

# Outcome-Based Education

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### ABSTRACT

The move to outcome-based education has been one of the most important trends in health-profession education in recent years. This paper defines *outcomes* and *outcome-based education*, describes the development of outcome-based education, identifies several different ways that outcomes have been presented, and discusses the advantages and disadvantages of the outcome-based educational approach. The implementation of outcome-based education at the University of Dundee medical school, Scotland, UK is described as a case study for curriculum planners in veterinary medical education. The lessons learned in Dundee from six years' experience with outcome-based education are identified to aid veterinary medical educators wishing to implement the approach.

### DEFINITION OF OUTCOMES AND OUTCOME-BASED EDUCATION

An outcome is a culminating demonstration of learning;<sup>1</sup> it is what the student should be able to do at the end of a course. Outcome-based education is an approach to education in which decisions about the curriculum are driven by the exit learning outcomes that the students should display at the end of the course. "In outcome-based education," suggest Harden and colleagues, "product defines process. Outcome-based education can be summed up as *results-oriented 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" (emphasis original).<sup>2</sup> There is a significant difference between outcome-based education and simply producing outcomes for an existing curriculum. "Outcome-based," insists Spady, "does not mean curriculum based with outcomes sprinkled on top. It is a transformational way of doing business in education."<sup>1</sup>

### THE DEVELOPMENT OF OUTCOME-BASED EDUCATION

Much of the work on the development of outcome-based education was carried out in pre-university education in the US by Spady.<sup>3</sup> The Coleman report, published in 1966, demonstrated problems in the pre-university educational system, with results attributed almost entirely to the socioeconomic and ethnic background of the students who attended the school. A need for reform of the American educational system was identified. Clarity of focus, expanded opportunity, and high expectations were the corner stones of reform. Educators turned to the work of Carroll<sup>4</sup> and Bloom<sup>5</sup> to achieve the desired reform. Carroll had argued that it was inappropriate to fix the time for study and expect variable learning results from students. What was needed was a uniform minimum standard that all students would be expected to achieve and that all would be given the time needed to achieve. Bloom developed Carroll's thinking into the notion of mastery learning, in which

a fixed level of performance was to be achieved by students by changing the relationship between time and learning. The learning became fixed and the time to achieve the learning became the variable. These ideas became the underlying educational principles of *outcome-based education*. The State Board of Education, Pennsylvania, decided in 1992 to replace rigid adherence to the traditional school calendar with a set of performance capabilities that students had to achieve. One school in Glendale Arizona took the decision, on its own, to extend the school day to better deploy its resources for the benefit of student learning. Aurora public schools in Colorado identified five, role-based, exit outcomes in 1990: self-directed learners, collaborative workers, complex thinkers, community contributors, and quality producers. The promise of far-reaching reform through increased accountability and more school autonomy and flexibility was seductive.

These reforms in pre-university education impacted on health-profession education at a time of dissatisfaction with medical education. In the US the *General Professional Education of the Physician (GPEP) Report*, published by the Association of American Medical Colleges (AAMC) in 1985, called on medical schools to give each student the knowledge, skills, values, and attitudes that all physicians should have. In the UK in 1993 the General Medical Council (GMC) published its recommendations for undergraduate medical education in *Tomorrow's Doctors*, a document that signaled far-reaching reform of the undergraduate medical curriculum. As part of that report, the education committee of the GMC identified the attributes of the independent practitioner. The search for the outcomes of medical education had begun.

### PRESENTATION OF THE OUTCOMES

Exit learning outcomes for the health care professions can be presented in a number of ways. Smith and Dollase<sup>6</sup> identified nine abilities expected of graduates of their MD2000 medical program at Brown University in Rhode Island (Table 1).

**Table 1: Nine abilities expected of graduates of the Brown University medical program**

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1	Effective communication
2	Basic clinical sciences
3	Using basic sciences in the practice of medicine
4	Diagnosis, management, and prevention
5	Lifelong learning
6	Self-awareness, self-care, and personal growth
7	The social and community contexts of healthcare
8	Moral reasoning and clinical ethics
9	Problem solving

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The English National Board of Nursing, Midwifery and Health Visiting identified ten key characteristics as the basis for the learning outcomes required for the higher award.<sup>7</sup> These are

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 multiprofessional 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 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 ongoing and cumulative process
10. ability to facilitate, initiate, manage and evaluate change in practice to improve quality of care

Long lists of outcomes are, however, somewhat difficult to remember and manage. McNeir<sup>8</sup> suggested, in relation to identification of outcomes, that “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.”

In 1998 the AAMC developed a set of goals for medical education and identified the attributes that physicians need to meet society’s expectations of them.<sup>9</sup> These attributes were memorably stated in four groups: the physician must be altruistic, knowledgeable, skillful, and dutiful. Charles Boelen of the World Health Organisation (WHO) advanced the idea of the five-star doctor for the twenty-first century.<sup>10</sup> S/he would be a care provider, decision maker, communicator, and manager and be community-minded. In Canada, the CanMEDS project<sup>11</sup> presented its understanding of the essential roles and key competencies of specialist physicians: medical expert, communicator, collaborator, manager, health advocate, scholar, and professional.

What all of these groups were saying, in essence, was represented by Harden and colleagues<sup>2</sup> in a three-circle outcome model, shown in Figure 1.

**Figure 1: The three-circle outcome model**



The inner circle represents tasks undertaken or work done by the doctor: *doing the right thing*. If that was all that was involved in being a doctor, however, we would be merely technicians and so the middle circle represents the approach taken to the tasks. The middle circle emphasizes the necessity for knowing not only what to do but why and how to do it: *doing the thing right*. The outer circle represents the personal attributes and professionalism of the doctor: *the right person doing it*.

### ADVANTAGES OF THE THREE-CIRCLE MODEL OF OUTCOME-BASED EDUCATION

The outcome-based approach as represented in the three-circle model has multiple advantages for health professions' education.<sup>2</sup> The advantages include

1. *Relevance*—Outcome-based education promotes fitness for practice and education for capability. The three-circle model ensures that areas that have been underrepresented in the traditional curriculum, such as appropriate attitudes and professionalism, are given the emphasis that is required.
2. *Controversy*—The process of identification of the outcomes within an institution promotes discussion of fundamental questions, such as what type of health professional are we aiming to train and what are the core issues.
3. *Acceptability*—The notion of the three-circle model of outcome-based education seems acceptable to most health professions' teachers and has an intuitive appeal.
4. *Clarity*—An explicit statement of what the educational process aims to achieve clarifies the curriculum for both students and teachers and provides a focus for teaching and learning.
5. *Provision of a Framework*—Outcome-based education provides a robust framework for integration of the curriculum.
6. *Accountability*—By providing an explicit statement of what the curriculum is setting out to achieve, outcome-based education emphasizes accountability. The outcomes provide details against which the graduates of the curriculum can be measured and facilitate the quality-assurance process.
7. *Self-Directed Learning*—If students are clear about what they are trying to achieve, they can take more responsibility for their own learning. Outcome-based education thus promotes a student-centered approach to learning and teaching.
8. *Flexibility*—Outcome-based education does not specify educational strategies or teaching methods. What is important is that the students achieve the outcomes and not how they get there. Innovation in teaching is possible and also encouraged by this approach and different learning styles can be accommodated.
9. *Guide for Assessment*—As it is the outcomes that are assessed, planning the examinations is clarified. The outcomes provide the framework for student examinations.

10. *Contribution to Curriculum Planning*—Identification of the exit learning outcomes enables specification of phase learning outcomes. The phase learning outcomes lead to the identification of course or module outcomes. The course outcomes lead to the identification of individual lesson outcomes. Outcome-based education is thus a top down approach to curriculum planning that aids coherence and cohesion in student learning.

11. *Facilitates Curriculum Evaluation*—The outcomes provide benchmarks against which the curriculum can be judged.

12. *Continuum of Education*—The outcomes provide pathways along which individuals can progress in basic or undergraduate, postgraduate and continuing education.

### DISADVANTAGES OF OUTCOME-BASED EDUCATION

The move to outcome-based education attracted fierce opposition, as well as strenuous promotion, in the pre-university sector. The disadvantages of the approach were seen as

1. *Imposition of Constraints*—Opponents viewed the implementation of the outcome-based approach as imposing constraints on children's education. Their concern was that education should be open ended, taking the child where he or she was able to develop. While this can be seen as a disadvantage in pre-university education, it is an advantage in health-professions education, focusing attention on fitness to practice.
2. *Inclusion of and Emphasis on Attitudes and Values Was Inappropriate*—Opponents of outcome-based education in pre-university education claimed that "the proposed outcomes watered down academic in favor of ill-defined values and process skills" and that "traditional academic content is omitted or buried in a morass of pedagogic clap-trap in the outcome-based education plans that have emerged to date."<sup>12</sup> The inclusion of attitudes, values, and professionalism is, however, an advantage in health-professions education at a time when health professionals are being criticized regularly in the media for poor attitudes and a lack of professionalism.
3. *Inhibition of Learning by Discovery*—McKernan<sup>13</sup> argued that education should be valued for its own sake and not because it led to a pre-identified 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 characterize learning through discovery and enquiry." He does, however, accept that this liberal notion of education is more appropriate in the arts and humanities. In health-professions curricula, the graduate must be fit to practice and the emphasis on outcomes promotes this. Curriculum planning is facilitated, making education more efficient as well as effective. The search is on, in many parts of the world, for ways to reduce the training time in many professions, but particularly in medicine, in response to government demand and the need to train increased numbers of

doctors. Outcomes provide the framework for efficient curriculum planning in the top-down approach described above.

### CASE STUDY: THE IMPLEMENTATION OF OUTCOME-BASED EDUCATION AT DUNDEE MEDICAL SCHOOL, SCOTLAND, UK

Outcome-based education was introduced at the University of Dundee medical school in 1997. Ten steps were followed in the outcome-based curriculum planning process<sup>14</sup> and those ten steps are described here.

#### Step 1: Identification of the Type of Doctor That the Country Needs

This step is decided in the UK by the GMC and relates to the level of training. All UK medical schools provide graduates who progress to the next stage of training, the pre-registration house-officer year, when graduates work as house officers in recognized posts in national health service hospitals. Training is thus focused on preparing for the next stage of training and not on independent practice.

#### Step 2: Identification of the Outcomes of the Educational Process

In outcome-based education the exit learning outcomes must be explicit and clearly and unambiguously defined. Medical educators supported discussion and debate among faculty that led to agreement on the 12 exit learning outcomes, based on the three-circle model (Harden et al 1999). These learning outcomes are:

##### *What the Doctor Is Able to Do—Doing the Right Thing: The Technical Intelligences*

1. *Competence in Clinical Skills*—The doctor should be competent to take a comprehensive, relevant medical and social history and perform a physical examination. He or she should be able to interpret the findings and formulate an appropriate action plan to characterize the problem and reach a diagnosis.
2. *Competence to Perform Practical Procedures*—The doctor should be able to undertake a range of procedures on a patient for diagnostic or therapeutic purposes. This usually involves using an instrument or some device; for example, suturing a wound or catheterization.
3. *Competence to Investigate a Patient*—The doctor should be competent to arrange appropriate investigations for a patient and where appropriate interpret these. The investigations are carried out on the patient or on samples of fluid or tissue taken from the patient. Personnel specifically trained for the purpose usually carry out the investigations (for example, a clinical biochemist or radiographer), but the investigations may, in some instances, be carried out by the doctor.
4. *Competence to Manage a Patient*—The doctor is competent to identify appropriate treatment for the patient and to deliver this personally or to refer the patient to the appropriate colleague for treatment. This outcome includes interventions such as surgery and drug therapy and contexts for care such as acute care and rehabilitation.

5. *Competence in Health Promotion and Disease Prevention*—The doctor recognizes threats to the health of individuals or communities at risk. The doctor is able to implement, where appropriate, the basic principles of disease prevention and health promotion. This is recognized as an important basic competence alongside the management of patients with disease.
6. *Competence in Skills of Communication*—The doctor is proficient in a range of communication skills, including written and oral, both face-to-face and by telephone. He or she communicates effectively with patients, relatives of patients, the public, and colleagues.
7. *Competence to Retrieve and Handle Information*—The doctor is competent in recording, retrieving, and analyzing information using a range of methods, including computers.

##### *How the Doctor Approaches Practice—Doing the Thing Right*

1. *With an Understanding of Basic, Clinical, and Social Sciences*—Doctors should understand the basic, clinical and social sciences that underpin the practice of medicine. They are able not only to carry out the tasks described in outcomes 1 to 7 but to do this with an understanding of what they are doing, including an awareness of the psychosocial dimensions of medicine, and to justify why they are doing it. These are termed the *academic intelligences*.
2. *With Appropriate Attitudes, Ethical Understanding, and Understanding of Legal Responsibilities*—Doctors adopt appropriate attitudes, ethical behavior, and legal approaches to the practice of medicine. This includes issues relating to informed consent, confidentiality, and the practice of medicine in a multicultural society. The importance of emotions and feelings is recognized as the *emotional intelligences*.
3. *With Appropriate Decision-Making Skills, Clinical Reasoning, and Judgment*—Doctors apply clinical judgment and evidence-based medicine to their practices. They understand research and statistical methods. They can cope with uncertainty and ambiguity. Medicine requires, in some cases, instant recognition, response, and unreflective action, and at other times, deliberate analysis, decisions, and action, following a period of reflection and deliberation. This outcome also recognizes the creative element in problem solving that can be important in medical practice. Outcome 10 involves the *analytical and creative intelligences*.

##### *The Doctor as a Professional—The Right Person Doing It: The Personal Intelligences*

1. *Appreciation of the Role of the Doctor within the Health Service*—Doctors understand the healthcare system within which they are practicing and the roles of other professionals within the system. They appreciate the role of the doctor as physician, teacher, manager, and researcher. This implies a willingness on the part of the doctor to contribute to research even in a modest way and to build up the evidence base for medical practice. It also recognizes that most doctors have some management and teaching responsibility.

2. *Aptitude for Personal Development*—The doctor has certain attributes important for the practice of medicine. He or she is a self-learner and is able to assess his or her own performance. The doctor takes responsibility for his or her own personal and professional development, including personal health and career development.

### **Step 3: Identification of Curriculum Content**

This step relates to the scope of the curriculum. It is the outcomes that decide what is taught. To achieve a place in the curriculum, all courses must contribute in some way to the curriculum outcomes. The outcomes thus have an important role to play in eliminating redundant material and reducing factual content to what is relevant.

### **Step 4: Student Progress through the Curriculum**

This step relates to the sequencing of the curriculum. The curriculum needs to be planned so that student progression towards the exit learning outcomes is coherent and cohesive. Student progression towards the exit learning outcomes involves increased scope, utility, and proficiency.

*Increased scope* involves increases in both breadth and difficulty. *Increased breadth* includes extending student learning to more or new topics or to different practice contexts or enabling the student to build on existing learning to attain new learning. *Increased difficulty* involves more in-depth or advanced consideration of a topic, the application of learning to a more complex situation, or dealing with less obvious, subtler situations. *Increased utility* involves the application of learning to medical practice. *Increased proficiency* means that the student becomes more accomplished. Performance becomes more efficient and more second nature as the student hones his/her skills. This progression towards the exit learning outcomes is a journey towards fitness to practice in the real world.

### **Step 5: Identification of Appropriate Educational Strategies**

This is an important step that identifies the educational philosophy of the school. The outcome-based approach has an important part to play in the selection of appropriate educational strategies. A student-centered, problem-based approach, with integration of the curriculum, some community-based teaching and learning, a proportion of elective courses chosen individually by students, and a systematic educational program were the educational strategies selected to support the learning outcomes. It is important to decide on the educational strategies before decisions are taken regarding teaching methods, as the educational philosophy should inform decisions regarding teaching methods.

### **Step 6: Identification of Teaching Methods**

Various teaching methods were employed, in accordance with the educational strategies adopted, to enable students to achieve the learning outcomes. For example, the learning opportunities provided in phase 2 of the curriculum included elements of problem-based learning, independent learning, lectures, small group work in the integrated learning area, clinical skills sessions, ward-based teaching, sessions in general practice, and computer-based learning. Only the small group and clinical sessions were compul-

sory. Students could then select the learning opportunities that best suited their preferred learning style to enable them to achieve the learning outcomes.

### **Step 7: Decision as to How the Students Will Be Assessed and the Curriculum Evaluated**

The student-assessment system is based on the demonstration of achievement of the learning outcomes by the individual student in each year of the curriculum. The learning outcomes, along with the content material of individual courses, provide a grid or framework for examination design, in a process known as blueprinting.<sup>15</sup> The outcomes provide a benchmark or framework for curriculum evaluation in each stage of the course.

### **Step 8: The Educational Environment**

The outcomes have a fundamental impact on the educational environment. The teaching, the teachers, the student perception of the climate or ethos of the school, and student social and academic self-perceptions are all shaped by the outcomes.

### **Step 9: Management and Administration of the Curriculum**

The academic committee and administrative support structure of the school were redesigned to support outcome-based education. Curriculum time was no longer the property of individual departments but was controlled by a central committee, the Undergraduate Medical Education Committee. The steering group of this committee planned the curriculum. Integrated course-teaching teams planned and implemented individual courses to enable the students to achieve the learning outcomes. Individual members of faculty were appointed as advocates to ensure that each outcome was appropriately represented throughout the educational program. The administrative and secretarial support structure of the school was completely reshaped to support the integrated nature of the outcome-based curriculum.

### **Step 10: Communication of the Curriculum to All Stakeholders**

Staff development and student induction are critical for the success of the outcome-based approach. The staff development process involved meetings, such as away days, presentations to departmental academic meetings, and individual discussions to ensure staff buy-in to the approach and keep staff informed of developments. Student induction was easier and students often informed staff of the learning outcomes that they were expected to achieve as the result of individual teaching sessions. Student study guides played an important part in informing the students of what they were expected to achieve. Student handbooks for each year of the course and a student induction period at the start of each year were found to be necessary. A curriculum newsletter was also helpful for updating both staff and students.

## **LESSONS LEARNED FROM IMPLEMENTING OUTCOME-BASED EDUCATION**

It has been said that it is easier to move a graveyard than change a medical curriculum. Changing to an outcome-based curriculum at Dundee required vision, leadership, and the commitment of large numbers of faculty. In 1993 the UK government funded a curriculum facilitator post for a

three-year period in every UK medical school. This additional resource was crucial in achieving change. The curriculum is now embedded with general acceptance. More work, however, is needed to fine-tune the curriculum. The move to outcome-based education proved to be a complex process that needed curriculum mapping to enable both staff and students to understand the planned progression and the complex relationship among learning outcomes, learning opportunities, curriculum content, and the assessment of the students. That work is underway. The emphasis on knowledge as a learning outcome seemed to be appropriate, but greater emphasis could have been placed on some other outcomes. Although the model includes health promotion and disease prevention, the GMC<sup>16</sup> considered that insufficient emphasis was given to public health medicine and encouraged the school to consider ways of enhancing this aspect of the course. Personal attributes and ethical approaches may also need increased emphasis. Rennie and Crosby<sup>17</sup> showed that, while most Dundee medical students consider dishonest behavior to be wrong, some students were unsure about what constituted dishonesty.

The move to outcome-based education was a major exercise for the medical school but was worthwhile. In a soon-to-be-published UK national survey of pre-registration house officers, conducted by researchers at Oxford University, 80% of Dundee medical school graduates said they had been well prepared for their posts. This figure was higher than for any other medical school in the UK.

## SUMMARY

Outcome-based education has much to offer institutions training health professionals. The approach is based on sound educational principles and provides a robust framework for students to acquire the necessary fitness to practice. The three-circle model of outcome-based education provides a template that can be used by a range of health professions at the undergraduate, postgraduate, and continuing-education levels. Institutionalization of the approach requires fundamental restructuring of the school and an intensive planning process, with taxing activities on many fronts. When visiting Chile recently, I stayed in a hotel that was undergoing structural alterations. There was a notice to hotel guests pinned at the entrance. It said, "sorry for the inconvenience—but you'll love the result when it is finished." The same may be said about the move to outcome-based education.

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