



AMEE Guide No. 14: Outcome-based education: Part 1—An introduction to outcome-based education

R. M. HARDEN*, J. R. CROSBY & M. H. DAVIS

Centre for Medical Education, Tay Park House, Dundee, UK

SUMMARY Outcome-based education, a performance-based approach at the cutting edge of curriculum development, offers a powerful and appealing way of reforming and managing medical education. The emphasis is on the product—what sort of doctor will be produced rather than on the educational process. In outcome-based education the educational outcomes are clearly and unambiguously specified. These determine the curriculum content and its organisation, the teaching methods and strategies, the courses offered, the assessment process, the educational environment and the curriculum timetable. They also provide a framework for curriculum evaluation.

A doctor is a unique combination of different kinds of abilities. A three-circle model can be used to present the learning outcomes in medical education, with the tasks to be performed by the doctor in the inner core, the approaches to the performance of the tasks in the middle area, and the growth of the individual and his or her role in the practice of medicine in the outer area.

Medical schools need to prepare young doctors to practise in an increasingly complex healthcare scene with changing patient and public expectations, and increasing demands from employing authorities. Outcome-based education offers many advantages as a way of achieving this. It emphasises relevance in the curriculum and accountability, and can provide a clear and unambiguous framework for curriculum planning which has an intuitive appeal. It encourages the teacher and the student to share responsibility for learning and it can guide student assessment and course evaluation.

What sort of outcomes should be covered in a curriculum, how should they be assessed and how should outcome-based education be implemented are issues that need to be addressed.

Outcomes and curriculum planning

A good archer is not known by his arrows but by his aim.

Thomas Fuller

A windmill is eternally at work to accomplish one end, although it shifts with every variation of the weathercock, and assumes ten different positions in a day.

Charles C. Colton

A key element in the conceptualisation and construction of a building is the architect's plan. This conveys an image in some detail of what the building will be like after it has been completed. It is accompanied usually by an artist's impression or even a three-dimensional model of the finished construction. The plans provide, for those who are commissioning the building and for the intended users, a clear unequivocal statement as to what they can expect when the building is completed. A judgement can then be made as to

whether the final product matches what has been proposed and agreed. Building authorities can see whether the building corresponds to the building regulations. Neighbours can see whether the building will intrude on their privacy or space, and negotiations can take place with amendments to the plan where necessary. The plan of the completed building will influence, too, the materials required for use in its construction and the methods of construction adopted. It will provide a tool for overseeing progress in the construction of the building.

In the same way, there is a need for a clear and public statement of the learning outcomes for a medical education programme. What sort of doctors will the programme produce? What competencies will they possess? What basic skills, including personal transferable and communication skills, will the doctors have? Will the doctors be orientated to healthcare in the community as well as in the hospital? Will they have training in health promotion? Will they be competent to undertake research? Will they have a commitment to the ethical principles of medical practice? A statement of the learning outcomes for the programme will address these and other questions.

All medical schools have outcomes whether by design or not. That is, they produce doctors, but the nature of the product may be unspecified. Zitterkopf (1994) reminded us, however, that "the difference between being outcome-based and simply producing outcomes is significant. An outcome-based school produces results relating primarily to predetermined curriculum and instruction. The focus is on the achievement of results . . ." The results of medical training, according to national reports and studies of graduates from different medical schools, are newly qualified doctors who do not demonstrate some of the basic competencies expected of them (Walton, 1993). A common perception of current medical education is of inappropriate and insufficiently rigorous outcomes.

The concept of a curriculum traditionally included two elements—the content or what the students studied, and the examinations which were designed to assess the extent to which the students had learned the content. This concept expanded to include the learning methods and educational strategies adopted, and later to include the aims and objectives of the programme. Harden (1986) has described these key curriculum components in the context of medical education. It is now accepted that learning outcomes should occupy a key position in curriculum planning and a model for the curriculum which recognises this is given in

Correspondence: Professor R. M. Harden, Centre for Medical Education, Tay Park, House, 484 Perth Road, Dundee DD2 1LR, UK. Tel: +44 (0)1382 631972; Fax: +44 (0)1382 645748; e-mail: p.a.wilke@dundee.ac.uk

Figure 1. Students pass through an educational programme receiving support as required. They study the prescribed content, using an appropriate learning approach and through this achieve the educational outcomes specified. Discussions about the various components of the curriculum are meaningless unless carried out in the context of these learning outcomes. Consideration of the outcomes should be the basis for curriculum development and evaluation.

What is outcome-based education?

Outcome-based education is easy to conceptualise but difficult to define. It is an approach to education in which decisions about the curriculum are driven by the outcomes the students should display by the end of the course. In outcome-based education, product defines process. Outcome-based education can be summed up as 'results-orientated thinking' and is the opposite of 'input-based education' where the emphasis is on the educational process and where we are happy to accept whatever is the result. In outcome-based education, the outcomes agreed for the curriculum guide what is taught and what is assessed.

The educational outcomes are clearly specified and decisions about the content and how it is organised, the educational strategies, the teaching methods, the assessment procedures and the educational environment are made in the context of the stated learning outcomes. Thus outcome-based education has two requirements. First that the learning outcomes are identified, made explicit and communicated to all concerned, including the students, the teachers, the public, employers and other stake-holders. (The range of stake-holders may all be involved also in determination of the learning outcomes.) Second, the educational outcomes should be the over-riding issue in decisions about the curriculum. Staff should consider course content, teaching methods, educational strategies and time allocated, in terms of the learning outcomes achieved by the course. It should be made explicit, for example, through study guides, how the course contributes to the learning outcomes. A clinical attachment in obstetrics, for example, might cover not only the outcomes directly relating to the field of obstetric practice, but may also contribute to other outcomes such as communication skills, the principles of screening and prevention, health promotion, information

handling and retrieval, ethics in medical practice and the role of the doctor as a member of a team providing health-care.

Outcome-based education, as defined by Spady (1988) is "a way of designing, developing, delivering and documenting instruction in terms of its intended goals and outcomes." "Exit outcomes are a critical factor, in designing the curriculum," Spady suggests. "You develop the curriculum from the outcomes you want students to demonstrate, rather than writing objectives for the curriculum you already have."

Some workers in the field associate outcome-based education with mastery learning. There is an important link between outcome-based education and mastery learning. "Outcome-based education", suggests McNeir (1993), "specifies the outcomes students should be able to demonstrate upon leaving the system. OBE focuses educational practice on ensuring that students master those outcomes and it asserts that all students can succeed". Spady (1993) has described the principles or characteristics of a 'fully operational outcomes-based school':

- (1) A collectively endorsed mission statement that reflects commitment to success for all students and provides the means for translating that commitment into action.
- (2) Clearly defined publicly derived 'exit outcomes' that students must demonstrate before they leave school.
- (3) A tightly articulated curriculum framework of program, course and unit outcomes that derive from the exit outcomes.
- (4) A system of instructional decision making and delivery that employs a variety of methods, assures successful demonstration of all outcomes and provides more than one chance for students to be successful.
- (5) A criterion-referenced system of assessment.
- (6) An ongoing system of programme improvement that includes staff accountability, effective leadership and staff collaboration.
- (7) A data base of significant, visionary outcomes for all students, plus key indicators of school effectiveness, that is used and updated regularly to improve conditions and practices that affect student and staff success.

Development of outcome-based education

The development of outcome-based education owes much to the work of Spady (1988). Pioneering work was carried out in schools in the United States of America where outcome-based education promised far reaching reform through increasing accountability, while at the same time offering more school autonomy or flexibility. Some states, such as Pennsylvania, legislated for outcome-based education (Pliska & McQuaide, 1994). In Florida, for example, the state legislature helped districts to define outcomes, then waived dozens of statutes to give the schools the flexibility they needed to meet these goals (McNeir, 1993).

This move to outcome-based education, however, also attracted fierce opposition. One concern was that education should be open-ended, not constrained by outcomes. Another concern was that the inclusion and emphasis on attitudes and values in the stated outcomes was inappropriate. Opponents claimed that "the proposed outcomes watered down academics in favour of ill defined values and

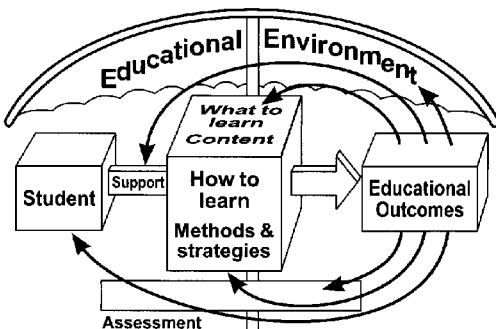


Figure 1. A model for the curriculum emphasising the importance of educational outcomes in curriculum planning.

process skills" and that "traditional academic content is omitted or buried in a morass of pedagogic clap-trap in the OBE plans that have emerged to date" (O'Neil, 1994). McKernan (1993) has presented what he sees as the limitations of outcome-based education. He argues that we must value education for its own sake, not because it leads to some outcome. "To define education as a set of outcomes decided in advance of teaching and learning conflicts with the wonderful, unpredictable voyages of exploration that characterise learning through discovery and inquiry." This liberal notion of education he accepts, however, is more appropriate in the arts and humanities. This view is discussed by Glatthorn (1993) who argues that it is possible for outcome-based education to accommodate a range of outcomes. Whatever the position in other disciplines, in medicine we cannot afford the luxury of ignoring the product. The need for a core curriculum in medicine with clearly specified learning outcomes has been identified (GMC, 1993; Harden & Davis, 1995) and the development of appropriate behaviours and attitudes is an essential component of the educational process in medicine.

In the UK, a 2-year Training Agency funded project led by the Unit for the Development of Adult and Continuing Education (UDACE), attempted to define learning outcomes and pilot their assessment for five disciplines in Higher Education (Otter, 1992). The project, suggested Drew (1998), reflected growing Training Agency interest in clarifying outcomes rather than prescribing the content of education and training or the processes by which it takes place. Drew believes that the project was extremely influential and that there is now increasing use in universities of learning outcomes.

Advantages of outcome-based education

There are major advantages in adopting an outcome-based model for medical education.

1. Relevance

Outcome-based education helps to focus discussion on the relationship between the curriculum and the practice of medicine and on education for capability. Use of an outcome-based model can highlight neglected areas, for example, informatics, health promotion, appropriate attitudes and communication skills while recognising the importance of traditional disciplines and content areas. By specifying the level of study, it can encourage higher level objectives and not just rote learning.

2. Controversy

"The very nature of outcome-based education forces one to address inherently controversial issues", suggests O'Neil (1994). Questions have to be asked as to what is the purpose of the medical school programme and what sort of doctor we are training. What are the fundamentals of medical education?

3. Acceptability

Outcome-based education is a model of education which is readily acceptable to most teachers. Outcome-based educa-

tion is teacher friendly. Few can disagree with the idea. "I find it hard to oppose the concept of OBE!" wrote Slavin (1994) "Who would argue that educational programmes should not be based on some idea of what we want students to know or be able to do?" Outcome-based education has an intuitive appeal that hooks people (Evans & King, 1994), and is acceptable politically, educationally, professionally, and ethically (Zitterkopf, 1994).

4. Clarity

The concept of outcome-based education is easily understandable. It is not constrained by educational jargon and is a relatively simple and unambiguous concept.

5. Provision of framework

Outcome-based education provides a powerful and robust framework for the curriculum. It helps unify the curriculum and prevents it becoming fragmented. It can be thought of as the glue that holds the curriculum together. By specifying courses in terms of their outcomes, individual teachers can see what they contribute to the whole curriculum. It can help to integrate the learning experiences, the teaching methods and the assessment.

6. Accountability

Outcome-based education, by setting out details of the finished product against which the product will be judged, emphasises accountability and quality assurance.

7. Self-directed learning

Outcome-based education encourages students to take more responsibility for their own learning. It provides students with a clear framework which allows them to plan their studies and to gauge their progress through the curriculum.

8. Flexibility

Outcome-based education is a potentially flexible approach. It does not dictate the form of course delivery or the educational strategy. Adjustments can be made at any time to the educational process provided that the changes proposed can be justified in terms of the specified learning outcomes.

9. Guide for assessment

Specification of the intended learning outcomes is essential for the planning and implementation of student assessment. Outcome-based education is consistent with the move to more performance-based assessment. It facilitates an assessment-to-a-standard approach in which what matters is the standards that students achieve and not the time they take to achieve this (Harden *et al.*, 1997).

10. Participation in curriculum planning

Many individuals or groups can contribute to the specification of outcomes. It encourages and facilitates integrated

teaching and learning and collaboration between different disciplines in medicine. The approach allows for wide participation in curriculum development and may involve members of the community, patients, other professions and employers. It embraces readily the concept of multi-professional education (Harden, 1998).

11. Tool for curriculum evaluation

Increasing attention has been focussed on curriculum evaluation. Outcomes provide a yard stick against which a curriculum can be judged. A failure to achieve the agreed outcomes almost certainly identifies a problem with the curriculum.

12. Continuity of education

Outcome-based education, by making explicit the outcomes for each of the phases or stages of education, helps to encourage continuity between basic or undergraduate education, postgraduate or vocational training and continuing education.

Presentation of the outcomes

Learning outcomes can be presented in a number of ways. Brown University described their learning outcomes as a list of nine abilities (Smith & Dollase, 1999). The English National Board of Nursing, Midwifery and Health Visiting (1991) have identified 10 key characteristics as the basis for the learning outcomes required for the Higher Award (Table 1). The Association of American Medical Colleges in the USA have developed a set of goals for medical education (AAMC, 1998). These are designed to guide individual schools to establish objectives for their own programmes. A consensus was reached on the attributes that physicians need in order that they are able to meet society's expectations of them in the practice of medicine. The attributes identified were grouped in four areas.

- Physicians must be altruistic
- Physicians must be knowledgeable
- Physicians must be skilful
- Physicians must be dutiful

Each attribute was followed by a more detailed statement as to contributions that the medical school experiences should make towards achievement of those attributes.

In Dundee we described initially the curriculum outcomes in 11 areas (Harden, 1998). These had many similarities to the Brown University abilities. Long lists of outcomes, however, are unmanageable and hard to apply in practice, and it is difficult to compare the outcomes included in different lists. McNeir (1993) suggested in relation to drafting outcomes, "the key for most schools seems to be developing outcomes that are broad in their vision but specific enough to be taught and measured effectively". There are advantages in having a structure which offers an easily remembered and understood framework. Such a structure could also allow comparisons to be made more readily between sets of outcomes from different sources.

With this in mind, we have developed a simple classification and format for the presentation of learning outcomes

Table 1. Ten key characteristics identified by the English National Board for Nursing, Midwifery and Health Visiting as the basis for the learning outcomes for the Higher Award.

1. Ability to exercise professional accountability and responsibility, reflected in the degree to which the practitioner uses professional skills, knowledge and expertise in changing environments, across professional boundaries and in unfamiliar situations.
2. Specialist skills, knowledge and expertise in the practice area where working, including a deeper and broader understanding of client/patient health needs, within the context of changing health care provision.
3. Ability to use research to plan, implement and evaluate concepts and strategies leading to improvements in care.
4. Team working, including multi-professional team working in which the leadership role changes in response to changing client needs, team leadership and team building skills to organise the delivery of care.
5. Ability to develop and use flexible and innovative approaches to practice appropriate to the needs of the client/patient or group in line with the goals of the health service and the employing authority.
6. Understanding and use of health promotion and preventative policies and strategies.
7. Ability to facilitate and assess the professional and other development of all for whom responsible, including where appropriate learners, and to act as a role model of professional practice.
8. Ability to take informed decisions about the allocation of resources for the benefit of individual clients and the client group with whom working.
9. Ability to evaluate quality of care delivered as an on-going and cumulative process.
10. Ability to facilitate, initiate, manage and evaluate change in practice to improve quality of care.

in medical education. In the three-circle outcome model described, outcomes are grouped in three areas (Figure 2). In this model the product of the training programme is identified as a doctor who is a professional able to undertake the necessary clinical tasks in an appropriate manner. The



Figure 2. A three-circle model representing educational outcomes.

inner segment of the diagram represents the tasks undertaken by a doctor. These relate both to health and illness and to individual patients and populations. The middle segment of the circles represents the expected outcomes which relate to the approach adopted by the doctor to the performance of the tasks in the inner segment. The outer segment represents the outcomes relating to professionalism and the development of the individual. A summary of outcomes in each of the three areas is given in Table 2.

The description of the 12 outcomes noted in Table 2 can be expanded to clarify what is expected in each area. Outcome 1, which relates to 'competence in clinical skills', is one of the outcomes which relates to the performance of the tasks expected of a doctor. It includes:

- obtaining and recording a comprehensive history;
- performing a complete physical examination and assessment of the mental state;
- interpretation of the findings obtained from the history and the physical examination; and
- reaching a provisional assessment of the patients' problems.

Outcome 9 'behaving ethically, recognising legal responsibilities and demonstrating appropriate attitudes', is an example of an outcome related to the doctor's approach to the tasks. It includes:

- an understanding of the law and medicine;
- moral reasoning;

Table 2. A three-circle outcome model adopted in the Dundee curriculum.

1.	Outcomes related to the performance of tasks expected of a doctor
	(1) Application of clinical skills of history taking and physical examination
	(2) Communication with patient's relatives and other members of the healthcare team
	(3) Health promotion and disease prevention
	(4) Undertaking practical procedures
	(5) Investigation of patients
	(6) Management of patients
2.	Outcomes related to the approach adopted by the doctor to the performance of tasks
	(7) Application of an understanding of basic and clinical sciences as a basis for medical practice
	(8) Use of critical thinking, problem solving, decision making, clinical reasoning and judgement
	(9) Incorporation of appropriate attitudes, ethical stance, and an understanding of legal responsibilities
	(10) Application of appropriate information retrieval and handling skills
3.	Outcomes related to professionalism
	(11) Role of the doctor within the healthcare delivery system
	(12) An aptitude for personal development and appropriate transferable skills

- ethical judgement;
- respect for dignity, privacy and the right of the patient as an individual in all respects, particularly with regard to confidentiality and informed consent;
- acceptance of the principle of collective responsibility;
- moral and ethical responsibilities involved in individual patient care and in the provision of care to populations of patients;
- practice of medicine in a multicultural society;
- respect for colleagues; and
- awareness of the need to ensure that the highest possible quality of patient care must always be provided.

Outcome 11, 'the role of the doctor within the health-care delivery system', is one of the outcomes related to professionalism. It includes:

- professionalism, code of conduct and personal attributes, for example, attention to duty, altruism, empathy, probity, punctuality, and putting the needs of the patient before one's own;
- role and responsibilities of a doctor;
- role of other professionals/interaction with other professionals/multi-professional practice;
- doctor as manager;
- medicine and alternative therapies; and
- healthcare delivery system including social and community contexts of care and relationships between primary care and hospital care.

This expansion is the first step in the production of a more detailed statement of outcomes in each area.

The three-circle outcome model described emphasises that medical practice is not just what a doctor does—the inner area of 'task performance'—but it is defined also by the doctor's approach to the task—the middle area. This is an important aspect of medical competence. To quote the song by Oliver "*It ain't what you do it's the way that you do it. And that's what gets results.*" In the same way, a 'good' doctor is defined not just by what he does but by the way he or she does it. The outer area represents the growth of the doctor as an individual, the personal attributes which are desirable and necessary in a doctor and the context within which he or she practices. Charles Handy (1994) in his book *The Empty Raincoat*, talks of the doughnut principle. In his inside-out doughnut the dough in the middle represents the core, what we have to do, and this is surrounded by the unbounded space of the hole on the outside, what we could do or could be.

The inner circle in the three-circle outcomes model represents the tasks we have to do, which are usually well defined and well understood. This is, however, not the whole picture. There is, according to Handy, the space beyond—the opportunity to make a difference, to go beyond the central duties in the core. Thus, the middle area represents the approaches to that which we could do and beyond this, the outer area represents the professionalism or what we could be. "The doughnut image" suggests Handy, "is a conceptual way of relating duty to a fuller responsibility in every institution or group in society".

The three-circle representation of outcomes can be viewed from a multi-dimensional perspective with a third dimension being the different areas of medical practice (Figure 3). The outcomes described may be exhibited in

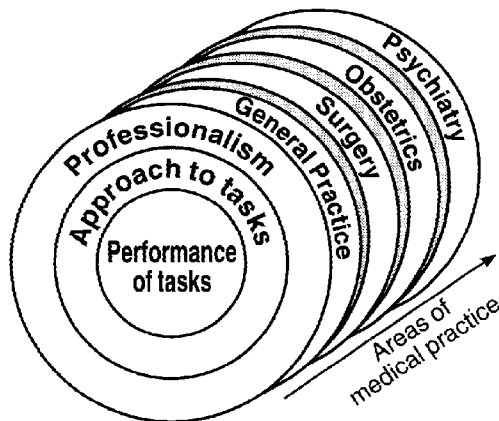


Figure 3. A three-dimensional view of the three-circle outcome model representing the outcomes in different specialties.

different ways in each specialty; for example, general practice, surgery, obstetrics, psychiatry, paediatrics, critical care, rehabilitation and so on. The undergraduate curriculum is built upon an integrated and cohesive structure through the contributions each discipline makes to the outcomes. In specialist or postgraduate training for one area of medical practice, the outcomes are viewed from the perspective of that specialty.

Specification of outcomes

Outcome-based education does not represent an easy option. Anyone adopting an outcome-based approach will find themselves struggling with difficult challenges. The identification of a school's educational outcomes represents a mission statement of what the school values. The outcomes specified indicate the importance the school attaches to issues such as the community, disease prevention, scientific thinking and the psychosocial model.

A range of stakeholders can be involved in the specification of outcomes. The following might contribute:

- university staff within the medical school with a broad range of interests;
- NHS hospital colleagues;
- general practitioners;
- recent graduates;
- students;
- other professions, e.g. nursing and professions allied to medicine;
- representatives of employers, e.g. government and trust managers;
- patients and representatives of patient groups; and
- the public including, for example, leaders of community health groups.

A measure of support and acceptance, by the stakeholders, of the outcomes specified is required if outcome-based education is to be implemented successfully.

Approaches developed for the identification of educational needs (Dunn *et al.*, 1985) may be applied to the identification of outcomes. These include:

- the Wisemen approach;
- the Delphi technique;
- critical incident studies;
- task analysis;
- study of errors in practice; and
- content analysis.

An outcome-based design sequence should be adopted in which the exit outcomes for the curriculum are first specified (Spady, 1988). The outcomes for the different phases of the curriculum are then derived from these and the process is repeated for the courses within each phase, the units within each course and the learning activities within each unit (Figure 4). The outcomes for the phases, courses, units and learning activities should be aligned with and contribute to the visionary exit outcomes. In this 'design down' process we move from exit outcomes to course outcomes and outcomes for individual learning experiences in a carefully structured manner.

A major challenge in outcome-based education is the design and implementation of an appropriate system for student assessment. The standards need to be set for each outcome. For example, for a practical procedure the level of proficiency expected of the student should be made explicit. This may vary at each phase of the course. It might include:

- Level 1.* an awareness of the procedure;
- Level 2.* a full theoretical understanding of the procedure;
- Level 3.* observation of the procedure;
- Level 4.* carrying out part of the procedure;
- Level 5.* undertaking the procedure under supervision; and
- Level 6.* undertaking the procedure unsupervised.

The precise definition or distinction between these stages will vary from outcome to outcome.

We can take one of the outcomes within the practical procedure domain as an example—lumbar puncture. Young doctors after several years of postgraduate training may be expected to carry out a lumbar puncture for therapeutic purposes unsupervised. On qualification they may be expected to be able to undertake the procedure under supervision and for diagnostic purposes will have practised the technique on models in the Clinical Skills Centre, and/or patients in the wards. After 3 years of a 5-year undergraduate programme they will have an understanding of the technique and the indications for it, and will have seen it demonstrated live or on a videotape. After the first year of the undergraduate programme they will have an awareness of the

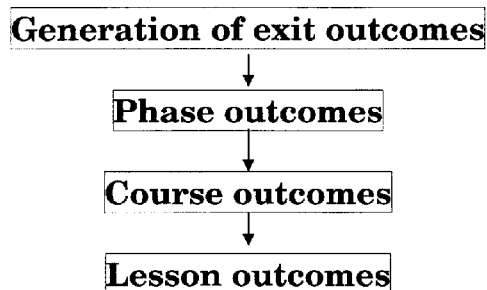


Figure 4. The design down process for development of outcomes.

technique and an understanding of the normal anatomy and physiology.

Implementation of outcome-based education

There are implications of implementing an outcome-based education programme for all concerned with the educational process. This includes faculties, curriculum committees, course planning groups, individual teachers, assessment committees and students.

Implications for Faculty or School of Medicine

The outcomes, as displayed, represent a mission statement by a Faculty or School of Medicine and communicate to the staff, to students and to others what the school values. A statement of outcomes is important too from an accountability or academic standards perspective. The outcomes can be used as the standard against which an internal or external judgement of the success or otherwise of the educational programme can be made.

- Was due consideration given to determining the educational outcomes? Were all the stakeholders involved?
- Have the outcomes been clearly and unambiguously communicated to all concerned?
- Is the overall educational programme and educational environment consistent with the outcomes as stated?
- Are the exit outcomes achieved by the students at the time of graduation?

Implications for curriculum planning committees and course committees

The outcomes should guide the courses included in each phase of the curriculum, the content in each course, and the teaching methods and strategies to be adopted.

- Are teachers familiar with the specified educational outcomes?
- Are the outcomes, appropriate to each phase of the curriculum, addressed in that phase?
- Does each course contribute appropriately to the outcomes for the phase?
- Are the learning experiences offered likely to assist the students to achieve the outcomes?
- Do students achieve the outcomes specified for the phase of the curriculum by the end of the phase?

Implications for individual teachers

Educational outcomes help teachers to relate their own contributions to the curriculum as a whole and help to clarify their role as teachers in the educational programme.

- Have teachers a general awareness of the educational outcomes for the curriculum?
- Have teachers a detailed understanding of the educational outcomes relating to their own contribution to the curriculum?
- Does their contribution to the educational programme reflect this understanding?

Implications for staff with responsibility for assessment

The educational outcomes should be used as the framework for assessment in each phase of the curriculum. It is essential

that student assessment procedures reflect the learning outcomes. This is possible using performance-assessment approaches such as the OSCE (Harden & Gleeson, 1979), and portfolio assessment (Snadden & Thomas, 1998).

- Do the assessment procedures adopted assess the outcomes?
- Are under-performing students, that is those who do not reach the standard required, given appropriate feedback and a further opportunity to demonstrate their competence?

Implications for students

It is essential that not only should the outcomes for the curriculum be clearly specified, but that they should be communicated unambiguously to students at the beginning of the course and at the start of each part of it. Course handbooks and study guides should highlight the curriculum outcomes relevant to that part of the course. In the Dundee curriculum, for example, the front page of each task-based study guide describes how the study of the task contributes to the 12 curriculum outcomes.

Students should also be familiar with criteria used to assess whether they have achieved the outcomes specified and the assessment methods employed. Students should be able, as they proceed through the course, to gauge their own progress towards achieving the exit outcomes. Students may be held accountable for demonstrating that they have achieved the outcomes specified. This may be done using portfolios.

- Are students familiar with the outcomes?
- Have students been involved in discussions relating to the outcomes as specified?
- Do they find the outcomes helpful as guides to learning?
- Do students recognise that the learning experience provided and the assessment procedures reflect the outcomes?

Conclusion

Outcome-based education has many inherent advantages which must make it an attractive model for curriculum planning for curriculum developers, teachers, employers, students and the public. Although outcome-based education has obvious appeal, research documenting its effects is fairly rare (Evans & King, 1994). Nonetheless, the arguments for introducing outcome-based education and evaluating its role in medical education are strong. Like many developments in medical education, however, it does not offer a panacea. It does represent, however, what is almost certainly a valuable education tool in medical education. Hopefully its adoption will encourage a legitimate debate on what kinds of educational outcomes we expect in medicine and how they will be measured.

Acknowledgements

We are grateful to all staff working in the Medical School at Dundee who have contributed to the development of the outcomes for the Dundee curriculum and to Barbara Stilwell who drew our attention to the relevance of the Handy's doughnut principle to the three-circle model we have proposed.

Notes on contributors

R M HARDEN is Director of the Centre for Medical Education, Postgraduate Dean and Teaching Dean, University of Dundee, UK.

J R CROSBY is Curriculum Facilitator at the Faculty of Medicine, University of Dundee, UK.

M H DAVIS is a doctor specialising in medical education, and Senior Lecturer in Medical Education, Centre for Medical Education, University of Dundee, UK.

References

- ASSOCIATION OF AMERICAN MEDICAL COLLEGES (1998) *Report 1: Learning Objectives for Medical Student Education. Guidelines for Medical Schools* (Washington, Medical School Objectives Project, AAMC).
- DREW, S. (1998) *Key Skills in Higher Education: Background and Rationale* (SEDA Special No 6. Staff and Education Development Association).
- DENN W.R., HAMILTON, D.D. & HARDEN, R.M. (1985) Techniques of identifying competencies needed of doctors, *Medical Teacher*, 7, pp. 15–25.
- ENGLISH NATIONAL BOARD FOR NURSING, MIDWIFERY AND HEALTH VISITING (1991) *Ten Key Characteristics of the ENB Higher Award* (London, ENB Publications).
- EVANS, K.M. & KING, J.A. (1994) Research on OBE: What we know and don't know, *Educational Leadership*, 51(6), pp. 12–17.
- GENERAL MEDICAL COUNCIL (1993) *Tomorrow's Doctors: Recommendations on Undergraduate Medical Education* (London, GMC).
- GLATTHORN, A.A. (1993) Perspectives and imperatives: outcome-based education: reform and the curriculum process, *Journal of Curriculum and Supervision*, 8(4), pp. 354–363.
- HANDY, C. (1994) *The Empty Raincoat: Making Sense of the Future* (UK, Hutchison).
- HARDEN, R.M. (1986) Ten questions to ask when planning a course or curriculum. ASME Medical Education booklet no 20, *Medical Education*, 20, pp. 356–365.
- HARDEN, R.M. (1998) Multi-professional education: Part 1—Effective multi-professional education: a three-dimensional perspective. AMEF Medical Education Guide No 12, *Medical Teacher*, 20, pp. 402–408.
- HARDEN, R.M. & DAVIS, M.H. (1995) The core curriculum with options of special study modules, *Medical Teacher*, 18, pp. 125–148.
- HARDEN, R.M., DAVIS, M.H. & CROSBY, J.R. (1997) The new Dundee medical curriculum: a whole that is greater than the sum of the parts, *Medical Education*, 31, pp. 264–271.
- HARDEN, R.M. & GLEESON, F.A. (1979) Assessment of clinical competence using an objective structured clinical examination (OSCE). ASME Medical Education Booklet No 8, *Medical Education*, 13, pp. 41–54.
- MCKERNAN, J. (1993) Perspectives and imperatives: some limitations of outcome-based education, *Journal of Curriculum and Supervision*, 8(4), pp. 343–353.
- MCNEIR, G. (1993) *Outcome-based Education: Tools for Restructuring. Oregon School Study Council Bulletin* (Eugene, Oregon School Study Council).
- O'NEIL, J. (1994) Aiming for new outcomes: the promise and the reality, *Educational Leadership*, 51(6), pp. 6–10.
- OTTER, S. (1992) *Learning Outcomes in Higher Education*, London, Unit for the Development of Adult Continuing Education.
- PLISKA, A.-M. & MCQUAIDE, J. (1994) Pennsylvania's battle for student learning outcomes, *Educational Leadership*, 51(6), pp. 66–69.
- SLAVIN, R.E. (1994) Outcome-based education is not mastery learning, *Educational Leadership*, 51(6), pp. 14–15.
- SMITH, S.R. & DOLLASE, R. (1999) Planning, implementing and evaluating a competency-based curriculum, *Medical Teacher*, 21, pp. 15–22.
- SNADDEN, D. & THOMAS, M. (1998) The use of portfolio learning in medical education. AMEE Guide No 11, *Medical Teacher*, 20, pp. 192–199.
- SPADY, W.G. (1988) Organising for results: the basis of authentic restructuring and reform, *Educational Leadership*, October, pp. 4–8.
- SPADY, W.G. (1993) Cited by GLATTHORN, A.A. (1993) Perspectives and imperatives: outcome-based education: reform and the curriculum process, *Journal of Curriculum and Supervision*, 8(4), pp. 354–363.
- WALTON, H.J. (1993) Proceedings of the World Summit on Medical Education, *Medical Education*, 28, supplement 1, pp. 140–149 (Oxford, Blackwell Scientific Publications Ltd).
- ZITTERKOPF, R. (1994) A fundamentalist's defence of OBE, *Educational Leadership*, March, 51(6), pp. 76–78.