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Effective Continuing Education: The CRISIS Criteria

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An International Association for Medical Education

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Summary

The need for continuing medical education (CME) is now well recognized. The challenge is to make it effective. CRISIS, an acronym, stands for the criteria which must be met to produce effective CME programmes: convenience, relevance, individualization, self-assessment, interest, speculation and systematic. CRISIS is a practical tool, based on 15 years of experience in the production and evaluation of CME programmes at the Centre for Medical Education, University of Dundee. The application of the CRISIS criteria to a CME programme will highlight any areas needing improvement and will guide programme producers in the creation of new CME materials. It will also help those responsible for planning CME activities to choose from a range of existing programmes.

Who needs a CRISIS?

An undergraduate medical qualification is no longer regarded as a lifelong certificate of competence: to keep abreast of developments in medical practice, a doctor has to find some method of keeping up to date. The need for continuing medical education (CME) has been well documented and is now widely accepted.

In response to the recognized need for continuing education together with financial inducements, provision of CME is now a growth industry. In the UK, the postgraduate education allowance for general practitioners, introduced in April 1989, offers an incentive payment for 'a balanced programme of continuing training'. More doctors now participate in approved courses and the number of programmes available from which the doctor can make a choice has dramatically increased.

The range of approaches adopted in CME varies widely, from formal lecture-based courses to small-group discussions or practical sessions and distance-learning programmes. Much discussion relating to the design of continuing education has focused on comparisons of different methods (eg videotapes versus lectures), on the use of new technology (eg computer-assisted learning, interactive video disks or satellites) and on the details of subject content.

However, to maintain and encourage quality in all forms of CME, a set of educational criteria is necessary. Using such criteria, programme designers, course constructors and teachers can ensure quality in their products; those responsible for auditing and administering programmes can check on high standards; tutors (or others who select programmes) can choose between competing products; and participants can assess what they 'consume'.

In 1982, at the Association for Medical Education in Europe/Association for the Study of Medical Education meeting in Cambridge, the CRISIS criteria were first described (Harden 1982). CRISIS is an acronym for seven criteria which contribute to the effectiveness of CME:

Convenience	makes voluntary participation easy.
Relevance	reflects the user's day-to-day role in medical practice.
Individualization	allows learners a say in what is learnt and to adapt the programme to their own needs.
Self-assessment	encourages doctors to evaluate their understanding of the subject and to remedy any gaps identified.
Interest	arouses attention and encourages learners to participate in the programme.
Speculation and	recognizes controversial and grey areas in medicine.
Systematic	offers a planned programme, with coverage of a whole subject or an identified part of it.

Since 1982, the CRISIS criteria have been widely applied in CME, including the large range of continuing-education programmes developed at the Centre for Medical Education at the University of Dundee. The model has been used, too, in areas other than medicine. Dunn & Hamilton (1985) applied a modified version of CRISIS to an assessment of continuing education for pharmacists. The rationale of the CRISIS criteria has also been explored, and the criteria related to Brookfield's (1986) six principles of effective practice in facilitating adult learning (Mulholland 1990).

The aim of this paper is to give a full description of the CRISIS criteria together with illustrations drawn from the work at the Centre for Medical Education, University of Dundee. If successful, developers and users of continuing education should produce and choose better products.

Convenience

To suit the user, continuing education must be available at the right place, at the right time and at the right pace. Access to resources should be rapid and easy.

Place

On occasion, it may be necessary for a doctor to attend a course some distance from the home and place of work. This is expensive in time, travelling costs and accommodation. Courses in the local postgraduate centre have clear advantages. Learning can be based also at home, in the surgery or elsewhere (eg while travelling to and from work). Such learning opportunities save the learner from spending valuable time in non-productive travel to and from a postgraduate centre.

A tradition has long existed whereby general practitioners educate themselves at home through books, journals and magazines. A parallel tradition has, until recently, put far greater resources into centralized learning, while community-based learning was the poor relation. There is an argument for a mixed economy in CME, with centralized courses and courses in postgraduate centres continuing their traditional role alongside distance learning. The centralized courses should, however, be made more convenient and accessible, eg by adjusting opening hours of the postgraduate centre and by providing general practitioners with more details of events and resources. In the past few years the need for convenience has been reflected in the rapid expansion of distance-learning activities, where the learner is situated at a distance from the teacher but with an interaction between the two (Harden 1988). This trend is likely to continue.

Time

To attend a conventional course at a postgraduate centre or university, the learner must fit in with fixed course schedules and hours. This may be difficult for busy doctors with a range of commitments. Care of patients is any doctor's first priority – at best, education comes second. The cooperation of partners in a group practice may also be required, to provide cover while the doctor is absent, attending an educational activity. Any fixed time, even a regular commitment at a set hour on a particular day of the week, is awkward to keep to. It is not uncommon to find a postgraduate tutor who, in response to poor attendance at postgraduate meetings, has changed the time and day of the sessions to that suggested as more appropriate by the participants, only to find there is no improvement and indeed on occasion even a drop in attendance. With distance learning, the user chooses the time and the duration of each period of activity.

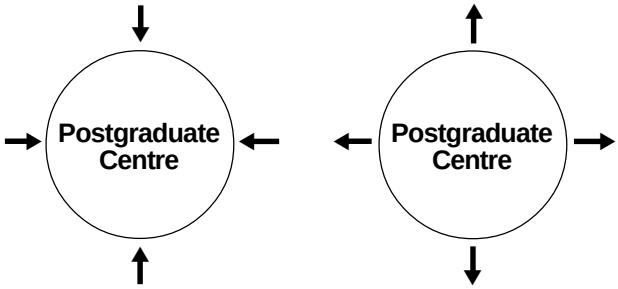

Figure 1: Centered education (left) versus distance learning (right)

Pace

In formal courses, students are traditionally constrained to learn at the same speed. Doctors who are new to the topic struggle to keep up. Doctors with some previous experience in the area could learn more quickly but are forced to slow down and therefore suffer from boredom. It is possible, to an extent, to make allowances in the planning of courses but this is likely to tax the ingenuity of the course planner. Solutions are easier with distance-learning programmes, which should let users work at their own pace – repeating as necessary or skimming material if already known.

Making education more convenient

Convenience of CME is increased by taking the education programme to the doctor, rather than expecting the doctor to come to the educator (see Figure 1). This is the basis for distance-learning, a concept which has achieved increasing recognition in recent years. Through distance-learning techniques, doctors can study when and where they wish and at a pace best suited to their needs.

More than anything else, the development of distance-learning approaches has helped to make continuing education more convenient for the doctor. Distance learning has four main features (Harden 1988).

1 The teacher is separated geographically from the student: communication is written, audiovisual or electronic.

2 The learning programme is carefully planned: the student receives advice and assistance on how best to tackle the subject.

3 The student's work is reviewed and remedial action prescribed where necessary: this implies two-way communication.

4 The learner works alone or occasionally in a small group.

In distance learning, a number of channels of communication are available. The learning material is most frequently distributed to the doctor by post. For example, one Centre for Medical Education programme, '*IF*' (Instant Feedback), comprising a series of patient management challenges and information related to the challenges (Harden et al. 1979), was distributed to 24,000 doctors throughout the UK, initially along with a medical journal and subsequently by direct mail. Doctors were invited to record their management of the patient described. They could receive immediate feedback, using a latent-image printing technique (Rogers et al. 1980), which allowed their response to be compared with that of their colleagues and with experts in the field. Further information was available on selected items through recorded telephone messages on a telephone-answering machine and in the form of printed notes of the topic.

More recent examples of distance-learning programmes distributed to doctors are a programme on management for general practitioners, '*If Only I Had the Time!*', in which 4,600 doctors enrolled and participated over a 2-year period and a programme on palliative care – '*MACPAC*' – distributed in collaboration with Macmillan Cancer Relief to over 5,000 doctors.

A series of 46 programmes published in the journal Update, '*Learning at Home*', was designed to be used by doctors when and where it best suited them (Harden & Sowden 1983).

Developments in telecommunication technology can provide convenient opportunities to hear, and to question, the views of one expert or an expert panel located remotely from the learner. Through satellite television and a supplemental telephone line, local audiences in many locations can tap into international expertise. Medical Television Network is one example of this technology in action.

If CME is to be convenient for doctors, it must be available where and when they want it. If you know that someone is lost in the jungle, you do not send them information about a jungle survival course being held in a nearby village the following month. To rescue them, you either go into the jungle and, if required, bring them out, or you parachute a map, compass and relevant instructions on map reading.

Convenience of CME can be enhanced by producing learning materials designed to make constructive use of otherwise empty time. An example of this is another Centre for Medical Education programme '*Medaymaxims*'. This consisted of short educational messages conveniently located on the doctor's desk, combined with telephone messages available on demand. It covered a range of topics and was distributed to 5000 general practitioners. '*Medaymaxims*' included a desk pad with a page for each day, containing one important message on a medical topic illustrated by a cartoon or diagram. Further information on the day's message was sent to the doctor if requested. Alternatively the doctor could listen to a recorded telephone message, which contained additional information about the topic. An audiotape was also available, in addition to the printed material and telephone message, and could be used by the doctor in a car, or at other times where it suited him or her to listen rather than read. In this way, the doctor was encouraged to use time which might not otherwise have been available for CME.

Frequently, doctors find themselves unable to schedule long periods for study and the hours that are available for learning programmes may be irregular. In these circumstances, for the learner's convenience, it is sometimes best to divide a programme into a series of modules or manageable units, each of which may stand independently. In the '*CASE*' (Clinical Assessment for Systematic Education) programme, which was distributed to 10,000 general practitioners, the subject of current trends in medical practice was divided into a series of 24 units (Adam et al. 1986). Each topic was succinctly covered in a small booklet. Of A5 size (about 6" x 8"), the booklets are easily pocketed. Because they are easy to transport, they can be studied anywhere and at any time.

On-the-job learning is a convenient form of CME. For its potential to be fulfilled, however, some organization or additional resources will probably be necessary. A programme, developed in the Centre for Medical Education for dentists, dealt with the common clinical problems encountered by dentists. On encountering a problem, the dentist could consult the programme as a focus for further learning through reference sources, audiovisual material, readings or a discussion with the tutor (Abdel-Fattah et al. 1991). The '*SHARING*' programme, on peptic ulcer disease, was designed to give the doctor an educational resource which would be of benefit also to the patient while assisting the doctor in the management of individual patients (Strachan et al. 1990). Job-aid cards, designed to assist a doctor in decisions about patients with suspected melanoma, were part of a

continuing-education programme on this topic intended for general practitioners.

It is likely that the future will see continuing efforts to make education more convenient for doctors and the further development of distance learning will be part of this – not a replacement for other forms of learning, but an adjunct to them.

Relevance

Why are the poems of Robert Burns still read? Why do they have worldwide appreciation, not only in the West but also in Central and Eastern European countries? One reason is that the message is seen as being relevant to everyone. People read the poem and can see themselves in the situation described. Topics addressed in CME programmes should be seen as being of practical importance and dealing with everyday problems rather than just academic interest (Premi 1974). While the rare Prader-Willi syndrome (a floppy infant, micro penis and failure to thrive) may be of relevance to paediatricians, it is unlikely to be seen as relevant by busy general practitioners, unless there are more generalizable messages for them.

The presentation of a series of facts is often seen as the basis of continuing-education programmes, but by themselves they may not be seen as relevant.

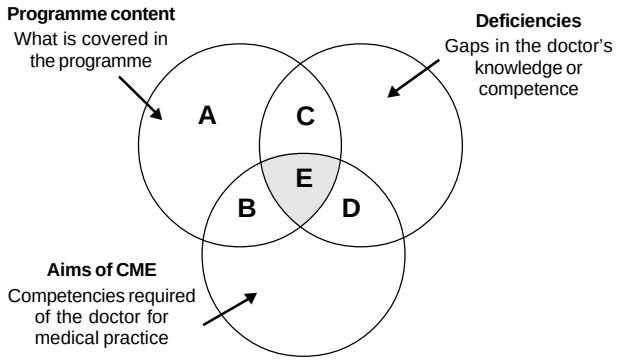

Figure 2: The relationships between the three components of relevance

(A) aspects of the programme where there is a mismatch between the educational activity on the one hand and on the other the objectives of CME and the needs of the doctor using the programme;

(B) aspects of the programme which, though relevant to continuing education in general, are not relevant to the doctor using the programme as he or she is already competent in the area;

(C) aspects of the programme which address areas where the doctor is not fully competent but which are not relevant to his or her medical practice;

(D) deficiencies in the doctor's competence in areas where he or she should be competent but which have not been addressed by the programme;

(E) a relevant programme – the area of competence addressed is required for medical practice, the doctor is not already fully competent in the area and the topic is addressed in the programme.

It is how the facts are applied to practice that makes them relevant. Facts themselves are simply inert knowledge, of little use. This applies particularly to rarities such as the Prader-Willi syndrome, which the general practitioner might see only once in a lifetime, and probably not even that. Continuing-education programmes, therefore, should not be overly theoretical.

Newton & Newton (1991) recommend that relevance should be made explicit. In other words, knowledge alone is not enough – the learner must be shown the uses to which that knowledge can be put. A neat connection between relevance and the perceived needs of users is provided by Sheets & Henry (1988). In an evaluation of programmes for family doctors, participants did best in topics which they could apply immediately or in the very near future.

Lack of relevance of CME programmes is a complaint made frequently by users. In a survey of 200 general practitioners carried out by the Centre for Medical Education, over 80% of GPs regarded lack of relevance to them as a problem they associated with CME meetings in postgraduate centres. Relevance is related to the choice of topic and also to the way, or context, in which that content is handled and presented. Programmes designed for hospital doctors often do not address adequately the issues in general practice. Relevance is as much about the perception of the user or learner as it is about the details of the content itself.

Figure 2 gives a graphic illustration of the three issues in CME which determine relevance. Relevance can be viewed as the extent to which there is a match or mismatch between the content of the programme, the aims and objectives of CME in the area under consideration, and the deficiencies in the doctor's knowledge or competence.

The highest priority learning needs in continuing medical education, according to Laxdal (1982), involve:

1 frequent, important or serious illnesses amenable to medical care;

2 conditions for which management methods have recently improved; and

3 conditions where education can improve previously poor management.

To ensure relevance, materials should be aimed at a particular audience and carefully checked for appropriateness with a sample of the target audience. To ensure continued relevance, periodic checks and, if necessary, updates should be made.

Relevance of a programme can be improved by examining the needs of the doctor at whom the programme is addressed. In a study carried out at the Centre for Medical Education in the area of melanoma, it was found that many CME programmes on this topic did not meet a general practitioner's needs. They looked at issues such as pathological and microscopic appearance, while the most important thing for a general practitioner to know was when a patient with a mole should be referred for further assessment and when the patient should be reassured and no other action taken. Guidance on this practical issue was often lacking. Tackling this mismatch was the key objective for a programme developed in the Centre and funded by the Cancer Research Campaign. The result was a programme which has been shown to change GPs' management of patients with melanoma (Laidlaw et al. 1992). A feature of the programme was a series of case studies, with colour photographs, of patients with skin lesions where the doctor had to decide whether to:

1 request a non-urgent appointment with a hospital specialist;

2 request an urgent appointment with a hospital specialist;

3 take no action other than to reassure the patient that there is nothing sinister about the lesion; or

4 observe and accurately record, follow up in further month.

The doctor was then given immediate feedback through latent-image printing as to the appropriateness of his or her decision in this simulated situation.

The first step in the development of the 'MACPAC' (Macmillan Palliation in Advanced Cancer) programme, supported by the Macmillan Cancer Relief Fund, was to identify the needs of general practitioners in the area of palliative care. A critical-incident type study was undertaken, in which a number of doctors were interviewed, to establish the issues of concern to them. Those topics were then central in the design of the programme.

A programme on management for general practitioners was based on a one-year study of the needs of GPs in this area (Swinfen 1987). The title of the programme, 'If Only I Had the Time!', reflected the general practitioners' common perception that their biggest problem is lack of time.

A key feature in the development of the programme 'Trends in the Management of Fissure Caries' was interviews with 16 general dentist practitioners, chosen at random (Pitts et al. 1992). These interviews produced many helpful suggestions on omissions from, additions to and changes of emphasis in the programme outline, produced by specialists in the field. The interviewees' opinions also allowed the potential audience to be divided into three categories: those already making use of the techniques in their practice, those interested in introducing the techniques in their practice and those not interested. The programme was designed to take account of all three groups.

'MACPAC' and 'Trends in the Management of Fissure Caries' demonstrate that the relevance of an educational activity may be increased by consulting members of the target group as part of the programme development. We would also strongly advocate including a member of the target group in the course-production team.

The 'CASE' (Clinical Assessment for Systematic Education) programme, developed in conjunction with the Royal College of General Practitioners, allowed us to look at the benefits of increased involvement of the potential users in programme production (Adam et al. 1986). General practitioners were closely involved, both in choosing the topics and in writing the material. Each of the programmes was the responsibility of one of the Faculties of the Royal College of General Practitioners, who worked with the project team from the Centre for Medical Education in the production of the programme.

Since relevance depends heavily on meeting the educational needs of practitioners, how are the needs of practitioners to be identified? Dunn et al. (1985) gave a review of the methods available. This included:

1 task analysis;

2 Delphi technique or panel of 'wise men';

3 critical-incident survey;

4 behavioural-event interview;

5 interviews with recent graduates;

6 study of recent textbooks and other information on the subject;

7 mortality and morbidity statistics; and

8 study of errors in practice.

No single technique provides a total insight as to educational needs. Dunn et al. concluded that Delphi, critical-incident survey and behavioural-event interview provide the best guidance in determining what competences are required.

Relevance can be accentuated by presenting the subject matter in a context with which the user can identify. For example, patient management problems, which feature in many of the Centre's programmes, are a vivid way to show practical and theoretical considerations of a topic. The concept is extended in 'If Only I Had the Time!', a CME programme for general practitioners on practice management, and 'Doctor's Diary', which covered a range of topics of interest to general practitioners. An important part of both CME programmes was diary extracts, where a doctor had recorded the experiences in his practice over a period of days, commenting on the decisions he had to make, and on areas where he found difficulties and problems as they arose in his practice. These episodes were then cross-referenced to a resource book.

Lay-out and design in a printed programme may also be used to emphasize relevance. Those sections of a programme which contain points of immediate importance together with practice guidelines can be highlighted in the text. In the programme for dentists, 'Trends in the Management of Fissure Caries', trends in dental practice were highlighted in a tinted area at the foot of many pages (Davis et al. 1992). In the same way, the 'MACPAC' (Macmillan Palliation in Advanced Cancer) printed programme gives recommendations and action plans in boxed tinted areas.

Individualization

In advertising and marketing, specialty magazines are becoming more important to advertisers: they target and focus the advertisement on an audience with a particular interest and needs. Even some mass-market magazines, too, offer a wide array of special demographic and regional editions. This trend towards individualization should be reflected also in continuing education.

Those following a continuing-education programme come from various educational backgrounds and differing domestic or professional circumstances. Their needs will therefore differ. A recently qualified doctor may be up to date on a subject, but lacking in experience: more senior colleagues may have the experience, but may be short on up-to-date theory.

The variation in individual needs can be divided into at least 10 areas:

1 type of medical practice, eg hospital or community, urban or rural;
2 previous experience and information about the subject of programme;
3 degree of interest, eg some general practitioners are particularly interested in asthma, others in dermatology;
4 preferred learning strategies and methods, eg lectures, group work, problem-based learning;
5 learning ability and speed;
6 amount of time willing to spend in continuing-education activities;
7 time of day and of week available for learning;
8 preferred location for learning, eg home, work, postgraduate centre, car;
9 learning on own or along with other professional members of the health-care team; and
10 teaching responsibilities, eg GP trainer, undergraduate teacher.

The first point to make about meeting the individual needs and expectations of CME participants is not to be overly ambitious with the target audience. An example of the problems which can arise was a series of videotapes on cardiology, produced by a commercial organization at a cost of over £500,000. An excellent film-production company and panel of internationally recognized cardiologists were used. The result was disappointing and the programmes less used than had been hoped. The main reason was that the audience targeted was too broad. While each videotape contained some material of relevance and interest to general practitioners, junior hospital doctors in training, general physicians, cardiologists and even medical students, many potential users were not willing to invest 20 minutes in watching a videotape just to see the few minutes relevant to them. The more closely defined is the target audience for a CME programme, the fewer problems are likely to result with individualizing the programme to meet the needs of each participant.

What can be done to individualize continuing education and increase the likelihood of success for all? A number of strategies can help a programme meet the individual needs of the users. Here are some examples.

To cope with the requirements for different levels of detail, a learning programme on rheumatology – 'Joint Studies in Rheumatology' – presented three parallel text streams, with information summarized in the left column, the main body of information in the middle column and further information on the right column. Alternative paths through parallel tracks allow doctors to choose the depth to which they study the subject. Once chosen, this is not fixed and can be varied as the doctors work through the programme, depending on prior knowledge and interest.

The need of some participants for additional information can be identified and built into the design of the programme. A further feature of the rheumatology programme was a resource book which was designed to allow the user to add further information sheets, supplied with self-adhesive backing strips, to sections of the book. In the 'IF' programme (Harden et al. 1979) further information was made available as an option, in the form of recorded messages on the telephone or as further study booklets on aspects of the subject. In the same way, the 'Medaymaxims' offered more detailed explanations on the telephone or in writing of the shorter messages presented in the programme.

Page lay-out and design, the use of headings and summary lists can all help readers match the programme to their learning needs. The doctor can scan the programme, stopping to study aspects of interest in more depth. In 'Trends in the Management of Fissure Caries' for dentists, carefully chosen headings and a short question relating to the subject matter were printed at the top of each page. This allowed the reader to scan through the resource book, stopping at pages of particular interest.

A carefully designed contents page and a quick reference guide, as used in the 'CASE' programme described above, may help a reader find parts of the programme that are of particular interest. The 'Malignant Melanoma' programme for general practitioners included a resource book, with each of the 11 pages (including covers) of a different size. The margin exposed in this way contained subject descriptions of each page, encouraging quick access to the information contained in the book. Spiral binding or loose leaf binding of a book makes it possible for the user to arrange the sections in his or her preferred order. This approach was adopted in the programme on the cardiac dysrhythmias, where the user could choose to have as the first section background information, clinical features or management.

Feedback and self-assessment provide a powerful method of individualizing a programme. 'Joint Studies in Rheumatology' and the management programme 'If Only I Had the Time!' both featured individualized computer generated feedback (Walker et al. 1989). Participants returned their responses to patient management problems or clinical situations to the Centre for Medical Education, University of Dundee. In turn they received feedback. The form of that feedback and the amount of information sent depended on the doctors' response to the problems. If their responses indicated that they were competent in the area, they were simply given a brief reinforcement. If, on the other hand, their responses demonstrated a failure to understand the area, a more detailed explanation was given, with reference back to the resource book and other sources of information on the topic. Information was also given which let doctors see how their decisions compared not only with experts in the area but also with colleagues.

Programmes can also be designed to take account of different learning strategies. A programme produced in the Centre for Medical Education on cardiac dysrhythmias comprised two volumes. The first volume, 'What Every Doctor Should Know About Cardiac Dysrhythmia', contained the basic information for general practitioners on the topic. A second volume contained patient-management challenges with cross-references back to the resource volume. Doctors could choose whether they first studied the subject in the resource manual or instead went directly to tackle the patient-management problems, referring to the resource manual only when they ran into difficulties. Information from a sample of 500 users suggested that about 85% of doctors preferred to get into the programme through the patient-management challenges and 15% through the resource manual. The user was free to choose between a problem-based or an information-oriented approach: that choice was not imposed on the user by the programme producer.

Programmes can be produced in different versions to take into account the time doctors have available to study the topic. For example, two different versions of a programme on melanoma were produced. One, part of the 'CASE' series, comprised key summary points on the subject and a set of short patient-management challenges in a brief 24-page A5 booklet. A more in-depth programme was also produced, which included an extended series of case

studies, and information about different aspects of diagnosis and management of melanoma.

Some doctors choose to share continuing-education programmes with other members of the health-care team. To meet this need, programmes can be designed for use by different disciplines. A series of patient-management challenges was developed particularly for this purpose at the Centre for Medical Education, in a study funded by the Scottish Office (Thomas 1990). A further programme, being developed as part of the 'MACPAC' (Macmillan Palliation in Advanced Cancer) series, is designed for use by the health-care team and has as its title 'Unite the Team'.

Self-assessment

A feature that often distinguishes successful from unsuccessful CME is the incorporation of a self-assessment component. Indeed continuing education has been equated with continuing self-assessment, critical self-appraisal being the hallmark of the good professional.

'The examination of clinical practice', asserted the New Leeuwenhorst Group (1986), 'must be the key element in continuing medical education, which otherwise becomes an intellectual or scientific game without a clear consequence'. Even excellent doctors can develop bad habits and become out-dated. These will show up in the mirror of self-assessment.

Why self-assess?

Self-assessment can contribute in a number of ways to CME.

1 It can serve as a diagnostic test to see whether readers need to participate in the learning activity/programme and, if so, to select parts of the programme from which they would benefit.

2 It can assess whether learners have the necessary competence or prerequisites to undertake the programme.

3 It can check whether they have mastered the topics covered in the programme.

4 It can demonstrate to doctors that they can go beyond the contents of the programme and apply it in their own context.

Self-assessment is not exclusively found in self-learning programmes but may be incorporated in formal postgraduate-centre programmes as well. One week prior to a postgraduate lunchtime meeting on 'The ten most useful drugs in clinical practice', doctors were asked to write down their personal choice. The following week, they could compare lists with their colleagues.

What should be self-assessed?

Too often, self-assessment is presented as a series of multiple-choice questions, to be tackled before, during or after a lecture or a distance learning programme, with recall of facts as a low-level objective. Much to be preferred is an approach to self-assessment which tests whether readers can solve problems in the area concerned and apply the knowledge to their practice. This may take the form of a patient-management problem (Harden 1983).

Self-assessment: a three-stage process

It is useful to think of self-assessment as a three-stage process.

1 **The question**. In the first stage, a question is put to the learner. This may be in the form of an illustrated description of a patient, as in the melanoma distance-learning programme described above, with a choice of various management options. Alternatively, it may be presented as a description of one doctor's practice, as in the 'Doctor's Diary' and 'If Only I Had the Time!' programmes, with an invitation to readers to compare their practice with that of the doctor whose diary is presented. In a computerized CME programme, patient-management problems can be presented as evolving cases, with development affected by prior decisions.

2 **The response**. The question having been asked, some mechanism has to be provided where the doctor can respond. In a printed programme, this may be in writing – a brief note as to a diagnosis, an explanation or a management approach. The response may be to make one or more selections from a range of options available or it may be to score various choices on a 5-point scale, where 1 = wrong or certainly do not do, 2 = probably wrong or probably not do, 3 = uncertain, 4 = probably correct or probably do, and 5 = certainly correct or certainly do.

This format was used successfully in the 'IF' distance-learning programme and was rated as attractive by users (Harden et al. 1979).

In patient-management problems, the doctor's response may influence the further development of the problem. This is more commonly encountered in computer-based programmes. Our computer program for 'MACPAC' (Macmillan Palliation in Advanced Cancer) allows a groups of doctors to explore issues in managing patients. Each computerized 'patient' responds to treatment or advice: doctors face the consequences of their actions (and mistakes). Standardized patients can also be programmed to give similar responses in a more life-like way.

The self-assessment component of a programme need not be overt, demanding a written response or a discussion with colleagues. Instead, the programme can be designed so that, as users work through it, their view on the topic or knowledge of the area is challenged. This technique was used in the 'Doctor's Diary' programme, where the reader's response to comments in the diary, such as 'I wonder what I should do next?' or 'I cannot believe that this is a characteristic feature of …', stimulates readers into deciding where they stand on the issue or forces readers to consider their own knowledge of the topic.

If the learning programme is being used in a group, the required response to the question may be a discussion by the group.

3 **The feedback**. The key part of self-assessment is the feedback to the learner. In its simplest form, this can be a 'Yes/No' or 'Correct/Incorrect' response. In almost every instance, however, it is of value to expand the feedback beyond this. Feedback should include an explanation why the correct answer is correct and why the incorrect answers are incorrect. In this way, any common misconceptions are addressed. The doctor should be referred back to the learning programme or to additional reading material where appropriate. In the Centre for Medical Education we have pioneered the use of individualized feedback, using a microcomputer (Walker et al. 1989). Each doctor participating in a number of our continuing-education programmes receives individualized feedback in the form of a personal letter: the letter reinforces correct responses and discusses inappropriate responses at length, with references back to the learning programme.

If the feedback is too readily available in a printed programme, the reader may consult this before making a choice or decision. Conversely, if the feedback is too difficult to get at, eg in some remote page in a book or available only in a subsequent instalment or programme, it may be little used. Feedback can be hidden yet immediately available on demand through two techniques: latent-image printing (Rogers et al. 1980) or scrambled text (Cairncross & Harden 1983).

Standards

Implicit in any self-assessment exercise is the notion that there is a standard against which doctors are assessing themselves. That standard may be derived from the views of an expert in the field or the consensus view of a panel of experts. We have found it very valuable to allow doctors, as part of the self-assessment exercise, to compare responses with those of their peers. This can be a pre-selected panel of doctors, the selection of whom should be identified in the programme, or the responses of other doctors taking part in the programme. These peer responses can be commented upon by the authors of the programme and by experts in the field.

Examples

The management programme, 'If Only I Had the Time!', invited doctors to make, in each of 18 months, a set of management decisions. In return, they received computer-generated, individualized letters giving comparisons with peer-group and expert responses.

For the 'Malignant Melanoma' programme, latent-image printing allowed immediate feedback on a series of decisions about skin lesions. In the computer program 'MACPAC' (Macmillan Palliation in Advanced Cancer), feedback was not only immediate, but also influenced the 'progress' of 'patients' whose alternative futures were built into the computer program.

Timing

The feedback component of a self-assessment activity may be made available immediately or subsequently. Immediate feedback, eg through latent-image printing or scrambled text, is studied by the doctors when they are perhaps most ready to receive the message, either having just finished or being in the process of working through the programme. In contrast, feedback provided later can be more sophisticated, more individualized and may contain information about the responses of other doctors completing the programme.

Of all the features, we have found self-assessment to be one of the most important in predicting the effectiveness of a continuing-education programme. It can clarify or even change the doctor's educational objectives and it can prompt reflective deep processing of information rather than surface learning. Sowden & Harden (1985) have shown that, for instructional text in medicine, the use of questions as an adjunct aid can enhance learning and understanding of the text.

The inclusion of a self-assessment element in a continuing-education programme is important, even if it has only a minor place in the programme. Alternatively it may be the major basis for the programme or focus for the programme.

Interest

Any continuing-education programme has to compete for time in the lives of very busy people, whether patients or health-care professionals. Uptake of the programme is seldom compulsory. Surrounded by expensively produced television advertisements and programmes, faced by high-quality print in free magazines and coffee-table books, the potential user is unlikely to look twice at a stapled collection of dull typescript pages shoddily duplicated. Even such a simple little thing as the title of a programme, course or lecture might sway a doctor's decision on whether to take part. Would the successful programme, 'If Only I Had the Time!', have been of less interest to doctors if dully labelled 'Management for General Practitioners: An Introductory Guide'? How the programme for a postgraduate centre is presented, or how a distance-learning programme is packaged, may also determine the doctor's participation. Indeed, the packaging may determine whether the doctor or the doctor's receptionist opens the envelope or deems it junk mail and consigns it to the bin.

For three main reasons, continuing education must be interesting to be successful:

1 to gain the attention of the potential user;

2 to encourage potential users to become actual users, and to invest time, effort (and possibly money); and

3 to hold attention and sustain the user's motivation to complete the material.

Educators have debated whether the stick or the carrot provides the better motivation. Both give little lasting interest and enthusiasm. The best reason for studying is the inherent satisfaction of finding out new things and developing new talents. As Kohn (1991) says, 'Rewards have been described as the "enemies of exploration"', The first large-scale distance-learning programme produced in the Centre for Medical Education went to both hospital doctors and general practitioners. Programme completion was encouraged by offering a limited-edition print of a McIntosh Patrick watercolour to every doctor who returned all their responses for the patient-management problems to Dundee. We have no evidence whether this affected doctors' responses – but some later programmes, offering no such rewards, have had equally high response rates.

Personal contact with doctors can help to stimulate their interest in a lecture or a programme. Tutor-initiated telephone calls – the 'friendly reminder' to continue study – may be of considerable value in encouraging distance learners who are not in a 'learning milieu' (Harden et al. 1980).

Some subjects are of intrinsic interest – meetings on a sex-related topic or one with financial implications usually attract a large audience – whereas others may be perceived as boring. For each continuing-education programme, there will be an appropriate combination of at least six factors to maximise attractiveness and interest.

1 *Relevance*

Relevance is so important that it merits treatment as a CRISIS criterion and has been discussed in a previous section. Anything that makes a programme more relevant will also make it more interesting. As part of the 'Malignant Melanoma' programme, doctors were sent the number of new cases of melanoma reported in their area since the programme had been initiated. This helped to related the programme to their own practice and was picked out by users as both relevant and interesting. Doctors have to appreciate how they will benefit from attending the meeting or studying the programme.

2 *Presentation of materials*

How the meeting or programme is packaged will also affect the doctor's level of interest. For example, the 'CASE' booklet 'HIV and AIDS in General Practice' carried a slip wrapper with a question designed to grab attention: 'What is the connection between AIDS, cabbages and caterpillars?' The

answer, given on the other side of the wrapper, was potential vaccines. The intention was that the doctors' curiosity, once aroused, would lead them on to read also the inside of the booklet.

A book may not always be the most interesting way to put across ideas in words and pictures. Audiotapes, videotapes and computer disks have all been used successfully. Novelty can attract – curiosity and interest may stimulate doctors to use computer-assisted learning programmes. A mixed-media approach is often attractive. However, by itself, a new medium or new approach is not automatically better. Some of the dullest programmes in recent years run on computers or are delivered via satellite.

3 *Text design and lay-out*

With printed material, well designed and laid out pages can help to seduce readers into studying the material. The design can help them to steer a path and find any chosen material. Text should be tightly edited and presented in 'bite-sized' chunks. Generous white space allows room for easy navigation and encourages readers to annotate the text where necessary. Spot colour can also help by differentiating, for example, summaries or crucial guidelines. In trained hands, an in-house desktop-publishing system can reveal and enhance the interest in any subject material. The 'SHARING' (Self-Help Resource in Gastroenterology) programme, published in 1988, and the programme for dentists on fissure caries provide examples of what can be achieved through desktop publishing.

4 *Visuals and colour*

The use of illustrations, in the form of overhead projection transparencies, slides or videotape extract, can add to the interest of a lecture. Similarly, the use of illustrations and colour can add to the interest of, and enhance, the printed page. Illustrations, which played a large part in the 'Learning at Home' series, published in *Update*, not only added to its interest but also may have increased its learning effectiveness (Sowden & Harden 1985).

5 *Cartoons and humour*

Cartoons and humour have a role, too, in arousing the interest of the doctor, whether in a lecture or in a printed programme. Learning can be fun – but this message is often not recognized. Humour, however, is notoriously difficult to handle: it may backfire on the user. A feature of the 'Medaymaxims' desk pad was a cartoon illustrating the message of the day. This was overwhelmingly voted a great success by doctors who received the programme. However, a small minority felt that the cartoons trivialized medicine. When cartoons were applied in such areas as cancer or palliative care, that disapproving minority felt that, at best, they trivialized the subject and, at worst, were in bad taste. Nonetheless, used with care and not overdone, humour can be a powerful weapon.

If the users are amused by the material, they will not become bored and may better retain the points made.

6 *Active involvement*

Audience participation is well recognized in the entertainment industry as a means of maintaining audience interest. In the same way, many people show a surprising willingness to work for nothing (in terms of cash and education) at solving puzzles printed in newspapers and magazines. The same principles apply in education. Active involvement is essential for effective learning. No one who has fallen asleep in a lecture or at an after-dinner speech would disagree.

Active participation is a key contributor to maintaining doctors' interest in computer-assisted learning programmes and simulations. That enhanced interest is particularly evident when programmes are used by groups of doctors. Patient-management problems in distance-learning programmes also, by involving the doctors, seek to maintain their interest.

Speculation and systematic

Speculation

All too frequently CME concentrates on aspects of medicine which are established facts and ignores areas where there is controversy or no single correct answer. It is important to include areas of controversy and speculation in CME programmes. Reasons for this include:

1 It will add to the interest of the programme, which may otherwise be boring and dull.

2 It makes the programme credible. Neglect of such issues may result in a programme seen as irrelevant to day-to-day practice, where issues are seldom clear-cut and where uncertainty is common.

3 Confronting such issues in a programme may help the doctor to tackle them in practice.

It is important to distinguish for the doctor aspects which should be objects of mastery, and where a clear-cut course of action is indicated, from areas which are a focus for speculation and where there is no clear course of action. Areas where speculation may exist include:

1 topics where there is more than one 'correct' solution;

2 recent advances which may not have been generally adopted or about which there is some uncertainty; and

3 subjects that are socially sensitive and have different interpretations, eg HIV and AIDS.

Such grey areas are often neglected as being too hard to put across to the learner. It need not be so – two views on a subject may occupy little more space than one oversimplification. For example, the 'CASE' booklet on HIV and AIDS allows the reader to rate various reactions in a series of case studies. A postcard with those ratings marked is then processed to provide a 'personal' computerized commentary.

Sometimes a controversial issue is presented as an established fact. This should be avoided. The learner will benefit by distinguishing between the genuinely authoritative and the strongly expressed individual view.

The 'IF' programme demonstrates the deliberate use of speculation (Rogers et al. 1980). For a series of patient-management problems, there were, in some instances, no absolutely correct answers. The doctor rated possible courses of action on a 1-5 scale, 1 being rejection, 3 meaning uncertain and 5 for agreement. Sometimes, 3 was the most appropriate answer. For example, there was some agreement on drug treatment after a myocardial infarction: admission to hospital of the patient described was more controversial and merited a 3.

The diary approach, adopted in 'Doctor's Diary' and 'If Only I Had the Time!', also allowed areas of uncertainty and controversy to be tackled, sometimes through the views of different members of the practice team.

Systematic

Much of CME is haphazard. A doctor can read medical journals and attend all meetings in the local postgraduate centre for a year but not be sure at the end of that time what has been covered.

Although some learning proceeds happily on an *ad hoc*, opportunistic basis, this is not a satisfactory basis if doctors are to keep up to date in all aspects of practice.

To be systematic, a continuing-education programme should let the consumers know how and why aspects of the subject will be covered over a planned period. The benchmark for systematic coverage is that a course provides all that the learners need to know about a particular topic. It need not include all there is to know or even all that it is nice to know. We should be looking towards a curriculum for continuing medical education: a curriculum planned with the same or greater rigour than the current undergraduate curriculum.

Several of the Centre for Medical Education's programmes offered systematic coverage of one area of medicine:

Programme	Coverage
Joint Studies in Rheumatology	One area of medicine – rheumatology
MACPAC	One area of medicine – palliative care
If Only I Had the Time!	One aspect of medical practice – management
CASE series	Current important trends in medical practice

Knowledge that doctors can thoroughly update themselves in one area of medical practice may increase motivation, by encouraging completion of the programme or attendance at all lectures in a series.

The future

CRISIS is of considerable value as a practical tool. In this booklet, we have described it in some detail, illustrated with examples from a wide range of CME materials produced in the Centre for Medical Education at the University of Dundee.

If we examine the cutting edge of that tool closely, it may look ragged. Any taxonomy is artificial and interferes with reality. For example, if a subject is *relevant* to a doctor's day-to-day work it is likely also to be *interesting*. Thus CRISIS shows a fuzzy junction between two criteria. Real life is always complex, CRISIS is a simplification – but if it does identify the characteristics of successful CME, it does work and deserves to be used.

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