills development, is part of a three-year Enterprise initiative being piloted across university departments and has been reported previously (Godfrey, 1993a; Godfrey and Wedgwood, 1993). It was distributed to medical undergraduates in the last academic year.

The *CDP*, aimed at helping medical undergraduates focus on their clinical skills development, is a medical school initiative in association with the Enterprise Unit. A process approach was used during its production by a team of senior clinical staff (Godfrey, 1993b). It was distributed to medical undergraduates on a pilot basis in May 1993.

While the two programmes, used sequentially, provide a comprehensive approach to students' skills development, this summary focuses on the CDP.

THE CLINICAL DEVELOPMENT PROGRAMME (CDP)

The CDP aims to enable medical undergraduates to plan, monitor and record their skills development during the clinical part of the course. It does so by:

- identifying both the procedural and interpersonal aspects involved in the practice of clinical skills;
- providing a means of feedback to students on their clinical development during the course (formative assessment);
- enabling students to develop self-understanding and the capacity for self-assessment;
- giving students a structure in which to plan and take responsibility for their learning with the goal of creating professionals who are 'self-educators'.

The *CDP* has three parts: development profile; record of achievement; action plans.

Development profile

This contains 14 clinical and professional skills as goals for students to work towards. Examples of these goals are:

- take a history;
- make a physical examination;
- present a case;
- maintain follow-up notes;
- undertake investigations;
- maintain health and safety.

There are criteria that describe each of the goals and that have two purposes. First, to make accessible to a beginner the key elements of a skill; secondly, to bring attention to the inseparability of the procedural and interpersonal aspects of clinical skills. Space has been provided on the profile for students to describe their experience and their progress towards selected goals. This enables students to reflect on and come to understand their learning in a structured way. This part of the profile is the student's property and as private as they want it to be.

Example: for the clinical goal 'Take a history', the criteria are as follows.

- Greet and set the patient at ease.
- Listen and accept the patient's communication in relation to the presenting complaint.
- Use direct and indirect questioning to obtain a full description of symptoms.
- Identify and follow up key symptoms against responses and accepted physiological norms.
- Make a systems enquiry of general health.
- Obtain an account of past medical history.
- Take an account of personal history (i.e. social, family, drugs, allergies, travel).
- Use language appropriate to the patient's level of understanding.
- Recognise and accept the emotional content of the patient's verbal and non-verbal communication.
- Make meaningful, organised and salient notes.

Students summarise their progress at the end of each semester or at the end of their term in a clinical firm using the 'spider chart' at the end of the profile. They can rate their progress on a scale from 1 (beginner) to 5 (competent), thus providing a profile of their clinical development at one point in time and also over time. The summary chart is for students to use with clinical teachers as a basis for discussion on their progress.

Record of achievement

This is for students to document any goals in which they claim to have reached the level of competence (i.e. 5 on the scale). The notion of competence used involves the student in meeting both procedural and interpersonal goal criteria and explaining the reasons for their actions – 'informed doing'. Therefore, students are required to reality test their own self-assessment through observation and discussion with peers and clinical staff who give formative feedback and support the student's own assessment when the latter is appropriate. Recording achievement, as an on-going activity, is aimed at ensuring that students can see their own progress. Given the length of undergraduate medical education, this sense of progress can help sustain application and increase motivation.

Action plans

These are used by students to select the goals they need to achieve and to establish how and when they will achieve them. An action plan can be written at the beginning of the student's clinical experience and subsequently each time they have summarised progress and recorded achievements. Clinical staff help students identify what they need to address, i.e. what areas could be usefully developed. As students move through different clinical firms, knowledge of their achievement and learning needs can be used by clinical staff to select experiences which further each student's clinical development.

The three parts of the programme described above can be used repeatedly in a cyclical manner and are based on Kolb's (1984) action reflection approach to learning . This aims to develop a 'reflective practitioner' (Schon, 1987) who learns from experience and is thus capable of continuing self-education.

IMPLEMENTATION

The *CDP* was distributed on a pilot basis in May 1993 to all students commencing the clinical part of their course (Year 3) and to a 10 per cent sample in Years 5 and 6. Students were made aware of senior clinicians' involvement in and commitment to the *CDP*. Given the pilot nature of the programme, four departments were selected in which clinical staff could give support to and have involvement with students using the *CDP*. Briefing notes and copies of the *CDP* were distributed to these four and all other departments.

FUTURE STRATEGY

The present *CDP* is a first step. Work is under way to identify and describe goals for the disciplines of paediatrics and obstetrics and gynaecology (goals for psychiatry have already been described), to extend the number of departments involved in CDP development, and to provide staff development. A comprehensive evaluation is planned for the end of the first pilot year and the data this yields will be used to inform further development work.

It is not our intention to describe every clinical skill that medical undergraduates undertake or observe and our current remit excludes a description of the numerous procedures that are undertaken at present. Our strategy for the present and immediate future is to focus on a core of skills which, while drawn from different specialisms, have wider applicability and contribute to the development of competent and reflective professional practice.

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CASE STUDY 16

DEVELOPING 'PROFILES' TO MONITOR PERSONAL AND PROFESSIONAL DEVELOPMENT

REG DENNICK, NOTTINGHAM

INTRODUCTION

Among the recommendations on undergraduate medical education produced by the GMC (1993) are a set devoted to 'attitudinal objectives' which specify that students should:

- develop a capacity for self-audit and for participation in the peer review process;
- be aware of their own limitations – be willing to seek help when necessary and be able to work effectively as a member of a team;
- be aware of the need for continuing professional development allied to the process of continuing medical education in order that high levels of clinical competence and knowledge are maintained.

This set of objectives is essentially concerned with the development of self-monitoring and evaluation skills which leads to reflective practice and professionalism as defined by Schon (1983). They are objectives which logically follow from the concepts of self-directed and student-centred learning also recommended by the GMC.

These personal and professional skill objectives, although considered important acquisitions by teachers, are frequently not taught in any formal sense and are usually picked up by 'osmosis'. However, in the last few years, following initiatives originating with the Technical and Vocational Educational Initiative (TVEI) in schools, attempts have been made to monitor the acquisition of these important transferable skills using 'profile' documents. These developments have now moved into the higher education sector through EHE projects. Indeed, Joyce Godfrey from the Sheffield EHE team described the staff development process involved in the development of a *PADP* document for medical education at a King's Fund Centre meeting in November 1992 (see also Case Study 15).

PROFILE DOCUMENTS

A profile document consists of a set of goals or aims subdivided into a set of criteria or objectives. These are all negotiable by staff and students, but typically consist of goals related to academic, professional and personal skills such as 'study skills', 'professional attitudes' and 'working with others', respectively. Students are encouraged to monitor their progress against the agreed criteria and to annotate their problems and achievements. The goals and criteria can be altered each year during a long course of study to reflect the changing nature of the challenges facing the developing student.

Example: for the academic goal 'Study skills', the associated criteria are as follows. I can:

- share responsibility for my own learning with my teachers.
- develop a timetable for allocating my study time.

O effectively organise my own study time.

O keep to deadlines for producing coursework.

O understand the learning process and think about how I learn best.

O monitor and evaluate my own learning, seeking help if necessary.

O locate required sources of information in libraries and databases.

O read efficiently and take appropriate notes.

O listen actively and take appropriate notes in lectures and seminars.

O identify key words and concepts in texts.

O process and summarise information on a specific topic.

This can be followed by a section where the student monitors progress by writing comments and setting personal goals. If necessary, there can be space for tutors' comments.

USING A PROFILE DOCUMENT

A profile document can be used in two distinct ways: it can be a personal document owned only by students and used to monitor their progress on a voluntary basis **or** it can be used to monitor progress in consultation with peers and/or a member of staff. Since the ultimate aim of using a profile document is to increase self-awareness and reflective practice, these aims are probably best served by encouraging students to communicate with each other and their teachers and tutors about their progress. Consequently this process needs to be supported by a network of staff and tutors, which has implications for staffing and staff training and development.

INTRODUCING PROFILE DOCUMENTS INTO MEDICAL EDUCATION

Godfrey (1993) outlines the staff development requirements for introducing a profile document into second- and third-year medical teaching. At Nottingham University, we are attempting to introduce a similar profile document into the first-year course in 1994. Many of the problems encountered by Godfrey have also been met in Nottingham and it must be emphasised that introducing innovative change in medical education needs to be managed sensitively. The model proposed by Gale and Grant (1990) has been found to be useful.

THE NOTTINGHAM EXPERIENCE

The development of a profile document in Nottingham was a response to the GMC recommendations which led to a *Personal and Professional Development* course. A draft profile document based on the Sheffield PAPD profile was constructed which mapped across a number of medically relevant academic, personal and professional goals with their associated criteria. It was called a *Personal and Professional Profile (PPP)*. The document was submitted to the scrutiny of three groups of people: the tutorial network staff, the Medical Sciences Curriculum and Examination Committee and the Staff Student Consultative Committee. (In retrospect the submission of a draft document can be seen as mistaken: it was perceived as a *fait accompli*. For the benefit of others involved in medical educational change, it may prove to be easier to discuss the concept of a profile document with such groups and then get them to construct their own set of goals and criteria, only showing an example document at a later stage.)

A considerable debate ensued, with tutors and staff members in particular taking strongly polarised views. It has to be noted that there is clearly a large degree of ignorance and misunderstanding from teaching and tutorial staff concerning the function of a profile document in encouraging reflection and self-monitoring. It is seen by some as yet another burdensome and irrelevant task which will undermine personal relationships with students. Other staff perceive the value of using a profile document but are concerned that they do not have the skills to administer it. A major concern is whether the present tutorial network can support a profile document or if a new organisation of academic staff needs to be created. These are legitimate concerns which will be addressed by further consultation, rewriting of the profile document and staff training opportunities. The staff and tutors were also keen to know how the students felt about using such a document. In many ways they felt that if the students had a positive response towards it they would be prepared to reciprocate.

FUTURE PLANS

The next stage will be to rewrite the document taking into account criticism from staff and students and to use it with a sample of tutors and students in a pilot study. The results of this study will be used to construct a final profile document for the next academic year. In the meantime, consideration will be given to setting up an appropriate staff support framework and finding specific time for tutorials.

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CASE STUDY 17

THE MOVE FROM INPATIENT TEACHING

MARY LAWSON AND FIONA MOSS, ST MARY'S

WHY OUTPATIENT TEACHING?

Medical students have traditionally gained the majority of their clinical experience at the bedside with hospital inpatients. Continuing this trend and teaching predominantly in the wards is unacceptable for a number of well recognised reasons. Closures have resulted in an increased pressure on fewer beds, together with a trend for earlier discharge. Increasingly, the patients occupying the remaining hospital beds either need high technology care or have prolonged hospital stays because inadequate social support delays their discharge. Inpatients no longer represent the range of common clinical problems. In addition, changes in management and treatment of disease are occurring, often through technological advances, and certain conditions are managed almost entirely in outpatient or day care units.

Changes are occurring rapidly. Length of inpatient stay data adequately illustrate this point: the average length of inpatient stay for acute specialties was 11.3 days in 1970, but had dropped to only 6.1 days by 1990. Almost 70 per cent of all hospital patient contacts now take place in outpatients (HMSO, 1992).

There is little doubt that such changes in the inpatient population are having a detrimental effect on the way medical students are prepared for their future practice. Their views of patterns of health and disease will inevitably be skewed by the disproportionate amount of time spent on the wards. The role of outpatient teaching in redressing this imbalance has now been realised. A King's Fund review of medical education concluded that 'increased use of outpatients and general practice for teaching is essential to reflect the true spectrum of health and disease in the community' (Towle, 1991). The GMC have endorsed this view in their recent recommendations on education (1993).

Unfortunately, ensuring that teaching 'follows the patient' is difficult. Practical difficulties include resource and manpower implications, clinic organisation and patients attending specifically for teaching. Numerous conceptual difficulties include concern that outpatients is seen as a low status activity, that students do not value clinic teaching and that developing outpatients will result in too little experience of acute medicine. In response to these issues, a project was initiated at St Mary's Hospital Medical School to develop strategies to allow the full educational potential of outpatients to be reached without diminishing teaching of acute medicine.

ACTION RESEARCH INTO OUTPATIENT TEACHING

It was decided initially that adopting an action research approach would be the best way to meet the aims of the project (McNiff, 1992). This would ensure that real problems would

be defined and addressed in their clinical context by the teachers involved. Working with these teachers to incorporate their views and experience, appropriate strategies were developed to shift the focus of teaching away from the wards whilst maintaining adequate clinical contact for the students and no associated drop in their experience of acute medicine. Initial results and experience were fed back and incorporated to improve the programmes as they evolved.

Three firms (two medical and one surgical) volunteered to participate in the pilot stage of the project. All three are based at a district general hospital to which St Mary's medical students are routinely allocated. The firms have now incorporated an increased emphasis on outpatient teaching for clinical students in all years (i.e. third, fourth and fifth year students on a traditional style course). A number of changes have occurred; not all are associated specifically with the shift towards the outpatient setting, but they have all served to increase the status of student teaching on the firms.

Changes in outpatient teaching

Teaching clinics – all students attended at least one session of focused outpatient teaching per week. Approaches varied but there were some shared features: a designated session in outpatients for teaching; a small number of patients invited to attend; patients either due for routine attendance or selected from waiting lists; patients know what to expect (e.g. they are seen for longer but have more time for discussion of their condition with their doctor); teaching is given a theme (when possible, students are told theme in advance to allow for preparatory reading); problem-solving approach (students may clerk in pairs and present to the group using problem-solving methods).

Routine outpatient clinics – teachers are urged to restrict time spent in busy clinics where teaching time is limited but to focus learning by introducing relevant points and summing up major points at the end.

GP teaching – students on medical firms now spend at least a half-day session with local GP tutors learning general medicine in the surgery or in patients' homes.

Project work – students are asked to complete a project looking at an aspect of the interface between hospital and primary care.

Student assessment – all students are assessed and given feedback with a clinical examination. Students also present their projects.

Student feedback – the process of teaching is evaluated using student diaries and students' perceptions of the quality of teaching assessed by questionnaire and nominal group work.

Teacher feedback – regular meetings are held to share difficulties and experience. A staff development programme is under development.

Students allocated to pilot firms all year – previously there were breaks leading to fragmentation of the teaching programme and lack of continuity. Teaching is now firmly integrated into the structure of the firm.

Teaching is given a framework – changes included providing written timetables and objectives. The roles of the different locations in meeting these objectives were made explicit.

A designated individual oversees the organisation of pilot firm teaching.

EVALUATION

At present, students see equal number of patients in the outpatient or inpatient setting on the pilot firms. They also clerk a similar number of patients in clinic or the wards. The main difference is in the number of patient presentations they make. Almost twice as many outpatients are presented in clinics, suggesting a higher degree of structure and supervision in teaching is taking place in this environment. The students rate their experience in teaching clinics highly in terms of relevance for their clinical practice and also in terms of enjoyment.

The teachers involved in the project are enthusiastic about their achievements. They are highly motivated to continue to progress with the shift towards more outpatient teaching. They are also extremely keen, having overcome many of the initial barriers to the shift, to share their experience to enable other teachers to become involved.

FUTURE PLANS

There are two elements to developing outpatient teaching for St Mary's Hospital Medical School students. First, there is potential to continue to increase focused outpatient teaching with the pilot firms. Secondly, there is the broader issue of dissemination and recruitment of teachers on other firms and at other hospitals in the teaching group.

For the pilot firms outpatient-based teaching is now an established part of firm teaching. These firms will be given continuing support to shift teaching even further from the traditional ward base. They will also be encouraged to experiment with different approaches and styles of teaching and provided with the necessary back-up and staff development programme to enable this to become a reality. Group sessions for student feedback and sharing of good and bad experience will be maintained. The pilot firms' work will be used as a model of good teaching practice for others. By far the greatest challenge in the project yet will be to secure the commitment and participation of new groups of teachers.

CURRENT CHALLENGES

In many ways life has been easy working with volunteer groups who were, by definition, already committed to providing quality in their teaching of medical students. Understandably this is not the case with all clinical teachers. However, it is encouraging that many of the concerns and difficulties already discussed are shared by a large proportion of clinical teachers from a range of specialties and institutions. The reason this is so encouraging is that there is already a wealth of experience to demonstrate to them how many of these concerns (either practical or conceptual) have been confronted and, to a large extent, overcome.

POSSIBLE SOLUTIONS

Again there are two threads to advancing the project. There is a need to create an environment for change on a larger scale first. Once this has been achieved, potential new recruits to the project can be identified and their commitment to advancing medical education secured. The second element should deal with the practical implementation on a larger scale.

Dissemination must take two lines. Initially, there is a need for information so that the scale of the current problems with hospital-based teaching can be fully appreciated.

Perhaps more importantly the combined experience to date should be shared to ensure change takes place, building on what has been achieved. Most hospital doctors are very aware of the reasons why a shift towards outpatients as the main focus of their teaching is desirable. Several groups have expressed interest in participating in this project, but too often they have stumbled when it comes to applying their ideals to the real life situation.

There are a number of processes under way to help. Videos will be made of teaching clinics to clarify for a larger audience exactly what they involve. The pilot firms have expressed the usefulness of sharing vignettes and anecdotes to illustrate how problems were overcome in their own practice. They have agreed to invite interested doctors to attend teaching clinics to see at first hand what happens from the teachers', the students' and the patients' perspectives and how other staff and administrative systems are affected. Joint meetings will also be arranged to discuss some of the issues more formally.

In parallel with this work, the structure for evaluation on all firms by students will be formalised and staff development programmes are planned to support staff through this transition. The experience of outpatient teaching can then be compared and contrasted with more traditional styles of teaching.

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CASE STUDY 18

EVALUATING OPPORTUNITIES FOR STUDENT–PATIENT INTERACTION

JOHN DENT AND MARGERY DAVIS, DUNDEE

Much of what medical students learn and remember in their clinical years is based on conditions they have encountered personally in particular patients. Increasing the opportunities for students to interact with patients should therefore help them to learn more about the conditions presented and improve their clinical competence. But are such opportunities for interaction available to students? If available, are they taken, what is their nature, and can they be shown to facilitate learning?

Opportunities for interaction with ward patients are becoming less available as the emphasis of current clinical practice shifts towards ambulatory care. Thus, a greater variety of clinical conditions is available in the outpatient clinic than in the wards. But can the opportunities for interaction and learning from patients in this setting be presumed to be the same as in the traditional ward round?

INTERACTIONS WITH PATIENTS IN WARDS AND CLINICS

During their three-week clinical attachment in orthopaedic surgery, 30 students were asked to complete a structured log-book. How they interacted and what they learned was recorded for every patient they saw in both clinics and ward rounds using the seven categories of the *EPITOME* model: **E**nquiry into symptoms; **P**hysical examination; **I**nterpretation of investigations; **T**echnical procedure undertaken; **O**ptions of diagnosis; **M**anagement and **E**ducation of the patient. A questionnaire on the acceptability of the log-book was completed by the students.

The number of interactions actually achieved by the student was divided by the total number of interactions potentially available in each clinical teaching situation. In the clinic students averaged 8.2 per cent of available interactions, compared with 7.1 per cent of available interactions in ward rounds. Interpretation of investigations and physical examination were the most frequently recorded interactions. The percentage of available interactions which students achieved in different clinics varied according to the teaching style of the clinician present (16.5 per cent were achieved when attending with one clinician and 8.4 per cent when attending with another). Interestingly, the percentage of available 'learnings' achieved by the students was the same in each situation (23.5 per cent). In the clinic, students who achieved a large percentage of interactions saw a smaller percentage of the patients attending. Clinics of different sizes made little difference to the average percentage of available interactions which students achieved (7.2 per cent and 11 per cent).

This study suggests that students can interact as much with patients in clinics as in ward rounds; however, they will not have opportunities to practise technical procedures in either situation. Students should attend clinics with different clinicians to increase their exposure to different conditions. Although the number of interactions they achieve will vary, they will accomplish a similar amount of learning.

However, taking time to interact with more patients results in the students seeing fewer patients. This diminished the usefulness of the clinic as an opportunity to see a variety of

patients, but clinics with large numbers of patients did not adversely affect the percentage of interactions possible.

FUTURE PLANS

Our plan for the development of this project is that clinics and ward rounds should be used interchangeably to provide opportunities for student–patient interaction. Any training in technical procedures, however, must be practised on separate occasions. Clinics should be used mainly to show students a wide variety of patients rather than for student–patient interactions as these can be achieved readily in ward rounds. Students benefit from attending large clinics by seeing the large number of conditions which present; having the opportunity to choose to attend a variety of clinics with different clinicians will not adversely affect the amount of learning they achieve. The use of the log-book for recording details of interest only on conditions of 'core' importance (according to GMC recommendations) would assist in making it more valuable as a revision tool. Although student attitudes to the log-book were divided, a sufficient number indicated that it stimulated their learning sufficiently to encourage us to continue the project with a pocket-book size log-book which would be more convenient to use than one which was printed on A4 paper.

CASE STUDY 19

GENERAL PRACTICE: THE IDEAL PLACE TO TEACH GENERAL MEDICINE

VIVIENNE JINKS, ELIZABETH MURRAY AND MICHAEL MODELL, UCLMS

'MEDICINE IN THE COMMUNITY' FIRM

UCLMS piloted a six-week junior general medical firm based in the community in September 1991 (total 4 students x 6 firms = 24 students). Following the success of the pilot, the firm was linked with the Department of Oncology and expanded to take a total of 48 students. From September 1993 the size of the initiative has increased to accommodate 112 students during the academic year with the founding of another *Medicine in the community firm* linked with the Department of Public Health Medicine (see Case Study 20). In addition, 42 students per year 'peel off' a hospital-based general medical firm for two weeks to learn general medicine in the community.

The *Medicine in the community firm* enables first-year clinical students to meet many patients suffering from a wide range of chronic diseases no longer seen in hospital wards. The aim of the firm is for students to learn the basic clinical skills of history taking, clinical examination and communication with patients. Students are attached in pairs to GP tutors. They spend two whole days taking histories from and examining patients either at home or in the surgery and thus gain insight into the conditions for patients, doctors and other health care staff outside the hospital environment. The students are supervised by their GP tutor who is able to tailor learning experiences to the individual needs of the students. One further session per week is spent learning clinical skills as a group in the Department of Primary Health Care. GP tutors are paid as lecturers at a rate of two sessions per week throughout the year, and may also claim the Family Health Service Authority (FHSA) fee for teaching students in the practice, giving a total remuneration of £6,577 per annum for taking students on alternate firms throughout the year.

Students are informally assessed by their tutor, and they are formally assessed at the end of the firm by means of an OSCE. The firm is evaluated by means of a student satisfaction questionnaire which shows a high degree of satisfaction with the firm. Constructive criticisms by the students have been acted upon to improve the quality of the firm.

PROBLEMS, CONSTRAINTS AND SOLUTIONS

1. Insecurity

Tutor insecurity about teaching clinical skills has been overcome by monthly staff development meetings which provide an opportunity for tutors to discuss their own educational needs as well as those of the students. Student insecurity and the insecurity of the medical school about the ability of the firm to provide valuable experience has been largely overcome by the positive feedback of the students and the active participation of a well-respected senior member of the department (MM). The structured nature of the firm, with nominated topics for each week, allows the students to study effectively and increase their enjoyment of the experience.

2. Organisation

The firm is now organised so that students spend two whole days per week in the practice. This has reduced the amount of time and money the students spend travelling. Having fixed days in the practice makes it easier for GP tutors to organise their teaching around other practice commitments, and has also made organisation between the Department of Primary Health Care and the Departments of Oncology and Public Health more straightforward. A greater degree of collaboration between the departments has possibly been sacrificed for ease of timetabling.

3. Philosophy and evaluation

The medical course at UCLMS is traditional, having a two-year preclinical course with no patient contact, and a three-year clinical course. The *Medicine in the community firm* is constrained within this traditional structure, and it is difficult to evaluate the impact that this one firm may have on students and the medical school. It has also proved difficult to encourage problem-based and self-directed learning in the space of a six-week firm, particularly when the students are unlikely to meet these concepts again during their course. Curriculum review might help to clarify the role and objectives of community-based education at UCLMS.

4. Recruiting new tutors

To date, the department has attracted enough tutors (22) of sufficient calibre through personal contact and by writing to 200 GPs who practise within a reasonable travelling distance of the Whittington Hospital. The amount of remuneration offered to our tutors is perceived as adequate by them for the amount of time involved. The tutors find this form of teaching personally rewarding and, so far, all tutors who have been involved in the firm continue to be so. We anticipate, however, that recruitment of more tutors for further expansion in 1994 may prove a rate-limiting step.

5. Costs and funding

So far the initiative has been funded by grants from the King's Fund and the Cancer Research Campaign, and a 'new blood' lectureship. This is an expensive method of teaching and is clearly not sustainable on the basis of soft money. One possibility is diversion at regional level of Service Increment for Teaching and Research (SIFTR) funding through the FHSAs to Academic Departments of Primary Care.

FUTURE PLANS

Provided that adequate, secure funding is forthcoming, the department plans to offer all 210 students a medical firm with community experience in their first clinical year from September 1994. Future firms may be based solely in the community or may be linked with other specialties which have shown interest in collaboration.

CASE STUDY 20

A FIRST-YEAR (CLINICAL) COMMUNITY PRACTICE COURSE

MARIA EVANDROU AND INGER O'MEARA, UCLMS

The course is designed to enable students to:

- learn and appreciate the full range of socioeconomic and environmental factors affecting an individual's health;
- understand the importance of good health to the individual;
- be aware of the relative merit of acute clinical medicine and of community medical services to health care;
- recognise the changing role of health professionals.

The course primarily uses the community setting as a learning environment, emphasising self-directed learning and combining it with weekly plenaries, interactive student feedback and discussion group sessions. The aim of the course is to widen the knowledge and experience of medical students in their first clinical year. The course is topic-based, encouraging the student to choose one of the following modules: drug and alcohol misuse; people with learning difficulties; homelessness and health; diabetes mellitus; care of elderly people; palliative care.

The firm runs for six weeks and has eight students at a time. It occupies one and a half days per week. Seven firms per year are planned. One day per week is spent in a community placement, and one half day per week is spent in the department. This *Community Practice Course* is part of a joint firm in Medicine in the Community/Public Health with the Department of Primary Health Care, Whittington Hospital, UCLMS (see Case Study 19). Thus students are able to enrich their community practice experience with an additional two days in a GP attachment.

COMPONENTS OF THE COURSE

1. Community practice modules

The aim of the community practice placement is to give students the opportunity to visit and generally build up a rapport with people in the community. This will enable them to develop their knowledge, skills and understanding of people's needs in the community and the best way to respond. Whilst on placement they are encouraged to observe, ask questions and reflect on their overall experience in the community.

The placements involve 'shadowing' one or more health professionals (GPs, nurses, psychiatrists, key workers, therapists, care managers, health advocates, chiropodists, other project workers and volunteers). Community placements have included: the alcohol advisory services, hostels, residential homes, diabetic clinics, needle exchange unit, day centres for homeless people, drug dependency unit, community chiropody services, cafes run by people with learning difficulties, day hospital for elderly people. The majority of placements are arranged with the support of the Camden and Islington Community Health Services NHS Trust.

Students choose a particular issue for their project and spend time with their tutors developing their ideas and planning their project work. The project relates to the experience, knowledge and skills gained during their community placement. Students are encouraged to:

- develop their skills in observation, reflection, communication and teamwork;
- develop a sensitive understanding to the needs and circumstances of people in the community;
- develop an awareness of interface between hospital and community services;
- appreciate the roles of health professionals in the community and the reality of multidisciplinary teamwork;
- develop clinical skills;
- place their medical education in an appropriate social, cultural and environmental context.

2. Plenary sessions

These sessions combine interactive teaching on issues relating to the community practice modules with group discussions and student feedback sessions on their community experience. Seminars from epidemiologists, public health physicians and social scientists include discussions on: the NHS and Community Care reforms; the role of doctors in the management of drug users; how homelessness relates to health; nutrition, food and health; alternative care models for diabetes; alcohol consumption and health. Self-directed learning rather than more traditional didactic teaching is emphasised throughout the course.

3. Community practice feedback sessions

These sessions enable the students to report back and discuss their observations, knowledge gained and any problems arising from their experience in the community. They are encouraged to relate back to notes taken during placements, discuss reading material and videos and generally reflect on the usefulness of what they have experienced and learnt each week.

4. Community practice library resource

This resource contains a growing selection of useful books, articles, reports, policy documents, journals, videos and newspaper cuttings which relate to the module topics as well as community-based teaching. The library resource is currently based in the department and students have general access to it.

5. Student documentation

(i) Course pack containing objectives of the course and the module, timetable, community placement contacts and map, placement worksheets, project guidelines, topic references, and assessment criteria.

(ii) Guides on writing an essay or report, making a poster display, oral presentations, and diary note taking of community practice experience.

6. Course assessment

Students are expected to present their project to the class and submit either a written paper on their project (three or four sides of A4) or a poster to illustrate the findings from their project. They are given clear guidelines on how to carry these out, as well as the assessment criteria used to give the final course mark. The mark given relates to the oral presentation, the piece of work handed in (report or poster) and general participation in the firm (i.e. both plenary sessions and community placement).

7. Course evaluation

A course evaluation questionnaire is given to all students; separate course feedback discussions are held with the students, community placement contacts and internal tutors. Fortnightly meetings are held to discuss placement planning, problems arising and general course development in relation to the feedback received.

CONSTRAINTS

- Locating a sufficient number of community placements for students.
- Increasing time required to arrange placement experience in the community and, in particular, tailoring the community placement to the preferences of the student during the six-week course.
- Building up our community-oriented library resource has proven time consuming and requires specific financing in order to offer the appropriate range and up-to-date literature and other educational material.

FUTURE PLANS

- Increase the number of students in each firm (numbers expected to double next year and increase thereafter).
- Encourage student participation in further developing their community placement experiences beyond the core arrangements which are made for them.
- Encourage greater participation by the community placement contacts to contribute to the course development.
- Encourage the students to view their project work as an opportunity for them to 'give back' something to the community, in particular the placement centre or locality they are attached to over the six-week course.
- Increase the range of module topics offered to the students.

CASE STUDY 21

LINKING PRIMARY CARE AND PUBLIC HEALTH

SUSANNA GRAHAM JONES AND MARTIN LAWRENCE, OXFORD

Oxford students now have a six-week *Public Health and Primary Care* module in their second clinical year. The first two courses have been closely monitored for evaluation purposes.

As regards primary care experience, students are individually attached to a practice throughout the six weeks, which gives them experience of community-based medicine, teamwork in primary care, and one-to-one work with patients and GP tutors.

Department-based sessions on two days per week encourage the students to relate their practice-based experience to broader community health issues, and to receive seminars on public health issues and methodology. Skills in consultation work, in clinical epidemiology and critical thinking are developed through hands-on exercises. Topics such as screening and health promotion, epidemiology, quality assurance, resource allocation, health service organisation and occupational health are covered in seminars.

Practice-based projects are devised and carried out by students working in small groups. These often require skills in questionnaire design, data handling and interpretation. Project results are presented to a mixed audience of GPs and members in the Department of Public Health and Primary Care.

PROBLEMS, CONSTRAINTS AND POSSIBLE SOLUTIONS

1. Conflicting agendas

The lecturers and tutors are committed to a new integrated course covering the two disciplines of primary care and public health medicine. However, second year medical students, with their immediate need to develop clinical and communication skills, may resist the emphasis we have placed on health policy and planning issues in the course.

Proposed solution

Explicit goal-setting exercises with successive groups of students, lecturers and GP tutors should enable us to strike a balance between students' learning objectives and the department's teaching objectives.

2. Maintaining the momentum in unfamiliar territory

The new curriculum presents challenges to GP tutors as much as to department lecturers. Practice-based experience of the purchaser-provider split emphasises the importance of our integrated course, but the teaching is new for all of us.

Proposed action

a) Students are provided with worksheets which pose questions for tutor and student to address together in the practice before or after specific seminars. These are brought back to the department for discussion with other students during seminars. Topics addressed in this way so far include 'risk-taking and decision-making in practice', 'referrals to hospital' and 'Care in the Community'.

b) Project presentations reveal choice and results of self-directed learning by groups of four to six students. Observation of the process and content of project work helps us to assess the extent to which teaching objectives are being met.

3. 'What if they don't like it?' Using student feedback constructively

Intensive course evaluation by students is necessary at this early stage. Some negative feedback is likely, given the novel approach and the linking of primary care and public health which is unfamiliar to medical students.

Proposed action

a) Explicit reference within the course to the importance of evaluation for future courses. Evaluation in the middle of a block has enabled change during that block.

b) Student feedback on content, relevance and quality of presentation of each of the taught sessions is discussed with all tutors and lecturers.

c) At the end of the course students are asked to rate the importance of departmental teaching objectives and the extent to which the objectives were fulfilled. They also rate the value of different settings for learning (e.g. time with health visitors, project work, seminars, GP tutorials).

4. So what? Evaluating the impact of the course in individual student's attitudes, knowledge and skills

What measurable change might be expected in any of these areas after a six-week course, given that the 'baselines' for student assessments would depend on the previous clinical experience of the students (range 12–23 months)?

Proposed action

a) GP tutors are asked to undertake formative assessments with each student; these assessments are not standardised or marked.

b) The current assessment package for each student includes an 'Attitude Enquiry' (De Monchy *et al*, 1988) which is completed before and at the end of the course and is intended to show any shift along a continuum from 'doctor-centred' attitudes to 'patient-centred' attitudes.

c) Students undertake an OSCE during the course; the results are returned to students and tutors for further work in practice. Tutors are encouraged to report on progress between the middle and the end of the course.

d) We are interested in the possible relationships between gender, attitudes (pre- and post-course), motivation and performance on the course. We will have enough data to set up such an analysis within six months.

SUMMARY

The new Oxford curriculum involves raising students' awareness of health policy and planning issues during their main general practice attachment. Is this the right agenda for the nineties?

CASE STUDY 22

CAMBRIDGE COMMUNITY-BASED CLINICAL COURSE

NIGEL OSWALD, STEVE JONES AND DI HINDS, CAMBRIDGE

On 18 October 1993, four University of Cambridge clinical students joined the staff at the Health Centre for the *Cambridge Community Based Clinical Course*. The possibility of using such an attachment for educational purposes was demonstrated previously when a house officer was supervised in this setting (Oswald and Kassimatis, 1989).

DESCRIPTION OF THE COURSE

Having spent four weeks with the main cohort of medical students in the Introductory Course, these students have embarked on a 15-month period based in the community, at a health centre serving 6,500 patients. This period is intended to provide students with a basic clinical training instead of their junior medical and surgery firms and the specialty rotations. It will provide the opportunity for student learning to be based on clinical experiences. The key to the success of the venture will be the breadth and continuity of the experiences provided by an attachment of this length.

Specific patient attachments will extend beyond the practice to the hospital and back again into the home setting. It is anticipated that such long-term connections with patients and their families will enable students to gain an insight into the experience of health, illness and rehabilitation as a continuum, in which each episode is an event in the life history of an individual and their family.

The planning process entailed extensive curriculum development. In shaping the curriculum, issues such as assessment, learning methods and organisation of content have been addressed. The curriculum model which has been developed is designed to integrate spheres of knowledge, as well as addressing key skills and attitudes. Within each specialty, specific key conditions contrive to trigger the clinical problem-solving process. Associated conditions have also been identified, and the knowledge underpinning these conditions defined. Skills that students will be expected to demonstrate are also specified. Central to the learning experience are core skills: those of communication, patient examination and taking a history.

Clinical skills teaching is primarily within the small group, but a strong emphasis is placed on student learning, which is intended to be self-directed and aimed at fostering a deep approach to learning. Such an approach aspires to provide a firm foundation for a lifelong commitment to professional development.

Priority activities include honing formative and summative assessment procedures, intensive recording of the student experience, development of teaching and learning methods, and monitoring and evaluation.

FUTURE PLANS

- Addressing a 'core curriculum'.
- Development of 'key competences' to be addressed.

- Four further students to be admitted in each of the academic years beginning September 1994 and September 1995.
- Implementation of proposals to assess and follow the progress of doctors who have qualified through the *Community-Based Clinical Course.*

MAIN PROBLEMS/CONSTRAINTS/BARRIERS

- Transferring from a feasibility study to a more general application.
- Planning to ensure appropriate implementation in the event of such a model being adopted elsewhere.
- Definitions of competences within criterion-referenced system.
- Financial implications.

POSSIBLE SOLUTIONS

- Recognition of time necessary for detailed advance planning.
- Appropriate professional development.
- Establishment of teaching networks to support and sustain implementation.
- Definitions developed in-house and validated.

Reference

Oswald, N and Kassimatis, M (1989) A house officer in general practice: a different experience. *Medical Education* 23, 322–7.

CASE STUDY 23

PROPOSAL FOR COMMUNITY-BASED TEACHING OF BASIC CLINICAL SKILLS

F HOBBS, JIM PARLE, SHEILA GREENFIELD, J SKELTON AND BARON MENDES DA COSTA, BIRMINGHAM

JUSTIFICATION

There are numerous arguments for the establishment of the teaching of basic clinical skills in the community throughout the clinical years and especially the third year (see GMC recommendations).

- Students can assess patients in their own homes or nearby and can therefore place their problems in context.
- There is a huge variety of potential clinical problems in the community and many practices can identify patients with particular symptoms, signs or difficulties using their computerised morbidity indexes.
- The influence of family and social factors on presentation and development of disease will be well illustrated and holistic approach/communication skills well demonstrated.
- By following patients into and out of the hospital, students can develop an understanding of the place of the episode of illness in the patient's longer-term history.

METHOD

Teaching

It is suggested that a sample of 32 students from the third year will spend one morning a week for 20 weeks during their clinical attachment attending a practice near their teaching hospital in a five-month pilot from March 1994. The teaching methods in the practice would consist of observation of patients booked routinely (undifferentiated complaints for problem-solving skills development) in long 20-minute consultations with the GP; this would be followed by an arranged teaching session with a few patients, seen in the surgery or at home who would be able to demonstrate either signs or symptoms. Those patients who are seen in the arranged session should have been chosen for one of the following reasons:

- to reinforce the teaching occurring simultaneously in the lectures in the afternoons at the medical school (theme or linked teaching);
- to demonstrate certain key or core skills that students at this stage should be expected to learn;
- to provide an opportunity for students to 'fill in' some of the gaps in their abilities following formative assessment of their skills.

Students will spend one morning every six weeks at the medical school in seminar teaching designed to:

- provide learning opportunities that students might otherwise miss (eg. teaching of both communication and examination skills with role players and standardised patients).
- provide the opportunity to reflect on their experience in a group of peers led by experienced teachers and thus to encourage both self-analytical and critical skills.
- initiate understanding of the need for group skills which have become so important in present-day medicine.

Recruitment and training of practices

Eight practices have been approached and have agreed to take part. All are experienced teaching practices. A training programme was instituted in late 1993 to update practitioners' clinical skills, train them in the use of videotape consultation feedback, and inform them of the level of skills and knowledge which might be expected of third-year students. Practices will be required to employ locum cover for the teaching session in order to protect time, and to use videotape equipment.

Assessment and evaluation

- All students will be assessed in the standard clinical examinations at the end of the attachment.
- Both students and teachers will provide evaluations of the process and content of the course.
- By controlled sampling of both students taking part in the experimental course and students who are not doing so, a comparison of teaching and learning opportunities can be made.
- We propose to develop further methods of assessment which again will be needed to compare the two groups of students (e.g. OSCEs which are presently being piloted in the department for final-year students).

We suggest that in this first year of an experimental course, conclusions concerning its effectiveness can only be tentative. Rigorous evaluation is difficult given our inability, for example, to randomly allocate students to the new and traditional courses. However, we suggest that with the evaluations and assessments described we should be able to determine the feasibility of such a course and therefore determine whether such an approach is worthy of further development.

PROBLEMS

- Reluctance (not necessarily explicit or even conscious) of hospital doctors to accept the expertise of GPs as teachers of basic clinical skills.
- Lack of sufficient funding to enable the Department of General Practice to develop a teaching contract with practices that will ensure that students receive the appropriate teaching.
- The apparent inability of the medical school to come to a definite decision to at least allow a pilot of the proposed new method of teaching as described above.
- The apparent lack of real power of the GMC to influence medical schools; to paraphrase, 'How many legions has the GMC got?'.

SOLUTIONS

- Does the GMC have the willingness to put pressure on medical schools to institute the kind of changes it appears to be proposing? If so, this would empower those keen to institute change.
- If 'real', and preferably new money were available, then such changes and experiments would be facilitated.

CASE STUDY 24

CLINICAL SKILLS TEACHING IN GENERAL PRACTICE

ROBERT McKINLEY, LEICESTER

The aims of the Leicester Department of General Practice's fourth-year course concentrate on the development of generic clinical skills, and teaching is based on the consultation. Students spend four and a half days in the department where teaching concentrates on the principles of problem-solving and key consultation skills. Clinical teachers in the general practices are expected to develop these skills in students during the rest of the five-week attachment.

We encourage clinical teachers to use a modified form of the *Leicester Assessment Package* (*LAP*) (Fraser *et al*, 1992) as the keystone of their teaching. The *LAP* consists of a description of the consultation competence against which the students' performance is judged, plus recording sheets and mark allocation scales to improve the objectivity of the assessments. It also contains a proforma for the preparation of structured, objective and constructive feedback to the student. The face validity of the description of consultation competence has been established (Fraser *et al*, 1994) and its reliability demonstrated (Mulholland *et al*, 1992). The modified form of the *LAP* does not include record keeping.

Clinical teachers are expected to set time aside for the frequent observation and educational assessment of their students' consultation competence, followed by the provision of feedback on their performance. We have instituted a series of workshops for clinical teachers to facilitate the uptake of this teaching model and to develop their skills (Preston-Whyte *et al*, 1993). These workshops are interactive, sequential and concentrate on the development of the participants' skills by offering repeated opportunities for practice under supervision. By necessity, these workshops have a high tutor-participant ratio (two tutors to a maximum of ten participants).

To date, 26 teachers have completed the course. We plan to offer an additional two workshops (i.e. 20 places) this year and aim that at least one clinical teacher from each teaching practice will complete the course.

References

Fraser, R C, McKinley, R K and Mulholland, H (1992) Assessment of consultation competence in general practice: the Leicester Assessment Package. In: *Approaches to the assessment of clinical competence*. Part 1. Centre for Medical Education, Dundee, 192–8.

Fraser, R C, McKinley, R K and Mulholland, H (1994) Assessment of consultation competence in general practice: establishing the validity of prioritised criteria of consultation competence. *British Journal of General Practice* (in press).

Mulholland, H, Fraser, R C and McKinley, R K (1992) The reliability of a limen referenced approach to the assessment of consultation competence: the Leicester Assessment Package. In: *Approaches to the assessment of clinical competence*. Part 1. Centre for Medical Education, Dundee, 415–20.

Preston-Whyte, M E, Fraser, R C and McKinley, R K (1993) Teaching and assessment in the consultation: a workshop for general practice clinical teachers. *Medical Teacher* 15, 205–10.

CASE STUDY 25

REVISING THE UNDERGRADUATE CURRICULUM AT NEWCASTLE

LOUISE ROBINSON, NEWCASTLE

CURRICULUM CHANGES

In line with the 1991 GMC recommendations and the King's Fund Centre report, *Critical Thinking*, major changes in the undergraduate medical curriculum are already under way. The fundamental aim of the new curriculum is to substantially reduce factual overload, to increase self-directed learning and introduce a more community-oriented, problem-based approach. Students will participate in a compulsory 'core' curriculum and then select 'options' to study in more depth, depending on their interests and future career choices. Thus, rather than produce the traditional complete doctor, the new graduate would **know less** but **understand more**.

Changes to the preclinical (Stage I) curriculum will begin in 1994. The aim will be to balance equally the time spent on contact teaching and self-directed learning. The core curriculum will consist of systems and topics modules and a new clinical skills course. 'Optional' study will involve a family study project, patient study and literature review. The revised clinical curriculum (Stages II and III) will be introduced in 1995.

ROLE OF GENERAL PRACTICE

There will be three stages of involvement for general practice.

1. Third-year introductory clinical skills course

A twelve-week integrated course, teaching basic clinical skills, with GPs required to provide up to three sessions of protected teaching time per week. Students would be divided between nine 'teaching units', each unit comprising a hospital firm (one medical and one surgical) and associated practices.

2. Fourth-year optional course

This will only be available to a limited number of students per year. There will be a departmental core package, sessions in practice and the remaining time devoted to community-based project work.

3. Fifth-year compulsory attachment

This will involve practices in any part of the Northern Region. Three weeks will be spent in full-time attachment to a practice with students being residential (either in GPs' homes or nearby hospital accommodation) for part of the time. The remainder of the attachment will be based in the department following a formal teaching programme.

We hope to develop a course for the GP tutors involved in the third-year attachment to improve their confidence in teaching clinical skills. A pilot study is to be set up in one of the 'teaching units' in 1994 to assess the feasibility of the introductory course.

PROBLEMS AND SOLUTIONS

1. Protected teaching time. The GPs involved in the introductory course will find it especially difficult to deal with the dual demands of providing primary care and student supervision. Investigating practice-based alternatives for self-directed learning could help.

2. GP recruitment and training. GPs may lack confidence about their new enhanced teaching role, especially teaching clinical skills. Providing adequate reimbursement, pre-course training and in-course support will increase and maintain enthusiasm for an enhanced teaching role.

3. Finance. The present FHSA undergraduate tutor payments will not be sufficient to allow GPs to provide protected time. The use of SIFTR resources is presently being investigated.

4. Organisation. It is hoped that each 'teaching unit' would have its own administrator, but practices will also need help with patient recruitment and student organisation. There are also huge implications for central (departmental) administration.

5. Resistance to change. Decreased teaching time in some specialties and concerns about the reduction in factual knowledge may lead to resistance to the new curriculum. This could be minimised by ensuring that each discipline has input towards curriculum planning.

d) COMPUTER-ASSISTED LEARNING (CAL)

CASE 26

A REVIEW OF CAL IN MEDICAL EDUCATION

JEANNETTE MURPHY, CELC

WHAT IS CAL?

Question: *'Would someone please tell me what is meant by CAL, CBL, etc.? What do I need to know in order to participate in the debate?'*

Context: *'I keep hearing people suggest that the computer has enormous potential as a resource in medical education. But those who are into computer-based learning (CBL), seem to talk in this mysterious language. When I listen in to a conversation between enthusiasts I can't make much sense of the problems because of the jargon.'*

Answer: '*Here are some definitions of the key concepts.*'

- **Courseware**: in general, this refers to course material produced for any medium – print, audio, video or computer program. However, the term is often used by those involved in CBL to refer specifically to CBL resources (e.g. tutorials, simulations on a computer).

- **Hypertext**: this is not a language or an authoring tool but a software-based concept. Hypertext refers to text which is produced as a series of 'cards' or 'nodes'. Each card is one screenful of information. (It is possible to produce larger chunks of information, occupying several screens, in which the student uses the *Page Down* key on the keyboard.)

  When 'authoring' a card, the author defines explicit links to other cards. For example, a word or concept may be linked to a definition; a finding may be linked to a source or reference. The cards are produced using a word processing package and then implemented using a particular hypertext product (e.g. *Hypercard*). The author will generally create menus and some self-assessment exercises. When the student uses the hypertext application (e.g. as a tutorial), the student is said to 'navigate' through the text. If the student wants further information he or she 'clicks' on a 'button' and the connected word or phrase appears on the screen.

- **Hypermedia:** this means the same as hypertext, except that the chunks of the document can be audio or video material or graphics.

- **Authoring:** the production of courseware. This is done using authoring software. There are many authoring software packages available which have been created to allow persons without a programming background to develop and create their own interactive multimedia packages. Examples include: *ToolBook, Guide, Authorware, Hypercard, Picture Book, Storybook.*

- **Multimedia:** the presentation of information using a variety of formats, e.g. text, graphics, numbers, audio-visual material. To deliver multimedia learning materials, workstations which are able to store and display information in different ways (e.g. alpha-numeric/graphic displays and audio-visual material) are required.

- **Interactive multimedia:** interactive multimedia make it possible for the user to manipulate the information.

- **Platforms**: the type of hardware and software available in an institution. When selecting courseware the key factor is the type of operating system. The main operating systems are: *UNIX, X-Windows, Windows, MS DOS and MacOS.*

- **Delivery system:** the equipment or technology required to deliver CAL to students. The delivery system required depends on the type of CAL you intend to produce or use. The move to multimedia courseware makes greater demands on the hardware, i.e. you require more powerful, more expensive machines.

- **Compact disc (CD) versus videodiscs**: videodiscs store images in an analogue form. The storage capacity of such discs is immense and access time to any particular frame is rapid. When the technology was launched there were two different formats or standards: *PAL* (used in Britain and most of Europe) and *NTSC* (used in Japan and the USA). Dual format players are available. CDs are smaller than videodiscs and the data is stored in digital form. There are a variety of CD formats in existence, and there is still no one accepted standard.

- **Digital CD-ROM** (meaning 'Compact Disc-Read Only Memory'); these are the digital equivalent of audio CDs. The most important characteristic of CD-ROM discs is their enormous storage capacity; a single disc can store half a billion bytes (characters) of information. These discs can store text, images, video or sound. Any of this information can be individually retrieved by your computer and presented through your screen or speaker. Read only memory (ROM) means that you cannot alter the original information. All that you can do is to read from the disc (i.e. retrieve what has been pre-recorded). The CD application most familiar to medical educationalists will be *Medline.* The key limitation to CD-ROM discs is speed. Access to information from CD-ROMs is slower than from hard discs because of the different way in which the information is stored. Care must be taken when purchasing a CD-ROM drive and the associated add-ons! Make sure you seek specialist advice, especially if you want to meet *Microsoft* multimedia criteria.

- **Interactive video:** this is the combination of still and moving video (and associated sound) with textual information and computer graphics.

- **Image compression and decompression**: one big problem in storing still or moving video images is the demands this places on storage capacity. This is particularly relevant to CDs. The solution to the problem of storage space has been to compress (and then decompress) the images. There are different standards for doing this.

- **Digital Video Interactive (DVI)**: a combination of hardware (an interface card) and software to compress/decompress digital data. (Apple's *Quicktime* is their software for compression/decompression.)

- **CD-Interactive (CD-I)**: yet another standard, developed by Philips to provide a complete multimedia platform. Much of the development appears aimed at the home market (note all the recent adverts!). CD-I discs can only be played in a CD-I player.

- **Virtual reality (VR):** still in the realm of 'futurology'. Although VR is often thought of as a games environment, it offers a plethora of medical possibilities. What VR promises is a capacity to reconstruct the feedback from all our senses: touch, sight, hearing, smelling and tasting. The potential for surgeons to perfect their craft in VR space is being compared with pilot training, where more flying hours are clocked up in simulations than in real planes.

- **Networks/Networking**: there are great advantages in allowing computers to communicate with one another. When computers are linked they can share resources and individual users can communicate. Networks make it possible for computers to 'talk to' one another. As well as local educational networks, there are national and international networks. *JANET* (and, coming soon, *SUPER JANET*) are networks for the educational community.

WHY USE OR PRODUCE CAL?

Question: *'Give me five good reasons why I should get excited about CBL materials? Why should computers be a part of the educational landscape?'*

Context: *'OK, I know a little bit about this technology – I've seen the odd demo, but in my medical school resources are really tight. There's very little spare cash around for machines, for software or to fund the in-house development of CAL. New learning resources are very low on our list of priorities. What case would one put to one's colleagues, to the powers that be, to persuade the institution to invest in CBL?'*

Answer: *'To answer this type of question you need to review the potential benefits of computer-based learning.'*

Benefits of CBL: these fall into three categories: benefits to students, benefits to tutors, and benefits to the institution. After studying these benefits, you then need to decide what it is you are seeking to achieve. You need to be clear what you want CAL to deliver if you are to realise benefits.

In view of the fact that we are only just beginning to see systematic attempts to introduce CAL into the curriculum and to evaluate its effectiveness, there is not a vast amount of research evidence available. What we have are small case studies and personal accounts.

The following publications contain information on the effectiveness of CAL in medical education.

Centre for Interactive Video in Education, Sheffield Hallam University (1993) *Evaluating learning technology. A database of international research since 1985 on the application of interactive technology to education.*

Jelovsek, FR and Adenbonjo, L (1993) Learning principles as applied to computer-assisted instruction. *MD Computing.* 165–72.

Laurillard D (1993) *Rethinking university teaching: a framework for the effective use of educational technology.* London: Routledge.

Leonard J (1993) *Interacting: multimedia and health.* London: Health Education Authority.

Macfarlane Report (1992) *Teaching and learning in an expanding higher education system.* Scottish Centrally-funded Colleges. (Main report, executive summary and bibliography).

INTRODUCING COMPUTER-BASED LEARNING RESOURCES

Question: *'How do I go about working out a strategy for adopting and using these new resources in the medical curriculum? Can you provide a blueprint?'*

Context: *'Now that I'm sold on the potential benefits of the technology, what do I do next? How do I get started introducing CBL into my own subject, or into the medical curriculum generally?'*

Answer: *'If you have reached this stage, it is time to start thinking about strategies, resources and an implementation plan. Here are some important steps to consider.'*

- ○ Taking stock – since you must start from where you are, you need to know what facilities and resources already exist. Carry out an inventory or audit. Look at your machines, rooms, software, staff and technical support services.
- ○ Identify your allies (and also those who are likely to be negative or hostile).
- ○ Determine which committees in your institution have responsibility for computing and IT.
- ○ Create user groups – these should involve both staff and students.
- ○ Investigate what provision there is for basic computer literacy training.
- ○ Find out what other departments or faculties are doing (both non-medical and other medical schools).
- ○ Liaise with supportive outside bodies involved in promoting CAL.
- ○ Review courseware which may be of use in your curriculum.
- ○ Examine the feasibility of creating your own courseware.
- ○ Make plans to evaluate or monitor any activities you initiate.

WHO CAN PROVIDE HELP, ASSISTANCE, INSPIRATION?

Question: *'Are there any persons or national groups to whom I can turn for help?'*

Context: *'After I leave this conference today, where can I go for help? To whom can I turn? What support groups exist? What networks are available?'*

Answer: *'There are quite a few national groups which exist to promote and support CAL, some of which are specific to medicine and other healthcare professionals. Some of these are identified below.'*

- ○ Association for Learning Technology (ALT). Telephone: 0865 273273. Purpose of organisation: to promote good practice in the use and development of learning technologies in higher education. Publications: ALT-J (Society journal).
- ○ Association for the Study of Medical Education (ASME), University of Dundee, telephone: 0382 65235. This year ASME ran a course to familiarise staff with computer-based learning. (Check to see if they are planning to run future courses.)
- ○ City and East London Conferation (CELC), St Bartholomew's Hospital Medical College, Clinical Skills and Informatics. Contact: Jeannette Murphy (Medical Informatics Co-ordinator), telephone: 071 982 6104. Purpose of organisation: as part of our EHE initiative, we are building up resources relating to medical informatics,

including CAL. Work in progress includes creating databases and producing a directory (funded by the Society for Research in Higher Education (SRHE). The Medical Informatics Department has considerable expertise in designing CBL resources (leaflet of packages available on request).

- CTI Medicine, Bristol, telephone: 0272 303137. Purpose of organisation: to encourage and support the use of computers in medical education. Publications: occasional newsletter; guide to software and resources for CBL.

- Institutes of Computer-based Learning. Heriot Watt University, Edinburgh; Queen's University, Belfast, telephone: 0232 335051.

- Information Technology Training Initiative (ITTI). Contact: Mrs Jean Burgan, Committee of Vice Chancellors and Principals (CVCP) in Sheffield, telephone: 0742 725248. Purpose: this project does not deal with subject-specific courseware. The goal is to develop software and training materials. All their products are available at low cost. They are useful for staff development in helping staff improve their skills or learn to produce their own courseware.

- Teaching and Learning Technology Programme Groups (TLTP). In May 1992 the Universities Funding Council invited institutions to bid for funding to support projects to develop the integration of new technologies into the mainstream of teaching and learning in higher education. The sum of £22.5 million has been committed to the first set of successful proposals over three years, with a further sum of £3 million made available in the second round of bids. Of the 43 successful projects in the first round of bids, one is directly concerned with medical education. The Centre for Medical Education at Dundee is heading a consortium of six medical schools (Glasgow, Aberdeen, Edinburgh, Newcastle, Liverpool and Queen's Belfast) which has been given funding of £900,000 for a three-year project. The name of the project is *Technology-based learning in medicine: beyond courseware*. The aim of the project is to develop a transportable technology-based system of learning in medicine which will be fully integrated within the curriculum and will be used by students on a daily basis to guide their learning. The project director is Dr Joe Smyth, Centre for Medical Education, Ninewells Hospital and Medical School, Dundee DD1 9SY, telephone: 0382 60111 x 3433/2287.

There are three other TLTP projects which are of potential interest to researchers and academics in the field of medical informatics.

Life Sciences – *Problem-centred practical and tutorial courseware for the life sciences.* Lead institution: Queen Mary and Westfield College (Department of Physiology in the Faculty of Basic Medical Sciences). Project director: Dr Malcolm George, telephone: 071 982 6375.

Courseware for Medicine – Queen's University Belfast has received funding to develop CBL materials in the following areas: general practice, obstetrics, orthopaedics and pharmacy. Project director: Dr McBride, Director of the Institute of Computer-Based Learning. Telephone: 0232 239263. Useful contact: Dr Kieron McGlade, Senior Lecturer, General Practice, telephone: 0232 240884 x 261.

Pharmacy – the School of Pharmacy and Pharmacology, University of Bath is the leading institution on a project aimed at developing courseware to assist and improve undergraduate teaching in UK Schools of Pharmacy. Project manager: Keith Brown, telephone: 0225 826797.

The second round of projects to be funded were announced in August 1993. Less money was committed to medicine this time, but there are some exciting projects under way.

Interactive surgical teaching between remote centres: UCL, Dr Jameson together with Edinburgh, Manchester, Cambridge, Newcastle and Bristol. Linked to *SUPERJANET*.

Computer-assisted learning in the teaching of ionising radiation: University of Dundee (Aberdeen, Glasgow, Edinburgh, Liverpool and Newcastle).

Computer-based courseware for public health medicine (Dundee).

HOW MUCH WILL IT COST?

Context: *'It's all well and good to talk about the benefits of CAL, but how does one go about costing CBL? And once we know how much it costs, how do we go about identifying funding sources?'*

Answer: *'As you might expect, there is no simple answer to this question. So much depends on your starting point (how much has already been invested in building and infrastructure) and what you are seeking to achieve in what timescale. Consider the points below.'*

- Methods of costing CAL: the best, or rather the only, document I have come across which provides a method for deriving the costs attached to CBL is the 1992 Macfarlane report (see above). There is a chapter in the body of the report and an appendix which both deal with costing methods. The Macfarlane report identifies four main components in the costs of using CBL on a large scale:

  i) Infrastructure costs: the costs of purchasing and installing hardware and software, and of providing networks. The Nelson Report set a target of one workstation for every five students.

  ii) Academic staff costs.

  iii) Courseware.

  iv) Research and development.

- Funding sources: check out the groups and organisations listed in the previous section.

CASE STUDY 27

INTERACTIVE COMPACT DISC (CD-I) AND MULTIMEDIA FOR STUDENT-CENTRED LEARNING

J C E UNDERWOOD, D W K COTTON AND S S CROSS, SHEFFIELD

The increasing emphasis on student-centred learning has motivated development in audiovisual and computer-assisted learning in medical education.

Interactive compact disc (CD-I) technology, an example of interactive multimedia, is being developed for recreational and educational purposes. Advantages over other learning technologies are:

- compact discs have a relatively large capacity for high resolution digitally-encoded video and audio signals;
- programs have multibranching architecture;
- students have complete control over the pace at which they learn;
- versatile self-testing opportunities are provided for students;
- choice of languages for the text and commentary on each disc;
- full motion video can be included;
- portable players will be obtainable for portable use.

INTERACTIVE COMPACT DISC ON TUMOUR PATHOLOGY

To gain experience of authoring CD-I and to determine the interest of medical students and their teachers in interactive multimedia, a disc on tumour pathology was made in collaboration with Churchill Livingstone, Epic and Philips. Taking a chapter on tumours in a new pathology textbook as the starting point, a script was prepared including animation sequences and a commentary to the illustrations. A series of MCQs was included, as well as a glossary of terms used in the field of neoplasia.

The disc has been demonstrated to students and teachers in the University of Sheffield Medical School and at other venues. Students like controlling their pace of learning and having opportunities for interaction with the program, for example:

- the program can be paused so that a table of text or an illustration can be studied in more detail (unlike a paused videotape image, the paused CD-I image is of perfect quality);
- a section of the program can be replayed immediately (unlike videotape, the CD-I will skip within seconds to the precise start of the section);
- students can select immediately which parts of the program they wish to study (a videotape has to be 'fast-forwarded' to find the required point in the program);
- if a word is not understood, students have the option of referring to the glossary;
- multiple-choice questions are fully integrated and the CD-I gives feedback on student performance.

PROBLEMS, CONSTRAINTS AND SOLUTIONS

Interactive compact disc technology has much potential for student-centred learning in medical curricula, but few medical schools have CD-I players and very few discs are available currently to justify the investment in machines. It may become popular in educational environments without any other provision for CAL. Medical schools with substantial provision of powerful PC or Macintosh computers for students (for word processing, statistics, etc.) will probably deploy interactive media through CD-ROM.

Authoring multimedia programs is very labour intensive for medical teachers and competes with research for time and resources. A co-ordinated approach by publishers, the interactive media industry and universities would facilitate the more rapid introduction of CD-I and other multimedia into medical education.

CASE STUDY 28

USING CAL PROGRAMS IN PHYSIOLOGY

STEPHEN BARASI, CARDIFF

Over the last four years we have developed ten CAL packages within the Department of Physiology. These are used to complement lecture courses offered within the department and have been produced by the same staff who have given the lecture courses. The CAL courseware is available both in the department (on fourteen stand-alone PCs) and also on similar machines in the library.

ADVANTAGES OF IN-HOUSE SOFTWARE

Students can immediately link the programs to the material presented during the lecture course. The academic author can emphasise priorities and focus on difficult areas of the course. Student access is particularly high before examinations and the presence of incorporated self-assessment components enables students to monitor their own performance.

PROBLEMS AND CONSTRAINTS

How to encourage staff to produce CAL packages? Initially we were able to encourage staff to produce the academic content of the packages because encoding was done by a senior technician with support from a software expert in the department. This facility will be less readily available in the future and, as multimedia options come onto the market, it is unclear how new CAL packages will be produced.

Increasing competition for 'academic time' means that opportunities for producing more software may be limited. We recognise that existing programs are probably too didactic and do not incorporate sufficient problem-solving exercises.

SOLUTIONS

We decided to develop our own CAL courseware because four years ago we were unable to find commercial packages which were suited to the needs of our students. The situation does not appear to have changed significantly in recent years. Although there are many clinically-oriented packages available in North America, relatively few basic medical science programs appear to have been produced. We have little idea of how attractive our CAL packages are to others in the UK.

If there were some form of nationally agreed core course in basic medical sciences, it would not be difficult to develop, on a co-operative basis, a series of CAL packages which could be made available to all medical schools. We look forward to the products of the various TLTP consortia, perhaps as a first step in developing software which can be used in any medical school.

There are a number of listings of available CAL packages already existing (e.g. Resource Directory – CTI Centre for Biology, Directory of Educational Software – British Pharmacological Society). However, it is unclear how much enthusiasm there is for using teaching software developed by other departments. Some form of refereeing similar to that used for research papers may encourage wider use.

CASE STUDY 30

PROJECTS AS LEARNING OPPORTUNITIES IN MEDICAL INFORMATICS

ALAN McWILLIAMS, LIVERPOOL

The GMC (1993) has now formally accepted Medical Informatics (MI) as an 'essential' in the undergraduate medical curriculum. Although it has taken some time for the new subject to earn this level of acceptance, MI has in fact been taught to all first-year medical students at Liverpool in their first term since 1988.

The Liverpool MI course occupies a total of 30 hours curriculum time, but has developed considerably since its inception. Originally it had two components: practicals (20 hours) to develop computer skills; and lectures (10 hours) to promote development of concepts in areas as diverse as security, audit, knowledge and certainty. In 1988 there were 157 students and in 1993 there were 183.

PROJECT STRUCTURE

In 1990 we began testing the use of project work as a way of reducing lectures and deepening the insights obtained. Projects were then introduced fully in 1991, with the emphasis on mobilising students' learning energy in a stimulating context. Currently the practical:project:lecture split runs at 14:8:8. Within each of a set of areas, students create and manage their own project teams, set their own objectives and report achievements.

Altogether 27 staff are involved, to varying extents. Each topic is supported by a resource person, and six other members of staff act as tutors during both practicals and projects. All these staff operate on a 'grace and favour' basis and the course owes much to their generosity and dedication. If anyone considers implementing this project approach elsewhere, the management overhead involved in organising and maintaining this structure should not be underestimated.

Students are given guidance on project design, methodology and reporting, but they themselves are responsible for negotiating and mapping of students onto topics, setting up teams and defining objectives. Unlike much of the rest of an undergraduate course, they have to work within real-world constraints, approach people for appointments and negotiate.

PROJECT TOPICS

A list of the topics that will be made available is published at the start of the course and students are encouraged to gradually form a prioritised list of three topics on which they would like to work. About seven weeks into the course they are given the mechanism with which to resolve themselves down onto a single topic and the projects begin. The 1993 topic list spanned subjects as diverse as medical decision-making, use of CD-ROMs, urban deprivation and forensic pathology, but all have been selected as both offering fertile ground for using IT skills to investigate and report, and containing significant informatics issues.

BENEFITS

Student motivation for MI project work is spectacular, and their achievements are eloquent testimony. Amongst the visible benefits are:

- reinforcement of basic computer skills;
- in-depth exploration of informatics issues for at least one domain;
- development of study skills (e.g. literature search, report writing);
- experience of teamwork (e.g. task allocation);
- development of time management skills.

COSTS

On the hardware front, MI students have walk-in access to any of ten 30-seat PC laboratories around the campus, with one guaranteed two-hour session per week.

Education of this nature is enormously labour-intensive, for students and staff. Students sometimes have to be actually discouraged from spending too much time on their project! Resource persons and tutors struggle to set aside time to maintain their commitment, and management is a major undertaking. Even obtaining the 30 hours of curriculum time in the first place took almost two years. All these real costs are far too easily ignored, and this remains a considerable challenge for policy makers.

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CASE STUDY 29

STUDENT-CENTRED MULTIMEDIA PROJECTS IN PRECLINICAL MEDICINE

JAMES AITON, SUSAN WHITEN AND HANIA ALLEN, ST ANDREWS

OBJECTIVE

The objective of this project is to develop and implement an innovative approach to the study of histopathology, anatomy and physiology. Intercalating medical students work individually and in teams to collect and integrate data from a number of different sources to create computer-based multimedia tutorials which combine text, graphics, video, animations and high resolution colour images.

The project has been designed with three main educational outcomes in mind. Students will acquire:

i) factual knowledge as they assemble information for inclusion in their project;

ii) a broad range of transferable educational skills as they integrate and synthesise the material into tutorials. They will take a more active role in the teaching and learning process than is often the case in traditional preclinical education;

iii) a wide range of transferable technological skills.

BACKGROUND

Recent advances in computer technology allow us to capture, store and display high quality digital colour images (both still and video) on low-cost student workstations (Apple Macintosh LC range). This has encouraged us to modernise our approach to the teaching of physiology, histology and pathology. We are developing a number of modules which allow students to investigate topics in extensive, interactive, visual databases. They study in an environment which combines a simple text with high quality photomicrographs, annotated diagrams and animations. Student assessment is based upon an 'electronic' multimedia essay.

The use of computers in teaching allows us to:

- present physiology and histology in an integrated fashion by emphasising the structural and functional relationships of cells and tissues in the body systems and the dynamic changes which occur in health and disease;
- enhance the students' opportunity to see and understand the relevant microscopic detail, by eliminating the frustration and limitations of the student microscope and by making available explanatory diagrams or labelled photomicrographs to show the important features of each image;
- introduce a wider range of human material than would have been previously available in our histology classes (including video sequences of clinically relevant material, specialised histological stains, pathology specimens, gross anatomical specimens, graphs and explanatory diagrams);
- compare both abnormal and pathological material on the same monitor screen.

MacCycle and *MacGut* are the first of this series of interactive, multimedia tutorials which have been developed using *Hypercard* to teach the integrated histology and physiology of the menstrual cycle and the gastrointestinal tract. Student response to these innovations has been very favourable.

CAL PROJECTS FOR INTERCALATED MEDICAL STUDENTS

Students are using *MacCycle* and *MacGut* as working examples to develop new interactive teaching modules in a similar style in order to integrate basic preclinical sciences into clinically relevant topics. Typical projects include the clinical significance of tuberculosis, arthritis, breast cancer, malignant melanoma and endoscopy.

We have enlisted the help of staff who individually supervise the projects. Some supervisors are from within the department and some are clinical contacts at Ninewells Hospital, Dundee and the Victoria Hospital, Kirkcaldy. During the first term, students are trained in the use of the relevant technological skills by an expert in computing and during the second term they will select and capture relevant images and assemble the multimedia package. In this way they will learn to integrate and synthesise a number of information modalities into a coherent tutorial. This type of task plays an important part in the acquisition of a deep understanding of a subject area and in development of observational skills. One benefit of this approach is that students begin to grasp the importance of learning how to teach their peers, a skill which will be invaluable as they assume more senior positions in their careers and become responsible for teaching junior staff.

ASSESSMENT

The assessment of the projects will be a component of the final honours degree mark (17 per cent of the total) and is based on strictly defined criteria. Students are expected to:

- research, organise and integrate material from the basic sciences;
- produce a self-contained educational package aimed at third-year medical student level;
- work efficiently to stated objectives, key milestones and deadlines.

We will assess the projects in the following ways.

- Content is assessed by the supervisor in terms of organisation, relevance and emphasis.
- Technology skills, that is, relevant use of techniques.
- Peer review by a third-year student and an independent member of staff.
- Oral presentation of the project to the class.

CONCLUSION

This project has provided an exciting environment within which medical students have been encouraged to accept a greater responsibility for their own education. They welcome this unique opportunity for a creative approach to their preclinical education.

We are grateful to the Scottish Higher Education Funding Council who provided financial support from their *Flexibility in Course Provision* initiative.

e) ASSESSMENT

CASE STUDY 31

RECENT TRENDS IN ASSESSMENT

BRIAN JOLLY, CELC

PURPOSES OF ASSESSMENT

1. Measuring academic achievement.

2. Diagnosing student problems.

3. Establishing improvements in performance.

4. Showing effectiveness of the curriculum.

5. Introducing curriculum reform.

6. Identifying teacher accomplishments.

7. Self-evaluating performance

The two purposes in which most people are interested when attempting some kind of assessment are measuring academic achievement and establishing improvements in performance (1 and 3 above). Many people pay lip service to diagnosing student problems (2 above), but it is not always done effectively.

The main task is to decide some aspect of performance and choose a method to measure it effectively. The problem in assessment is how to measure medical students by comparing against a standard when the measures are not very reliable.

MATCHING OBJECTIVES, TEACHING AND ASSESSMENT

In an ideal situation, there are a series of objectives for the curriculum or course, a series of carefully matched teaching activities and a series of carefully designed, matching assessments. However, what usually happens is that there are some objectives which have adequate teaching methods and assessments, others which are inadequately assessed and others which seem not to be assessed at all. There are also some things which are not taught very well or not taught at all and which do not appear in the objectives (known as the hidden curriculum). It is difficult to find concrete examples of the last case in the undergraduate curriculum, but in postgraduate medicine it is common: for example, examinations of the Royal College of Physicians have no curriculum and no objectives, there is just the assessment.

An effective assessment should have two basic characteristics:

- Reliability, that is, it should give consistent results.
- Validity, that is, it should actually measure what it is supposed to measure.

RELIABILITY

There are three aspects of reliability:

i) Internal reliability – is the test consistent within itself?

ii) Marker reliability

iii) Repeatability

Most of the reliabilities which have been reported in the literature for the assessment of clinical competence deal with internal and marker reliability. These studies show that, in general, markers do agree about the things they look at. In fact they agree more than might be expected given the chance attributes which occur in most clinical or knowledge examinations. Internally, tests usually agree with themselves, e.g. MCQs are usually reliable if one looks at the correlations between the various items.

There is little research on repeatability because no-one has done a study in which students had to take a final examination twice to see if they passed or failed both times. Although an extrapolation could be made from re-sits, the results would only apply to that small group of students who failed the first time as those who had passed would not be re-examined.

Reliability is usually only affected by two factors: the length of the test and the test method that is chosen. The longer the test, the more reliable it is, that is, the more consistent and accurate the measurement. The problem is that the length of test which, according to the literature, is needed to make good decisions about people tends to be much longer than the tests that are currently used, especially in relation to the assessment of clinical competence.

Various ways of making tests longer without having to do it all in one day are currently being investigated. Examples are multiple hurdles, adaptive testing (not discussed here because it is rather complex) and sequential testing. Multiple hurdles involves getting students to do something which they have to pass in order to do something later on (quite a common approach). Sequential testing refers to giving a broad spectrum test and separating out the people at the very top (for example,the top one third) and testing the remainder more rigorously. The rationale behind this is that people who score very highly on one test are almost certainly going to score highly in the others.

VALIDITY

There are four aspects of validity:

i) Content or face validity – does the test actually test the objectives?

ii) Construct validity – does the test correlate highly with a gold standard test?

iii) Criterion validity – can you predict using the test's results? Since tests are used to make decisions, there ought to be a correlation between the assessment score and what it is meant to predict (e.g. final examination marks should predict performance as a house officer).

iv) Constraints on learning – what does the test do to students when they are preparing for it? This aspect is becoming more important and has been recognised in the literature as a central aspect of validity (rather than an aspect of test construction outside the issue of validity), so that validity now has four components rather than the traditional three. There are several published studies which show that the way people are assessed will direct the way that they learn and can lead to detrimental effects.

In general, construct and criterion validity are rarely investigated. We are only now developing blueprinting matrix techniques for looking at tests and seeing whether they do sample the objectives of a particular course. If there is no content validity (i.e. the test is not related to the course objectives) then the test is not really valid, irrespective of what happens in relation to construct or criterion validity.

THE LONG CASE AND OSCE

Until recently, the typical clinical examination in most British-style medical schools was a long case, a few short cases and a theory *viva*. The long case has high apparent content validity in that it seems to be doing what is required of an examination of clinical competence. It seems to be able to sample certain examples of clinical competence in great breadth and depth and it attempts to measure aspects of competence not tackled by other measures, i.e. it is looking at on-the-job clinical encounters between potential doctors and patients.

The problems are that it has low reliability and there are candidate-related factors because there is no direct observation of the interaction between the student and the patient. It is also quite costly and difficult to mount.

People have tried to change the long case into a more structured examination, the Objective Structured Clinical Examination (OSCE), in which there are the same content and same criteria and the same examiners for all candidates.

A summary of recent research into the reliability of OSCEs indicates that, across all the studies which have been done, the following statements are generally true.

- If there are less than 15 stations the results are unreliable. More than 20 stations are needed for reliable results.
- Checklists generally have high reliability and rating scales have low reliability.
- Irrespective of the type of scoring, if there are less than 15-20 items per station, reliability is relatively high; if there are more than 20 items reliability is low.
- There is high reliability when rating of students is by medical examiners or patients; reliability is lower when trained others are used to do the examining.
- Test security is not important – it does not matter if students know what is in the OSCE before taking it.
- The weighting of the items within a particular station is not important.

However, in relation to the type of scoring, there have been a couple of recent studies that suggest that the effect of using checklists on student behaviour is to make them memorise the rating scale and try to internalise the list of things which they need to reproduce in the station. A solution is to use a small part of the rating scale for overall impression along with a checklist of things the student has to do.

WAYS OF COMPARING STUDENTS

Norm-referenced testing yields a rank order of candidates based on a distribution of scores (for example, the old eleven plus examination; the Test Match).

Criterion-referenced testing provides an indication of the candidate's performance against a series of objectives or criteria (for example, the driving test; height requirement for entry into the police force).

Since the important question is, can doctors do specific things, not how much better is one doctor against another, people are trying to move away from norm-referenced towards criterion-referenced testing. However, criterion-referenced tests generally require more testing time – it is easier to say that A is taller than B than to measure how tall A and B actually are. (For criterion-referenced tests it is necessary to know what the units of measurement are, as well as how many units the candidate has scored.)

TEST METHODS

In order of increasing validity to the clinical situation:

- essays;
- short answers (including modified essays, *key features*);
- objective items (including MCQs, *extended matching items*);
- paper simulations;
- computer simulations;
- mannequin simulations;
- patient simulations/patient instructors;
- oral;
- direct observation (ratings and checklists);
- audit;
- outcome measures.

Key features is a concept which has been developed by the Canadian Medical Council for their final comprehensive assessment of clinical competence at the undergraduate level. Using a short answer/MCQ format, they take a case or issue and select from it the fundamental things that they would expect a reasonably competent graduate to do or know and then focus the case on those things. Much work on key features will be published soon.

Extended matching items have been introduced by the National Board of Medical Examiners in the USA. They are like MCQs, but quicker to write, the choices are wider and the cases more clinically oriented.

There is much talk currently in North America about using audit and outcome measures as assessment tools and they are likely to be increasingly important.

CHOOSING AN EXAMINATION METHOD

1. Define the tasks that students are expected to be able to do and ignore 'competency' (i.e. do not worry about trying to define or evolve a hidden trait called competency).

2. Select tasks with the highest fidelity to the real situation that students will be operating in.

3. Let the task dictate the method (choose the method of assessment which is most closely aligned to the tasks, rather than fitting the things that students should be able to do into existing methods).

4. Select a suitable method and attempt efficiency within that method.

5. Combine methods into a battery (there are very few situations where one can match aims and objectives with a single test).

6. Attend to the content of the examination and its translation into scores.

7. Verify the educational consequences and acceptability of the method (i.e. what the students are doing to prepare for the test which you have given them).

Finally, in contrast to the way many people are developing assessment procedures and looking at the time, resources and measurement characteristics together, it is much more efficient to use one examiner per student and have the student go through two cases or situations with two separate examiners than it is to use two examiners to examine the same student. That is, it is better to spread out the variability of examiners in order to increase the breadth of experience the students are getting with the test, because in general the unreliability of tests comes not from examiners or test methods, but from case content (content specificity), which is the most important variable.

IMPROVING CLINICAL EXAMINATIONS

1. Restrict the range to aspects of competence not measured more objectively by other methods.

2. Standardise the interaction.

3. Directly observe the long case.

4. Increase the number of cases.

5. Standardise the cases (simulated, standardised, selected).

6. Reduce examiner bias (by training and selection).

7. Move the clinical examination into ward or practice setting.

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CASE STUDY 32

TOWARDS COMPETENCE-BASED ASSESSMENT

TIM USHERWOOD, MAGGIE CHALLIS AND HELEN JOESBURY, SHEFFIELD

INTRODUCTION

In 1990, the Department of General Practice at Sheffield University introduced a six-week module in general practice and public health medicine for final-year students. Students spend three days a week on attachment to local practices and one day a week working in small groups. Originally, the small group work was problem-based, building on the McMaster model (Usherwood *et al*, 1991). Over time it has evolved to a process of reflection on and discussion of practice attachments, with identification of issues that arise and presentations by students about these issues. Other activities in which the students engage during the module include facilitated discussion in small groups of tape-recorded interviews with patients seen during their practice attachments (Usherwood, 1993) and a clinical audit project undertaken during their second attachment.

Initially, summative assessment of students completing the module was based on a number of grid-style criterion-referenced profiles (Usherwood and Hannay, 1992). It was intended that students' scores on these profiles would be determined by a process of negotiation between individual students and their tutors. However, for various reasons we became increasingly unhappy about both this process of summative assessment and the criteria which were intended to reference it. We therefore set about revising our assessment methodology with the aim of identifying the major learning outcomes of the module and of devising appropriate assessment methods in the light of the emerging national model of competence-based assessment (NCVQ, 1992).

REVISING THE ASSESSMENT METHODOLOGY

The revision of our assessment methodology was driven by two fundamental questions.

1. What are students expected to know and to be able to do by the end of the module?

2. How can we find out whether they have achieved this?

The first question requires identification of the desired learning outcomes of the module. Surveys by structured interviews and self-administered questionnaires of departmental and practice-based tutors generated a long list of outcomes that were being sought by tutors and/or were being either informally or formally assessed. These outcomes fell broadly into two categories: personal skills and knowledge; and skills and knowledge specific to general practice.

Following a series of workshops with tutors, we were able to write a statement of expected student achievement (SESA): the module aims to give students the opportunity to develop skills and knowledge that will enable them to:

- identify, assess and manage patients' physical and psychological problems within their social context;
- work appropriately with others, both professional and lay carers, within the current context of general practice;

- enhance their personal skills in the fields of clinical care, communication, self-directed learning and medical audit.

In seeking an answer to the second question, we worked through the list of learning outcomes and decided which items were to form part of the summative assessment. A range of appropriate assessment methods was then considered. In appraising the various options, workshop members were informed by their own experiences, by the results of the surveys of tutors and also by the findings of a small survey of students who were asked to comment on the original assessment process (Challis *et al*, 1993). It was finally agreed by both departmental and practice-based tutors that assessment should take place on the basis of a portfolio of evidence of learning. This portfolio consists of four items.

1. Practice attachment performance sheets which take the form of a checklist of activities to be undertaken by students, each activity being accompanied by a brief description of what competent performance would look like. There is also room on the sheets for practice-based tutors to comment on students' particular strengths and areas where further development is needed.

2. The small-group tutor's assessment form, which is similar to those above, relating to the students' participation in the cycle of learning.

3. A short assignment requiring students to make short notes on one of three topics: a home visit to a patient, a comparison of the two practice placements or a critical incident analysis. Whichever topic is chosen, the student is required to address four specified aspects and compliance with this instruction represents a pass performance.

4. A medical audit project and a taped interview with the patient. These are still being assessed using a grid-style, criterion-referenced profile. However, we are currently engaged in seeking answers to our second fundamental question in relation to students' clinical audit skills and patient interview skills. The intention is to revise our summative assessment of these areas of learning at the start of the next academic year.

COMMENT AND THE FUTURE

Although our work has been informed by the national model of competence (NCVQ, 1992), it has not been constrained by it. Moreover, we would not claim that we have developed a perfect, or even optimal, methodology for the summative assessment of our students' learning. Indeed, we are surveying both students and tutors to obtain their comments on our revised instruments and methods. However, we do feel that our revised assessment methodology is an improvement on its predecessor on a number of relevant criteria (Bartram, 1992). In addition, we feel that the whole process of revision and evaluation of the changes (with an expectation of further revision) has challenged us to discuss and to think quizzically about many aspects of our interactions with our students.

The work described here was funded by the Department of Employment. Any opinions expressed, however, are entirely those of the authors.

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CASE STUDY 33

CLINICAL AND COMMUNICATION SKILLS WORKBOOK ASSIGNMENT

ANNIE CUSHING AND TAMARA JOFFE, CELC

The new curriculum at CELC aims not only to develop knowledge and skills needed for medical practice but also to foster an approach to lifelong learning, development of skills in self-reflection and self-critique with awareness of strengths, weaknesses and learning needs.

DESCRIPTION OF THE WORKBOOK ASSIGNMENT

During the first clinical year, students undertake an integrated eight-week course in clinical and communication skills, ethics and law, sociology, and sociology applied to medicine. At the end of the term they have to submit a Workbook Assignment report on a patient in which they must demonstrate an understanding and ability to apply all the above subjects to a patient's case. The task entails audiotaping an interview with a patient and writing up a report which includes six sections.

i) An analysis of the communication process involved in obtaining the history.

ii) The medical history.

iii) Examination findings and initial assessment.

iv) Discussion of the psychosocial aspects.

v) Discussion of the ethical and legal aspects.

vi) Discussion of the nursing and paramedical care of the patient.

The interview critique relates to a section of the interview, 5–10 minutes in length, that the student has selected on the basis of its particular interest from the communication skills perspective. They transcribe this part, analyse it and submit the tape for verification. In commenting on things they did well and areas for improvement, they support such statements by illustrating with verbatim extracts from the interview and suggest worded questions or responses that they could have made for improvement. The key feature of the assessment in this section is that it is based on students' skills of self-reflection and the ability to appraise the communication process, discuss difficulties or constraints, and propose ideas for improvement.

Self-reflection is also in the examination findings section where students must include discussion of difficulties or ease in approaching and examining the patient.

Another feature of this Workbook Assignment is that it gives students the opportunity to put into practice two important issues from their ethics and law course: obtaining consent (for audiotaping) and maintaining confidentiality.

STAFF VIEWS

The first cohort of 240 students completed this task in December 1992. Initial staff concern over the feasibility of this task was replaced by considerable enthusiasm for it as a means of assessing students and determining whether objectives for the course were being met. Collaboration between clinical and other subject tutors has been good and helped to promote greater understanding of the contribution of different subject areas to a holistic approach to patient care. The amount of time to assess each report is considerable, requiring as it does four examiners to mark different sections and the need to listen to the tapes.

STUDENT VIEWS

Questionnaires to gather students' views on this method of assessment as an appropriate test of their skills and knowledge showed, overall, a very favourable reaction. It was rated by 35 per cent as effective or very effective as a means of assessment, while 16 per cent considered it as ineffective or very ineffective.

'Students thought the assignment challenging in a number of different ways. On a technical level, organising the taping of an interview on a hospital ward involved ensuring the patient understood and was happy to be taped beforehand, then making sure the recorder was actually working – all this when history taking is still a new skill, itself demanding great concentration.'

'Transcribing a section of the tape was laborious and in some cases there wasn't a lot to say about all the sections to be covered (ethical, psychosocial, etc.). Assessing your communication skills on paper seemed contrived.'

'Despite these difficulties, working on the assignment was both illuminating and fun. Many patients enjoyed the attention of being taped, while most of us forgot about the recording as we became involved in the patient's story. Listening back to the tape was revealing because you could focus on your verbal communication technique and assess where you could improve and where you did well.'

'Overall, the process encouraged us to think critically about our relationship with patients and promoted a more holistic attitude. As an early clinical experience it will probably make better doctors of us in the future.'

THE FUTURE

This Assignment will continue as an assessment of the first clinical term students. They must pass before being allowed to enter the examinations for Parts 5–10 of MBBS. Amendments have been introduced to the Workbook this year to include the criteria and marking system used by examiners for each section, so that these are made explicit to the students. Additional tape recorders and administrative changes should resolve some of the practical problems.

While there are no plans as yet to extend its application within the clinical course, it does offer a mechanism for the continuation of reflective learning and for addressing the recommended strands of communication skills, ethics and law, and behavioural sciences, as recommended by the GMC.

CASE STUDY 34

PEER ASSESSMENT OF PRESENTATION SKILLS

DAVID TAYLOR, LIVERPOOL

In 1990, the physiological laboratory at Liverpool University radically changed its approach to class practicals, largely in response to a considerable increase in student numbers. We had originally allowed the students to follow a rather traditional practical course in which they were required to follow established procedures and submit written laboratory reports. We developed the course to allow the students more initiative in the design, execution and presentation of their experiments. This necessitated a more flexible approach to laboratory time and the introduction of small group work (Taylor and Moore, 1993)

Because of our desire to comply with the aims of the EHE Initiative to improve students' communication skills, we decided that the practical component of the course should be assessed by determining the group's ability to prepare a poster in which they were to detail the rationale behind the work that they performed and discuss their findings. This had the major benefit that neither students nor demonstrators were obliged to spend large amounts of time preparing or marking laboratory reports which were usually both stereotypical and time consuming. It also freed the students from the constraints of predetermined experimental procedures and obliged them to think more carefully about their experimental design.

STAFF ASSESSMENT OF POSTERS

Our initial method for assessing the posters was for a demonstrator to give each group a mark based in equal measure on the scientific data presented and the conclusions reached, the presentation of the poster, and the performance of the group in responding to a '*mini-viva*' based on the poster. This method was most enjoyable and stimulating for the staff but required quite a lot of staff/demonstrator time. Each poster took between 10 and 15 minutes to assess, and there might be 30 groups in any practical class.

TOWARDS PEER ASSESSMENT

Over the last two years we have been moving towards a system of peer assessment. In the interim period each poster was assessed by students from another group, chosen at random by demonstrator staff. They had the task of assessing the poster according to a series of predetermined criteria and giving the poster a mark. The mark was recorded, along with the names of the student markers. The demonstrator staff then roamed around the laboratory checking for consistency between the markers and arbitrating in cases of disputed marks.

PROBLEMS AND SOLUTIONS

The consistency of marking between students, and between student and staff marks, was very good for life science students. We did observe a problem with students of the professions allied to medicine, since weaker students tend to give higher marks and stronger students lower marks. Our initial feelings were that this reflected the greater heterogeneity in the student group.

One possibility would be for us to return to the scheme of all posters being marked by the demonstrator staff. We wish to avoid this, partly on grounds of time, and partly because we believe that the responsibility for the marking should devolve onto the students as part of their educational development.

What we are going to try to do, and have already started, is to give a more precise list of marking criteria, based on the benchmarks which are laid down for distinguishing between degree classifications. We will continue to oversee and arbitrate for the time being.

We have also included a compulsory practical-based essay question on the examination paper and we are collating the marks obtained in this question with the marks obtained by the students in their poster presentations and with their overall examination result.

Reference

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CASE STUDY 35

ANONYMOUS MARKING AND 'QUALITY CONTROL' SCRIPTS

M B DUTIA AND IAN NIMMO, EDINBURGH

This summary outlines a procedure for allowing a large number of examination anwers to be marked anonymously; it does not discuss the pros and cons of anonymous marking. The summary also describes our initial experience with inserting 'quality control' scripts among the students' ones.

PROCEDURE FOR ALLOWING ANONYMOUS MARKING

The key feature of the procedure is to label a student's script books with a bar code and then after the scripts have been marked, to decode his or her identity using a bar-code reader. The process is controlled by a computer program called *Barmark*.

Each student taking a particular examination is issued with a set of sticky labels. Each label contains the student's matriculation number printed as a bar-code and the last five digits are also printed in plain text. The first two digits which indicate when the student joined the university are starred out to preserve anonymity. The first label in the set carries the student's name while the others do not: its function is to enable the student to identify his or her set of labels. Subsequently the student fixes one anonymous label to each script book that is handed in for marking. After the books have been marked and sorted by candidate (using the serial class enrolment number), their bar-coded labels are scanned using a hand-held reader and the *Barmark* program identifies the student from a class list located in a disk file. The marks awarded are typed in from the keyboard or scanned in from a printed sheet of bar-codes representing the integers from 1 to 100.

Barmark ultimately produces a text file containing the candidates names, matriculation numbers and marks awarded. The text file can then be imported into a commercial spreadsheet package for further processing.

The procedure involves some costs. Printing the labels on a dot-matrix printer has been time consuming (approximately 700 labels per hour) but inexpensive (each student's label supply costs less than two pence). The bar-code reader costs about £350. We are developing a more efficient method of producing the labels cheaply on a laser printer.

The *Barmark* program is available from M B Dutia on request. A more detailed account of it is given in Dutia (1993).

'QUALITY CONTROL' SCRIPTS

The introduction of anonymous marking enables the person in charge of the examination to insert 'quality control' scripts among the genuine answers and have them all marked together. One simply needs to generate the desired number (say two to three) of dummy matriculation numbers and the corresponding quality control answers written out in genuine script books by trusted individuals not involved in marking the examination.

To date we have written what were meant to be 'borderline' answers to find out how the markers' perceptions compared with the course organiser's (double marking is often difficult for logistical reasons). We have not yet had answers from external examiners but the option is open to them. We have also checked markers' reproducibility by giving different quality control 'candidates' identical answers. A third aim has been to confirm the accuracy of the overall system for coding the candidates, entering their marks and eventually decoding them.

Obviously the process involves extra work, particularly for the person constructing the quality control answers. Fortunately it has not yet thrown up any anomalies: the borderline 'candidates' were awarded borderline marks, the reproducibility was excellent and no errors in accuracy have been detected.

Reference

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CASE STUDY 36

TESTING PRACTICAL CLINICAL SKILLS IN PAEDIATRICS

DAVID DAVIES, CARDIFF

Student assessment is often described as the 'tail that wags the dog' of medical education and, whether we like it or not, it is seen as one of the single strongest determinants of what students actually learn. It is therefore a powerful tool for manipulating the whole education process. No single examination method can be expected to assess the wide range of attributes thought to be required in a 'good doctor', namely knowledge, skills and attitudes. A range of methods is therefore required.

CURRENT ASSESSMENT METHODS

In our paediatric block attachments, our students are currently tested on knowledge with an MCQ, clinical reasoning with data interpretation, slide questions and their course commentaries. Clinical attitudes and ability to take a long case history are evaluated with a consultant mark. The ability to elicit physical signs and attitudes to children and parents, are tested by short case examination. However, it was perceived that these methods of assessment do not fully test the students' grasp of practical skills needed in paediatric practice which are clearly defined in our teaching handbook.

A NEW ADDITION

Objective-structured clinical examination (OSCE) is a method of assessment that provides a more standardised way of assessing clinical competence. Using this same principle, we have developed an objective-structured assessment of practical skills which requires minimal resources. Sixteen tasks have so far been evaluated over a period of one year:

* Peak flow assessment
* Making up infant feeds
* Lumbar puncture technique
* Measurement of height
* Prescription writing
* Hip examination
* Immunisation requirements
* Asthma inhaler technique
* Urine analysis
* Measurement of temperature
* Oral rehydration therapy
* BM stix blood glucose
* Squint assessment
* Blood pressure measurement
* Measurement of occipito-frontal head circumference
* Performing a hearing distraction test

COMMENT

The system has proved practical to run at the end of each clinical short case examination and can be adequately supervised by SHOs and registrars with minimal explanation. We plan to continue to add to the list of practical procedures. It is so far our subjective opinion that, during their attachment, students are more likely to make themselves aware of practical skills needed since the introduction of this means of assessment.

CASE STUDY 37

ASSESSMENT OF A BEHAVIOURAL SCIENCES COURSE

DAVID MAY, DUNDEE

DESCRIPTION OF THE COURSE

The course takes place every Friday in the Spring and Summer terms of the second year, making a total of 17 full teaching days. For approximately 140 students there are two 'dedicated' full-time lecturers plus some occasional and limited support for seminar work. The course comprises the two separate but related disciplines, of medical sociology (Department of Psychiatry) and health psychology (Department of Epidemiology and Public Health). Together they make up a 'core programme' of whole class, lecture-based sessions which occupies all 17 Friday mornings. Afternoons are given over to a seminar programme (with students organised into groups of about 20) which focuses on doctor-patient relationships and communication/social skills within the context of living with, and caring for, long-term illness or disability. This programme involves students spending some time doing observation and practical work in various hospital and community facilities as well as interviewing patients in their own homes.

ASSESSMENT

The course forms part of the 2nd MB professional examination along with Pathology and Clinical Pharmacology. Assessment consists of two separate, unseen, written papers in medical sociology and health psychology respectively, each of one and a half hours in duration, together with two term papers (case studies/reports) each of 1500–2000 words in length related to students' seminar work.

In recent years we have introduced two minor innovations to the assessment of the medical sociology component.

1. Innovations in the structure of assessment

For the 1992–3 session, the emphasis in the medical sociology assessment was switched to include a large continuous assessment component. Each of the eight teaching sessions was concluded with a short (roughly 30 minutes in duration) in-class test relating to the material covered that morning. Students could use their best five in-class test marks to contribute up to 50 per cent to their overall medical sociology mark, the other 50 per cent being contributed by the end of course unseen examination. Students who completed less than five in-course tests were assessed on the basis of the end of course examination alone, as in the past.

This assessment scheme proved extremely popular with students: in an end of course evaluation, 95 per cent of students said that they approved of the revised assessment procedures, with 80 per cent 'strongly approving'. But, perhaps more importantly, this new procedure had the following consequences.

- It dramatically improved class attendance, averaging 88 per cent of the year over the eight sessions of the course (up from between 33 per cent and 50 per cent in previous years). All but one student attended a minimum of five sessions and over 40 per cent attended all eight.
- It significantly decreased failure rates. Only two students failed the medical sociology component of the course in 1993 at the June diet, compared with 40 students failing health psychology and nine medical sociology failures in the previous year. (Note that, following the September re-sit diet, only two students had still not passed in health psychology and one in medical sociology).
- Freed from the constraints of the examination hall, it was possible to experiment with more imaginative forms of assessment, including use of tape extracts and video material.

2. Innovations in the content of assessment

So far as the end of course examination is concerned, we have moved away from the traditional essay question format, which tends to assign undue importance to literary ability as opposed to understanding, in favour of a more problem-solving approach. This has proved to be a much more discriminating instrument, as well as a means of reinforcing learning rather than just testing knowledge. There are, however, limits to the extent to which we can develop this approach within the confines of the traditional, written professional examination that still dominates the preclinical years.

CONSTRAINTS

The scope for innovation in assessment is very much limited by:

- the structure, organisation and resourcing of the course;
- our present need to handle large numbers of students at any one time;
- the prevailing culture of the medical school, especially in the preclinical years, where student behaviour is very much examination driven and the status of courses is in part a function of the demands they make on students.

CHAPTER 4: Problems and solutions

CHALLENGES IN INNOVATIVE LEARNING AND ASSESSMENT

Discussion groups at the conference considered problems and solutions in relation to four aspects of innovative learning and assessment: self-directed learning, computer-assisted learning, assessment (of competence) and evaluation. Some of the major issues arising out of these discussions are summarised below, before a consideration of the broader issues relating to the introduction, support and adoption of innovations is presented.

1. Self-directed learning (SDL)

In their 1993 recommendations, the GMC optimistically state: 'Medical schools are well aware of the merits of the learner-centred and problem-oriented approaches and are striving towards their adoption, moves which are strongly encouraged. Most are reducing their reliance on the didactic lecture format and are promoting small group learning wherever possible.' Unfortunately, the reality is that moves towards student-centred learning, and the natural consequence of that, SDL, are patchy and fraught with difficulties of both philosophical and practical kinds. Some of the major problems and possible solutions which have been identified are summarised below.

Problems

- Despite the GMC's statement, there are many staff who remain unconvinced of the benefits of a student-centred approach to learning, or who pay lip service to the concept but are unwilling or unable to change their style of teaching accordingly. Medical education has long been a lecture-based culture and many teachers have never experienced any other type of formal education. Since few have received training in educational techniques, they rely on what they have learned in the course of their own education and what they have 'picked up on the job', neither of which may be appropriate preparation for the new philosophy. There is still an attitude of mind in which staff consider that their role as teacher is to 'cover the topic' on behalf of their students.
- Many students too are discomfited by changes in the education system which place more of the responsibility on them. They expect lectures and an emphasis on factual content. Problems can occur if SDL occurs as an island in an otherwise didactically taught, traditional curriculum (see Case Study 19). Students naturally become confused if most teachers expect them to sit passively in lectures while a few require them to be active learners. Teachers sometimes report problems with student motivation.
- The high student numbers in most medical schools present difficulties in implementing student-focused learning and small group teaching. Shortage of rooms and shortage of tutors may be inhibiting factors.
- SDL requires that students have access to resources for learning, particularly adequate library and computing facilities. There may also be a need for the preparation of self-study materials or computer programs, which require time, expertise and funding.

Possible solutions

- Staff development is needed in relation to SDL so that those involved can understand why it is desirable, what the implications are for the way in which the curriculum is designed and how their role will change from 'teacher' to 'facilitator of learning'. Many teachers have problems, in terms of both theory and practice, with the idea of giving over some control to students – a necessary prerequisite for SDL. Teachers should be provided with opportunities to discuss their concerns, to see examples of successful initiatives, to read the research literature and to be supported when they try out new methods (see, for example, Case Studies 11 and 12).

- Students should be supported in their SDL, especially in the early stages of their undergraduate course. They should be actively helped to develop independent study skills as part of the curriculum. (Case Study 3 gives an example of a course in which learning is addressed as a specific skill which needs to be developed.) Consideration should also be given to groupwork as well as individual student-centred learning as a way of increasing motivation and support.

- SDL requires clear objectives so that the students know what is expected of them, and that these objectives are shared with the students by the staff. Ideally, students should have some opportunities to set their own objectives, perhaps in negotiation with their teachers in the form of learning contracts, to ensure that both the needs of the students and the requirements of the curriculum/teachers are met (see, for example, Case Study 21).

- There is a need to make the best use of all the different educational methods which are available – lectures, tutorials, SDL, CAL, etc. in relation to the objectives of the curriculum. Research has now reached a stage where it can be used to indicate which particular combination of teaching methods and assessment procedures is most likely to achieve the learning outcomes required on a particular course (Entwistle, 1992). Teachers should be selected according to their strengths, for example as lecturers or small group tutors.

- Research evidence shows that it is not necessary to have 'expert' tutors for SDL tutorials and that, in fact, subject experts may not be the best tutors because they tend to dominate discussions (Silver and Wilkerson, 1991). The anxiety of tutors in facilitating groups studying outside their area of expertise can be allayed by briefing meetings, the preparation of tutor's guides, and by staff development aimed at reassuring tutors that they do not need to be able to answer all the students' questions and that admission of ignorance can be a strength.

- The cost of preparing resources for SDL (study packs, CAL, etc.) could be reduced if schools were to collaborate in their preparation, use and evaluation.

- SDL must be supported by the assessment system (see discussion below) and not fall outside it, as Case Study 11 demonstrates.

2. Computer-assisted learning (CAL)

In their 1993 recommendations, the GMC state: 'The new technology now applied to education has substantially increased the scope for self-directed learning. Many imaginative and highly successful programs have been developed in a variety of forms. Their preparation is, of course, demanding of resources, particularly of staff time, and a consortium approach to the development and distribution of educational packages is to be encouraged.'

Problems

- There is a still a feeling that CAL is just an expensive toy. Staff rightly want to know what is the evidence that using CAL is cost effective.
- Many staff are unfamiliar with CAL and its potential as a tool for learning. Some students are also unfamiliar, but with the increasing use of computers in schools and homes, for both study and pleasure, this is less likely these days.
- As noted by the GMC, CAL is expensive to produce. People are often suspicious of packages produced elsewhere and would prefer to produce their own if possible. Many are unfamiliar with what is already available.

Possible solutions

- The use of computer technology and information management skills are becoming increasingly important in the practice of medicine, and their inclusion in the undergraduate curriculum cannot be ignored for much longer. American medical schools have already made considerable advances in: i) providing a facility where students have access to computers; ii) using computer technologies such as interactive videodisc instruction and CAL in required courses (Association of American Medical Colleges, 1992).
- Staff need to be given opportunities to learn about computer technologies and ways in which computers can be used to enhance their students' education. Case Study 26 provides a useful introduction for those whose knowledge of the subject is hazy. Medical schools should establish some organisational structure, for example a Teaching Technology sub-committee (Case Study 2), to promote the use of computers in education.
- It is necessary to promote the sharing of resources through consortia to develop and evaluate CAL packages. Initiatives such as TLTP are important, but all medical schools must be able to reap the benefits of their work. Consortia of medical schools that share computer programs should continue to be encouraged and funded.

3. Assessment

The GMC note that their recommendations have major implications for the assessment of students: 'The aim of correcting curriculum overload by the introduction of the core and special study module concept would be wholly frustrated if the present examination system were to continue. Its demands are such that, to a large extent, it determines the learning habits of students and sets their priorities. They are reluctant to afford time to explore areas in which they will not be examined. Moreover, papers in the multiple choice format tend to put an emphasis on the acquisition of facts at the expense of reasoning and the attainment of the educational goals we have highlighted. It is essential that assessment systems adequately test the achievement of these goals and that they reflect the integrated nature of the curriculum.'

Problems

- There is much research evidence to show that assessment drives learning and that many current assessment practices have detrimental effects on students before, during and after the assessment has taken place (Newble *et al*, 1994).

- As noted above, assessment frequently does not match the objectives of the course. Even when designed appropriately, testing methods tend to be concentrated on factual knowledge or basic clinical skills and rarely address equally important issues like problem-solving or attitudinal objectives.
- Barriers to changing the assessment systems include ignorance, university regulations and the attitudes of external examiners.

Possible solutions

- The effects of assessments on student learning should be recognised and attention paid to the design of assessments which: i) promote problem-solving and the application of knowledge rather than the memorisation and recall of facts; ii) assess competence; iii) encourage deep learning and healthy study habits (for example, continuous learning rather than concentrated cramming immediately before examinations).
- There is a large body of research on the assessment of competence both in higher education, and in relation to medicine (Newble *et al*, 1994). In fact, the assessment of clinical competence is one of the few areas in educational research in which demonstrable, significant and replicable effects have accrued. It is important that those responsible for designing the curriculum are familiar with this research so that reliable and valid assessment systems can be put in place.
- A resource database or clearing house of available assessment techniques, accessible to all medical schools, would be a worthwhile initiative. An extension might be the establishment of a co-ordinating body for the development and evaluation of new assessment procedures, linked to an international exchange and development programme.
- Examiners, including external examiners, should be trained.

4. Evaluation

The GMC recommendations do not address the issue of evaluation of courses, yet it is essential when new programmes are introduced. Both monitoring and outcome evaluations are necessary if critics are to be silenced, and improvements and decisions about future developments are to be made on good evidence rather than subjective opinion. Evaluation needs to consider the acceptability, effectiveness and efficiency of the innovation. Some of the problems and potential solutions in relation to evaluation are as follows.

Problems

- There are rarely good baseline data against which to measure the new developments. Evaluation of current teaching is frequently done badly or not at all. Students may be asked to fill in evaluation questionnaires but the response rate is often low because they feel that their views are either ignored (questionnaires end up in wastepaper bins or locked cupboards) or that nothing ever happens as a result. When new courses are introduced, students may be given questionnaires about every aspect of the change: they develop questionnaire fatigue and again the response rate falls.
- Staff may sometimes feel threatened or defensive about declaring evaluation results, especially if they have put a lot of effort into courses.

- Evaluation tends to focus on satisfaction questionnaires. There is a need for a wider range of acceptable methods, both quantitative and qualitative, which go beyond the 'enjoyable' and 'useful' range.
- Evaluation takes time and resources. In many medical schools there is no-one with the time, expertise or funding to collect and analyse potentially large volumes of data.

Possible solutions

- Evaluation should become part of the culture of the medical school as a means to improve quality. Staff and students should be involved in the planning of evaluation. There should be a proper system for evaluation, organised centrally (by the medical education unit if one exists).
- A strategy should be developed and agreed for how the results of evaluation will be fed back in an independent and constructive manner to both staff and students. If students voice concerns, they must feel that something has been done as a result (perhaps by putting up on a noticeboard action which has been taken, or reasons why action could not be taken).
- Advice should be made available on, for example, methods and analysis, either by in-house experts or, since this is not necessarily yet widely available within medical schools, perhaps through the preparation of a short practical manual on evaluation.
- Money should be earmarked for evaluation (for example, as part of any grant application for educational development).

CHALLENGES IN SUSTAINING AND ASSIMILATING INNOVATIONS

1. Ensuring appropriateness and quality

Potential problems

If people do not want to change they will look for excuses to ignore, criticise or trivialise innovations. It is therefore important to ensure that they relate to the process of curriculum change in the institution and that they are of good quality. Many people can have good ideas, but are they based on sound educational principles? Are innovators up-to-date and well enough informed about the theory and practice of medical education? Do they have a broad view and knowledge of the curriculum or are they just trying an isolated experiment in their own discipline without reference to anyone else's teaching? Is the innovation part of the overall curriculum development process in the medical school, even if it is an experiment or pilot, or is it an individual's bright idea, hidden from the public gaze or scrutiny?

Possible solutions

- Those with innovative ideas should be encouraged to discuss them with the central curriculum planning body in the medical school. Early involvement of the decision makers will give the innovation a better chance of later adoption and sustainability, especially if there are cost implications which will have to be picked up by the school after initial pump priming. The more profound the innovation, the more important is such institutional support; if there are major costs involved, the Dean's support will be critical in terms of obtaining funding. Those with an overview of the curriculum, for example staff in the medical education unit, should at least be aware of the innovations planned or in progress; preferably they should be more closely involved, for example, in evaluation.
- Expert assistance should be available to innovators, again perhaps through the medical education unit, for example, educational expertise to advise on planning, assessment and evaluation; a summary of the key educational principles which should underlie innovations in the medical school's curriculum; a guide to current theory and research in medical/higher education; information about similar initiatives elsewhere and names of useful contacts.
- Rigorous evaluation (see above).
- Innovations may be planned as an experiment or action research which can be published as a worthwhile piece of work.

2. Support for the innovators

Potential problems

Those who try to do innovative things in medical education frequently feel unsupported either psychologically or materially. They frequently are not given time in which to develop new ideas or, subsequently, credit for the work they do. They may have to fight or compete for resources.

Possible solutions

- Those in authority should recognise the efforts of those who are innovating by showing interest in what they are doing and by providing opportunities for people to describe their work to others (through seminars or articles in a newsletter, for example). Giving them protected time is helpful. Ideally, those in authority should recognise and reward innovators' efforts – for example, some medical schools are introducing criteria for promoting academic staff on the basis of excellence in education and teaching. At the very least, innovators in education should not be penalised if their interest in educational developments means they are unable to devote so much time and energy to scientific research. Academic staff should be allowed to choose education as a legitimate research interest.
- Innovators themselves should support each other by identifying allies, networking and forming support groups, both within and across institutions.

- In the absence of extrinsic rewards for involvement in education, teachers will have to rely largely on intrinsic rewards – the motivation and enjoyment which come from working with a group of colleagues who have similar interests and complementary skills. People always find time for the things which they enjoy doing and which give them personal satisfaction. People are likely to remain enthusiastic and creative for longer, in a more sustained way, if they work together in groups.

3. Dissemination and sharing between medical schools

Potential problems

In the past, medical schools tended to work completely independently of each other. However, there is a new realisation, now that they are being required to change their curricula, that innovation takes time and resources, both of which are in scarce supply. The GMC have recognised the importance of sharing as a way of reducing the extra work which will inevitably be involved if their latest recommendations are to be implemented. However, the sharing of information does not just happen, even if there is a willingness to do so. It requires organisation and resources to bring people together or to facilitate the exchange of documents. How is this to be achieved?

Possible solutions

- Conferences and workshops in medical education, such as those organised by the King's Fund Centre and ASME, are generally well attended. It is also encouraging to see that many other organisations, such as specialist societies, are beginning to include education as a topic for discussion at their meetings which previously concentrated on research and clinical work. There is still scope for more meetings (preferably informal and organised as 'educational' events), perhaps hosted by medical schools not normally regarded as centres of medical education activity, which would also encourage more participation from local academic staff. However, it is important that such events have a clear purpose and value, and are well organised.

- There are various possible ways in which information might be shared other than through face-to-face contact, for example, producing a database of innovations and good practice, with contact names and addresses; the establishment of a resource library where written curriculum and course documents, newsletters, learning resources (written, audio, video, computer-based) and staff development materials could be accessed; a 'publishing house' which would undertake to produce and disseminate such material. For any of these ideas to become a reality, an organisation or a consortium needs to be identified as the central focus or co-ordinating body, a role which the Association of American Medical Colleges has assumed with impressive commitment in North America.

- Since there may be a reluctance to adopt ideas or materials which have been developed elsewhere unless there is some system of quality assurance in place, educational developments might be refereed by peer review in the same way that research papers are. Such a system might also be linked into the criteria for promotion (see above). If medical schools could agree on a core curriculum, such materials, if of proven quality, might be relatively easy to adopt or adapt more widely. There may also be an interesting new 'market' in special study modules, particularly those on more specialised topics.

4. Adopting the innovation

Potential problems

Sometimes innovations blossom and then wither because they fail to be taken up into the mainstream of the curriculum. Although it is easier to innovate with small numbers of students and staff who are already motivated rather than trying to convince the whole school to move, the innovation may fail when scaled up, or it may prove impractical or too costly to be feasible for the whole student body. Others fail because, when spread more widely, their effect is diluted or the original idea becomes misinterpreted or corrupted (perhaps because people are poor teachers/role models or have their own agendas to pursue). Some people are afraid of adopting the innovation because they worry it might reveal their lack of competence, for example, in facilitating small group discussions.

Possible solutions

- As highlighted in the section on ensuring appropriateness and quality above, the innovation should be planned as part of the curriculum development process: that is, the agreement and support of those in authority should be obtained before a start is made, plus some commitment that, if shown to be successful, the innovation will be incorporated into the curriculum (at least for an acceptable number of students) and that the necessary core funding will be found once 'soft monies' have been used up. To avoid unrealistic expectations on either side (both innovators and the institution), realistic decisions based on available resources will have to be taken early on as to whether the innovation is to be planned as a small-scale pilot intended eventually for all students, or whether it will always be an option for a limited number of students.

- If appropriate, as many people as possible, including students, should be involved in the development of the innovation both to harness the ideas and perspectives of a range of people and to promote ownership. This is based on the assumption that people have more commitment to making something work if they have been involved in its development and have a personal investment in its success.

- The innovation should be clearly described with its aims and key principles (plus any evaluation results) so that others can understand the concepts. Those who have been involved in the innovation may be good 'missionaries', spreading the word to colleagues, perhaps inviting them to sit in on their teaching to see at first hand what is involved, making training videos, helping to run workshops to train others, and overcoming the 'can't be done' attitude.

- When the innovation is to be spread, those involved in the teaching must be fully trained (through staff development), especially if it involves them in teaching something new (for example, clinical skills teaching by GPs) or teaching in a different way (SDL). Many teachers report a sense of personal satisfaction and motivation as a result of having had opportunities to improve their own skills in order to teach students better.

5. *Maintaining the momentum*

Potential problems

The current upheaval in the undergraduate curriculum should not just be viewed as a one-off activity. The world in which doctors will be practising is changing too rapidly for the curriculum to become fixed as in the past. The danger is that everyone will breathe a sigh of relief when the new curriculum has been introduced. The reality is that medical education must be continually evolving.

Possible solutions

- The lead for implementation of curriculum change must come from the GMC. It has recognised this in its latest recommendations, but there is still considerable doubt that the measures which they have committed themselves to take will go far enough in ensuring the full implementation of the current recommendations. The assessment and accreditation system introduced by the Australian Medical Council (1992) has proved an extremely effective and popular model, and is one which should receive serious consideration in the UK.

- It is to be hoped that the forthcoming quality assessment exercise by the Higher Education Funding Council will support and reinforce the GMC's recommendations on the undergraduate curriculum.

- The money which the Department of Health has provided through the Undergraduate Medical Curriculum Implementation Support Scheme (UMCISS) has been invaluable in facilitating curriculum change in those schools which are taking implementation seriously. There is still a shortage of money in the system to support innovation and there is an urgent need to make more funding available for educational research and development and for curriculum evaluation. Appropriate administrative and financial management systems are required within medical schools to support education, ideally with a specific budget for educational development. The allocation of the Service Increment for Teaching and Research (SIFTR) has been much criticised and is a major barrier to moving more teaching out into the community and general practice. A review of the funding of medical education is much needed.

- The GMC will need to be responsive to new developments in health care which should be incorporated into their recommendations and in the 'additional guidance notes' which they state they will issue. Medical schools, too, need to put organisational structures in place which will ensure that the curriculum is continually monitored, reviewed, evolving, and responsive. Good links with the community, with other health professionals and with employers might help medical schools to keep in touch with the needs and demands of the real world into which their graduates will go.

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APPENDIX: List of contributors and conference participants

Jim Aiton, School of Biological and Medical Sciences, University of St Andrew's, St Andrew's, Fife KY16 9TS.

Hania Allen, School of Biological and Medical Sciences, University of St Andrew's, St Andrew's, Fife KY16 9TS.

Stephen Barasi, Dept Physiology, University of Wales College of Cardiff, Cardiff CF1 1SS.

Roger Barton, Dept Medicine, University of Newcastle, North Tyneside Hospital, Rake Lane, North Shields, Tyne and Wear NE29 8NH.

Anita Berlin, Dept General Practice, St Mary's Hospital Medical School, Gateforth Street, London NW8 8EG.

Len Biran, Dept General Practice, St James's Hospital, Leeds LS9 7TF.

Mitch Blair, Dept Child Health, University of Nottingham, E Floor, Queen's Medical Centre, Nottingham NG7 2UH.

Josef Bohm, Anglo-European College of Chiropractic, Parkwood Road, Bournemouth BH5 2DF.

Mairead Boohan, Faculty of Medicine Office, Queen's University Belfast, 71 University Road, Belfast BT7 1NF.

Paul Booton, Dept General Practice and Primary Care, King's College Hospital School of Medicine, Bessemer Road, London SE5 9PJ.

Clair Du Boulay, Dept Pathology, Level E, South Block, Southampton General Hospital, Tremona Road, Southampton SO9 4XY.

Mark Brennan, Assistant Registrar (Curriculum Development), Dept Surgery, Level 7, Bristol Royal Infirmary, Bristol BS2 8HW.

David Bullimore, Academic Unit of Medicine, Level 7, CSB, St James's Hospital, Leeds LS9 7TF.

Maggie Challis, Dept General Practice, Medical School, Beech Hill Road, Sheffield S10 2RX.

Charlie Charlton, Academic Unit, Queen Elizabeth Hospital for Children, Hackney Road, London E2 8PS.

Gwen Chessell, Medical Learning Resources, Medical Faculty Office, University of Aberdeen, Polwarth Building, Foresterhill, Aberdeen AB9 2ZD.

John Cookson, Glenfield General Hospital, Groby Road, Leicester LE3 9QP.

D W K Cotton, Dept Pathology, Medical School, Beech Hill Road, Sheffield S10 2RX.

S S Cross, Dept Pathology, Medical School, Beech Hill Road, Sheffield S10 2RX.

Annie Cushing, Communication Skills Co-ordinator, London Hospital Medical College, Turner Street, London E1 2AD.

David Davies, Dept Child Health, University of Wales College of Medicine, Heath Park, Cardiff CF4 4XN.

Margery Davis, Centre for Medical Education, Ninewells Hospital and Medical School, Dundee DD1 9SY.

Reg Dennick, The Medical School, The University of Nottingham, Nottingham NG7 2UH.

John Dent, University Dept Orthopaedic Surgery, Royal Infirmary, Barrack Road, Dundee DD1 9ND.

M B Dutia, Dept Physiology, Medical School, Teviot Place, Edinburgh EH8 9AG.

Jennifer Eaton, Dept Postgraduate Medicine, Canynge Hall, Whiteladies Road, Bristol BS8 2PR.

Maria Evandrou, Dept Epidemiology and Public Health, University College London Medical School, 66-72 Gower Street, London WC1E 6EA.

Jennifer Field, Aldermoor Health Centre, Southampton SO1 6ST.

Michael Field, Faculty of Medicine, University of Sydney, Australia.

Guy Fowler, 45 Derwentwater Road, London W3 6DF.

Joyce Godfrey, Enterprise Unit, University of Sheffield, 65 Wilkinson Street, Sheffield S10 29J.

Susanna Graham-Jones, University Dept Public Health and Primary Care, Gibson Building, Radcliffe Infirmary, Oxford OX2 6HE.

Sheila Greenfield, Dept General Practice, University of Birmingham Medical School, Birmingham B15 2TT.

Penny Hatton, Staff and Departmental Development Unit, Room 11/80, Physics/Admin Building, University of Leeds, Leeds LS2 9JT.

Stan Head, Dept Physiology, St Mary's Hospital Medical School, Norfolk Place, London W2 1PG.

Dianne Hinds, East Barnwell Health Centre, Ditton Lane, Cambridge CB5 8SP.

F D R Hobbs, Dept General Practice, University of Birmingham Medical School, Birmingham B15 2TT.

Laurence Howard, Dept Physiology, University of Leicester, PO Box 138, Leicester LE1 9HN.

Vivienne Jinks, Dept Primary Care, UCLMS, Whittington Hospital, Archway Site, Highgate Hill, London N19 5NF.

Helen Joesbury, Dept General Practice, Medical School, Beech Hill Road, Sheffield S10 2RX.

Tamara Joffe, Medical Student, London Hospital Medical College, Turner Street, London E1 2AD.

Brian Jolly, Joint Academic Unit of Medical and Dental Education, St Bartholomew's Hospital Medical College, Charterhouse Square, London EC1M 6BQ.

Steve Jones, East Barnwell Health Centre, Ditton Lane, Cambridge CB5 8SP.

Brian Kliger, Anglo-European College of Chiropractic, Parkwood Road, Boscombe, Bournemouth BH5 2DF.

Martin Lawrence, University Dept Public Health and Primary Care, Gibson Building, Radcliffe Infirmary, Oxford OX2 6HE.

Iain Lawrie, Medical Student, Faculty of Medicine, Leicester University, PO Box 138, Leicester LE1 9HN.

Mary Lawson, Academic Dept Public Health, St Mary's Hospital Medical School, Norfolk Place, London W2 1PG.

Frances Lefford, Dept Anatomy, University College London, Gower Street, London WC1E 6BT.

Stella Lowry, British Medical Association, BMA House, Tavistock Square, London WC1H 9JP.

Morag Macdonald, 'Mizpah', 8 St Fillans Terrace, Edinburgh EH10 5NH.

David May, Dept Psychiatry, Ninewells Hospital and Medical School, Dundee DD1 9SY.

Peter McCrorie, Curriculum Coordinator, Faculty of Basic Medical Sciences, Queen Mary and Westfield College, Mile End Road, London E1 4NS.

Helene McGrath, Medical Student, Cambridge University Clinical School, Addenbrooke's Hospital, Hills Road, Cambridge CB2 2QQ.

Robert McKinley, Dept General Practice, Faculty of Medicine, Leicester General Hospital, Gwendolen Road, Leicester LE5 4PW.

Helena McNally, Faculty of Medicine, Queen's University of Belfast, 71 University Road, Belfast BT7 1NF.

Alan McWilliams, Midas Unit, 2nd Floor, Whelan Building, University of Liverpool, PO Box 147, Liverpool L69 3BX.

Baron Mendes da Costa, David Corbet House, 2 Callows Lane, Kidderminster DY10 2JG.

Lesley Millard, Medical Education, Southampton General Hospital, Tremona Road, Southampton SO9 4XY.

Michael Modell, Dept Primary Care, UCLMS, Whittington Hospital, Archway Site, Highgate Hill, London N19 5NF.

Elena Moses, Cambridge Health Promotion and AIDS Services, The Shed (139), Addenbrooke's Hospital, Hills Road, Cambridge CB2 2QQ.

Fiona Moss, Associate Postgraduate Dean, Directorate of Public Health, North West Thames Regional Health Authority, 40 Eastbourne Terrace, London W2 3QR.

Jeannette Murphy, Enterprise Team, St Bartholomew's Hospital Medical College, Charterhouse Square, London EC1M 6BQ.

Elizabeth Murray, Dept Primary Care, UCLMS, Whittington Hospital, Archway Site, Highgate Hill, London N19 5NF.

Helen Nicholson, Registry, St George's Hospital Medical School, Cranmer Terrace, London SW17 0RE.

Ian Nimmo, Dept Biochemistry, Hugh Robson Building, George Square, Edinburgh EH8 9XD.

Inger O'Meara, Dept Epidemiology and Public Health, University College London Medical School, 66-72 Gower Street, London WC1E 6EA.

Gillian Orange, Dept Medical Microbiology, Ninewells Hospital and Medical School, Dundee DD1 9SY.

Nigel Oswald, East Barnwell Health Centre, Ditton Lane, Cambridge CB5 8SP.

Jim Parle, Dept General Practice, University of Birmingham Medical School, Birmingham B15 2TT.

Stewart Petersen, Dept Physiology, University of Leicester, PO Box 138, Leicester LE1 9HN.

Antonio Rendas, Dept Pathophysiology, Faculdade Ciencias Medicas, Campo Santana, 130–1100 Lisboa, Portugal.

Louise Robinson, Dept Primary Health Care, The Medical School, Framlington Place, Newcastle upon Tyne NE2 4HH.

Ed Rosen, British Postgraduate Medical Foundation, 33 Millman Street, London WC1N 3EJ.

J Skelton, Dept General Practice, University of Birmingham Medical School, Birmingham B15 2TT.

John Sketchley, General Council and Register of Osteopaths, 56 London Street, Reading RG1 4SQ.

Phillip Snashall, Dept Medicine, North Tees General Hospital, Stockton, Cleveland TS19 8PE.

David Taylor, Physiological Laboratory, University of Liverpool, PO Box 147, Liverpool L69 3BX.

Sandy Thompson, Medical Education Unit, St Mary's Hospital Medical School, London W2 1PG.

Angela Towle, King's Fund Centre, 126 Albert Street, London NW1 7NF.

J C E Underwood, Dept Pathology, Medical School, Beech Hill Road, Sheffield S10 2RX.

Tim Usherwood, Dept General Practice, Medical School, Beech Hill Road, Sheffield S10 2RX.

Ian Ward, BMA Medical Students Group, British Medical Association, Tavistock Square, London WC1H 9JP.

Tony Waterston, Community Health, Newcastle General Hospital, Newcastle upon Tyne NE2 3AE.

John Weinman, Dept Psychology, UMDS, Guy's Campus, London Bridge, London SE1 9RT.

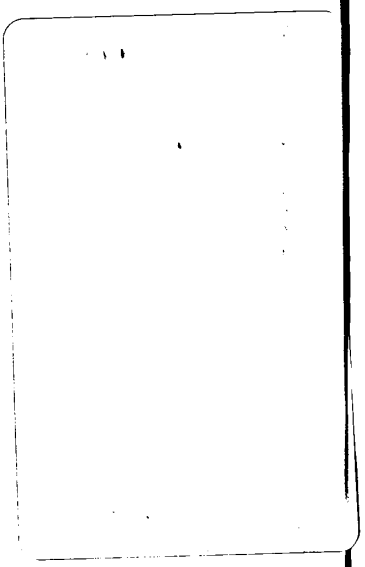
Elaine Whitaker, Dept Physiology, The Worsley Medical and Dental Building, Leeds University, Leeds LS2 9NQ.

Carl Whitehouse, Dept General Practice, Rusholme Health Centre, Walmer Street, Manchester M14 5NP.

Susan Whiten, School of Biological and Medical Sciences, University of St Andrew's, St Andrew's, Fife KY16 9TS.

Rachel Woolrych, Medical Student, Cambridge University Clinical School, Addenbrooke's Hospital, Hills Road, Cambridge CB2 2QQ.

Paquita de Zulueta, 27A Lansdowne Crescent, London W11 2NS.

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SHARING IDEAS 3

Innovative learning & assessment

In response to the latest recommendations on undergraduate medical education from the General Medical Council, and other pressures and opportunities for change, innovation in UK medical schools is flourishing.

This report arises out of a conference held at the King's Fund Centre in November 1993 to highlight key issues in innovation in learning and assessment through the presentation and discussion of case studies and the sharing of ideas and experiences. The emphasis is on new developments in relation to self-directed learning and skills development, alternatives to traditional clinical teaching, computer-assisted learning and the assessment of competence.

The report outlines the impetus for innovation in medical education; presents summaries of 37 oral and poster presentations given at the conference; and highlights potential problems and possible solutions in order to make a series of suggestions for future research, development and decision making.

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