

3 Principles of curriculum design

Janet Grant

The Open University, UK; University College London Medical School, UK; Centre for Medical Education in Context, UK; Peninsula Schools of Medicine and Dentistry, UK



KEY MESSAGES

- A curriculum is an ideological, social and aspirational document that must reflect local circumstances and needs.
- The curriculum is made up of all the experiences learners will have that enable them to reach their intended achievements from the course.
- A curriculum statement should enable learners, teachers and managers to know and fulfil their obligations in relation to the course. It should describe intended learner achievements, content to be covered (the syllabus), teaching, learning, supervision, feedback and assessment processes, entry requirements and course structure.
- A syllabus is simply a list of the main topics of a course of study. This is only part of the curriculum.
- The way in which a curriculum for medical education is constructed depends on the designers' views about how students learn, how medicine is practised, issues of social responsibility and accountability, the role of the knowledge base, professional values and health service development.
- The curriculum design process should ask what is the purpose of the educational programme, how the programme will be organised, what experiences will further these purposes and how we can determine whether the purposes are being attained.

There is no body of evidence that shows that there is one best choice for framing a curriculum as a whole or any of its parts. A curriculum should simply be fit for the purpose and context of its place and day.

Introduction

My bookshelves carry an ever-expanding history of medical education, so I chose some books at random to determine whether the years had produced different ideas about curriculum design. Partially they had, and partially they had not. For instance, in 1961,(1) curriculum debates centred on instructional skills and ideas about how students learn. The curriculum was to be made up of objectives and experiences with relatively traditional divisions of content, but all based on the health needs of society, the philosophy of scientific thinking and the professional characteristics of physicians. In 1972,(2) the advice was to define aims and objectives in behavioural terms (not so different from today's preoccupation with competences, perhaps), and also that curricula should offer what the student and community require – not what is convenient for medical school staff to offer. Teachers were advised to try to integrate their teaching more effectively and give students some choice over what they learn. By 1982(3) and 1983,(4) a systems approach to educational design was advocated, with an emphasis on teaching methods aimed at delivering the learning objectives in the belief that active student involve-

ment in learning was a likely effective strategy. By 1989,(5) it seemed reasonable to devote entire books to the question of how the curriculum might be structured to facilitate learning appropriate to clinical practice. In the journals, there is the constant revived and revisited theme of social accountability,(6) incongruously placed alongside the equally powerful, and contradictory, rhetoric of the 'post-colonial dilemma' of globalisation.(7)

We can see from this snapshot that ideas develop according to economic and social imperatives but continue to have roots in previous thinking. Ideas of integration, a focus on students' learning rather than teachers' teaching, a need for teachers to learn how to do their job well, a focus on outcomes, albeit expressed as objectives or even competences, and a recognition of the responsibility of the school to respond to societal need and to prepare the student for professional practice have been current for many years. But the same ideas can give rise to different curriculum designs and to different processes of reaching that design. The design principles that we have now are based on the professional choices that curriculum designers make. Those choices are informed by the theories, the dominant rhetoric and social conditions of the day, and by the values and experiences of the medical profession doing its best to produce the next generation of doctors fit for its changing purpose.

And there is an enduring truth, expressed by Michael Apple,(8) that a curriculum is an ideological statement, expressing values, beliefs and aspirations. It cannot be a

neutral document, but must reflect relevant values deriving from the local political, cultural, professional and social context. This is even more so, as globalisation is the catchword of the day which threatens to homogenise curricula to standards not derived from local contexts.

Jolly and Rees recognise that there is a need for rational, open and accountable curriculum design processes. They eloquently describe the accompanying lack of evidential basis for how best to do this, but conclude that: 'Although curriculum design is an imprecise and arbitrary rubric, such a code is needed: systematic and arbitrary is somewhat better than capricious' (9, p. 22).

Curriculum design in medical education is an arena in which many battles are fought. There are many different views about, for example, what medical students should learn, how they should learn it, what qualities we want them to develop, where the science base stands, where skills of communication and examination should be acquired, how long it should all take and whether we want to frame their task in terms of outcomes or competences. The call for management, leadership and teaching skills to be included in the curriculum persists,⁽¹⁰⁾ as, apparently in contradiction, the debate about curriculum overload continues, albeit without substantial research evidence.

There are equally as many views about how a curriculum should be developed and structured. And given that in education it is often difficult to find incontrovertible research findings on which to base decisions, there are no evidence-based approaches to curriculum design that we could meaningfully quote. This means that vogues in curriculum design ebb and flow in response to the dominant concerns of society and the professions, just as they ebb and flow in relation to teaching and learning methods, curriculum evaluation and even assessment of learning.

All these factors make a heady cocktail, which ensures that the business of curriculum design, development and review will never close. Eisner⁽¹¹⁾ talks of 'curriculum ideologies', which are 'the value premises from which decisions about practical educational matters are made'. These can be very strong, so that, as Toohey says, 'Alternative views are literally "unthinkable"' (12, p. 44). And so zealotry for a particular curriculum model develops, as she says, on beliefs that are 'so commonly held in the discipline, that they are accepted without question'. Integration, learner-centredness, and adult learning theories probably come into this category of belief. So because curriculum theory is based largely in ideology rather than evidence, this continuing spiral of changing views will never cease.

To muddy the pool even further, predominant concerns in curriculum design at the basic (medical school), postgraduate and continuing education levels are very different. In medical school, we have students who have everything to learn and a school that has the responsibility and opportunity to ensure that they do and the right to call on the student's time and fill it with activities that reflect the school's view of curriculum.

At the postgraduate level, learning occurs in the context of clinical practice. Our student now is a young doctor who still has much to learn and examinations to pass, but also

has clinical duties to fulfil. Much of the learning is dependent on the clinical work that is experienced, and teachers and curriculum planners only have limited power to organise the days of a postgraduate trainee.

At the stage of continuing professional development, every doctor has become an autonomous professional, each with a unique history of experience and many with unique learning needs arising out of their professional practice. For most, there is little protected time and minimal finance for learning. At this point, the idea of a set curriculum might seem to be an unworkable irrelevance. This, in turn, renders the standardised assessment of practising physicians highly problematical.⁽¹³⁾ Instead, we might simply guide senior doctors to identify their own learning needs, design their own learning and reinforce that in their own practice.⁽¹⁴⁾

Here, therefore, the principles of curriculum design are discussed only as they apply to undergraduate medical education and postgraduate training. Enduring principles are presented that will stand the test of time, changes of fashion and the many different contexts across the world in which medical curricula are applied. The principles outlined should be flexible enough to yield different types of curricula in different hands. The curriculum must be appropriate to its context, not a slave to abstract, if well meaning, intent. Effective education must be contextual, rooted in its own culture and conditions.

What is curriculum?

Educators and philosophers have addressed the question of what to teach and how to teach at least since Plato wrote *The Republic* in about 360 BCE. It might seem surprising, then, that it is only relatively recently that curriculum design has become a topic of debate in its own right, although the initial concerns about the nature of curricula arose with the advent of mass schooling in the late 19th century.⁽¹⁵⁾ Until that point, curricula were defined by elite and specialist groups, and a curriculum statement (whether explicit or implicit) might contain only the content to be studied, and perhaps the time to be taken and the teaching method to be used.

Nowadays, however, this will not do. For reasons discussed in the next section, a curriculum statement now would be regarded as satisfactory only if it addresses the wider experience of the learner and the context of learning as well as the content and quality control of the enterprise. The curriculum should guide the learner, the teacher and educational managers. At the same time, it should leave room in its implementation for the creative and individual professionalism of the teacher, and for the individual preferences of the learner, given that both are clear about what is to be achieved.

The specification of intended curriculum outcomes (expressed in whatever terms) is, in almost all cases, non-negotiable, not least because the curriculum is the basis for planning and developing the assessment system. If there is no agreed curriculum, how can we develop an objective, representative, valid and reliable assessment system? Simply, we cannot.

Many countries have some kind of guidance in relation to curricula at all stages. But few set actual standards for how a curriculum should be stated, what its component parts should be, and how it should be developed, implemented and used. In some countries, curricula are set by the state; in others they are set by regulatory or professional bodies. In the USA, the Liaison Committee on Medical Education sets accreditation standards that contain guidance on many key aspects of curriculum, but not on how to frame the curriculum statement itself. The UK offers a similar statement at the undergraduate level⁽¹⁶⁾ and specific standards for curriculum design at the postgraduate level,⁽¹⁷⁾ which allow the development of different curriculum statements that meet those set standards. Increasingly, medical educators at all levels are comparing their own curricula and medical education and training processes with the standards set by the World Federation for Medical Education.⁽¹⁸⁾

Definition

Although much is written about curriculum, definitions are few and far between. Accordingly, on the basis of a review of curriculum theories, the context of medical education, and the needs of teachers, trainers and regulators, a definition of curriculum was developed and adopted by the UK's General Medical Council (*see* Box 3.1). Curricula that comply with this definition will offer all stakeholders a clear description of requirements and expectations. The definition, although developed for postgraduate training, is appropriate to all levels.

However, this statement is possibly not enough, given the tension between increasing prominence of ideas of globalisation, and the articulated, but perhaps less acted on, imperative for a curriculum which reflects local needs. The requirements of the health care service and of communities are concrete. The best way of structuring a curriculum is theoretical, until it is decided on the basis of those local needs and resources. A curriculum must be contextual.⁽¹⁹⁾

BOX 3.1 What is a curriculum?

A statement of the intended aims and objectives, content, experiences, outcomes and processes of an educational programme, including the following:

- a description of the training structure (entry requirements, length and organisation of the programme, including its flexibilities, and assessment system)
- a description of expected methods of learning, teaching, feedback and supervision.

The curriculum should cover both generic professional and speciality-specific areas.

The syllabus content of the curriculum should be stated in terms of what knowledge, skills, attitudes and expertise the learner will achieve.

Source: UK General Medical Council

Standards for design

Curriculum standards address more than simply the syllabus content of the course. For example, the guidance in the GMC's *Tomorrow's Doctors*⁽¹⁶⁾ – which forms the basis of quality inspections of medical schools in the United Kingdom – addresses a wide range of issues from the core knowledge, skills and attitudes expected of students on graduation, to systems of assessment and arrangements to ensure the health and safety of patients.

In the USA, the Liaison Committee on Medical Education sets similar accreditation standards for American Medical Schools⁽²⁰⁾ as a condition for licensure of their graduates. Not surprisingly, among the accreditation standards are some fundamental curriculum issues such as the following:

- educational objectives
- curriculum structure and design
- content
- teaching and assessment
- curriculum management
- roles and responsibilities
- evaluation of curriculum effectiveness

In the UK's postgraduate arena, the General Medical Council, sets out specific standards against which all postgraduate curricula are formally judged and approved before implementation.⁽¹⁷⁾ These standards themselves reflect the view taken of the learning process, and the key contexts and factors that influence medical education. These are discussed further in the next section. Although the standards shown in Box 3.2 were developed for curricula in postgraduate medical education, there is no reason why they should not equally be applied to any level of medical education and training in any location.

Such standards try to decrease the distance between the three coexisting types of curriculum identified by Coles:⁽²¹⁾

- the curriculum on paper
- the curriculum in action
- the curriculum the learner experiences.

Further afield, the World Federation for Medical Education (WFME) has set, piloted and evaluated quality improvement standards for all aspects of medical education at all stages to 'provide a mechanism for quality improvement in medical education, in a global context, to be applied by institutions, organisations and national authorities responsible for medical education'.⁽¹⁸⁾ These are all aspects of curriculum. The WFME standards⁽¹⁸⁾ address:

- mission and outcomes
- the educational programme
- the learning and training process
- assessment of learning
- students and trainee characteristics and needs
- staffing and faculty
- educational resources and training settings
- evaluation of the educational programme and process
- governance and administration
- curriculum renewal.

These standards are already widely used for self-studies within medical schools and for accreditation purposes. They support the view that curriculum design must encompass

BOX 3.2 Standards for postgraduate medical curricula

- 1 The purpose of the curriculum must be stated, including linkages to previous and subsequent stages of the trainees' training and education. The appropriateness of the stated curriculum to the stage of learning and to the specialty in question must be described.
- 2 The overall purpose of the assessment system must be documented and in the public domain.
- 3 The curriculum must set out the general, professional, and specialty-specific content to be mastered.
- 4 Assessments must systematically sample the entire content, appropriate to the stage of training, with reference to the common and important clinical problems that the trainee will encounter in the workplace and to the wider base of knowledge, skills and attitudes demonstrated through behaviours that doctors require.
- 5 Indication should be given of how curriculum implementation will be managed and assured locally and within approved programmes.
- 6 The curriculum must describe the model of learning appropriate to the specialty and stage of training.
- 7 Recommended learning experiences must be described which allow a diversity of methods . . .
- 8 The choice of assessment method(s) should be appropriate to the content and purpose of that element of the curriculum.
- 9 Mechanisms for supervision of the trainee should be set out.
- 10 Assessors/examiners will be recruited against criteria for performing the tasks they undertake.
- 11 Assessments must provide relevant feedback to the trainees.
- 12 The methods used to set standards for classification of trainees' performance/competence must be transparent and in the public domain.
- 13 Documentation will record the results and consequences of assessments and the trainee's progress through the assessment system.
- 14 Plans for curriculum review, including curriculum evaluation and monitoring, must be set out.
- 15 Resources and infrastructure will be available to support trainee learning and assessment at all levels.
- 16 There will be lay and patient input in the development and implementation of assessments.
- 17 The curriculum should state its compliance with equal opportunities and anti-discriminatory practice.

Source: UK General Medical Council(17)

much more than a statement of the content to be covered in the course.

A note of caution

The standards cited all require the curriculum designer to think about the intended product and character of the course, its rationale, values or mission. Without these elements, standard setting for curricula becomes a dangerous and instrumental undertaking, apt to serve only political or economic purposes. 'Aims-talk', as Noddings(22) calls it, is the first and most important element of curriculum design and its most important standard whereby local relevance can be assured.

Curriculum in context

The most powerful emerging influence on thinking about curriculum concerns the role of local context, and the dangers of importation of curriculum models from different cultures and systems,(7) even as the international trade in curriculum as a transferable commodity flourishes. And yet there is no evidence that western models (for the flow of ideas is invariably from west to east) are any better in their outcomes than other models.(7,23,24) A phenomenon has been noted, namely the 'apologetic stance taken by authors in the east about their slowness in adopting western methods, even though . . . those methods will demand an "intense re-socialisation of learners into metropolitan Western mindsets"'.(7, p. 177)

But this is not simply an east-west diversification. Differences in educational and assessment culture have been shown in medical education, even within and between western countries.(25–27) So a contextual curriculum will not place its emphasis narrowly on educational method and the search for the most effective methods of teaching and learning, for which there is no robust differentiating evidence base. Instead, the emphasis must be on context, on health benefits and benefits to the scientific and cultural basis of medicine. In a contextual curriculum, the 'medical education' decisions become secondary.

Before we go on to think about curriculum in more general terms, we should be clear about the necessary components of a curriculum designed to be sensitive to the local context. Some of these will be true for any curriculum, but some will not. These include the following.

- Consideration of the body of knowledge, skill and experience necessary for the practice of medicine in the local context. This may be derived from the scientific base as commonly used and understood but must be done so consciously and on the basis of analysis.
- Prioritisation of health problems, which will yield very different results from location to location.
- Contextualisation of knowledge, appropriate to the local setting which will allow not only appropriate understanding of the context of health and illness, but also of the approach to communication and clinical decision-making.
- Awareness of the diversity of medical practice, according to which, even the classification of disease, its manifesta-

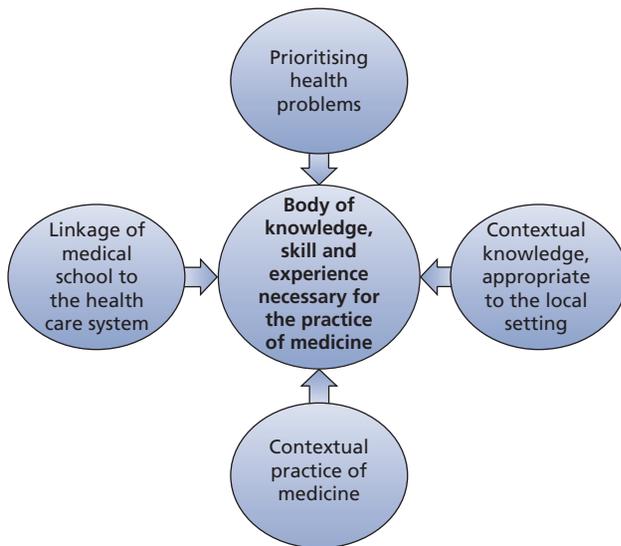


Figure 3.1 The curriculum in context.

tion and treatment are all linked to the local context. Thus the content of the curriculum is affected by the context, at every level. In the era of globalisation, universal truth is hard to find.(28,29)

- Linkage of medical school inputs, processes and outputs to the health care system without which contextualisation of learning is severely compromised.

We can represent this as shown in Figure 3.1.

In summary, a curriculum must be contextual to be meaningful. Bearing this in mind, we can now consider the more traditional views of curriculum.

Factors that influence curriculum design

It can be seen from the GMC curriculum definition and standards cited that a comprehensive curriculum is much more than a syllabus statement, which simply sets out the topic headings or content of a course or a programme. Writing a curriculum is a process that demands consideration of values, beliefs and choices. It deserves a review of evidence and a development process, which sends out messages about quality assurance and recognition of all the stakeholders.

The days when subject experts or workforce managers alone wrote down what was to be learnt are now past. These days, curriculum design encompasses many other factors that derive from the democratisation of social processes, the development of educational theory, political imperatives and economic concerns. Box 3.3 highlights some influences on modern medical curricula and their areas of effect. Each of the influences cited here has had its effect, and the residue of each of those effects remains to become incorporated into the new generation of curricula, making each new reformulation richer than the previous models.

The evolution of curriculum models and learning theories is addressed below. But the other factors, which are not

BOX 3.3 Influences and effects on medical curricula

Influence	Example of effect on medical curricula
Theories of learning	• Learner-centred design – for example, problem-based
Theories of professional practice	• Integrated curricula
Social values	• Teamwork
	• Ethics
	• Socially responsible medical schools
	• Widening participation curricula
	• Core and options curriculum
Knowledge base expansion	
Professional	• Communication skills training
	• Professionalism
Health service development	• Community-oriented curricula
Political	• Multiprofessional elements
	• Shorter curricula for faster production of medical workforce
Accountability and transparency	• Outcomes-based curricula
	• Objectives-based curricula

part of the academic discourse, are equally as important in shaping ideas about curriculum. Some of these factors affect the content of the curriculum, and some affect its design. For example, theories of professional practice have arisen around the sorts of ideas that are embodied in the UK General Medical Council's statement on *Good Medical Practice*, which defines a set of common content for professional behaviour and values.(30) This document covers such issues as professional standards for clinical care, maintaining good medical practice, educational activity, and relationships with patients, colleagues and teams. It is a professional statement that influences curriculum guidance.(16)

Another highly influential statement is that of the Royal College of Physicians and Surgeons of Canada(31) on the essential roles and key competencies of specialist physicians (CanMEDS). This statement addresses the qualities of a doctor that every educational programme should facilitate:

- medical expert
- communicator
- collaborator
- manager
- health advocate
- scholar
- professional.

Such statements not only contribute to the vision that an organisation has of its intended product, but will also affect directly the content and style of the curriculum. On the other hand, social drivers for accountability and transparency have determined the use of clear outcomes, amenable to peer or lay input and review. Political imperatives have

often pushed curricula to be more aware of issues of the cost and speed of workforce production. From this, we should be aware that choice of curriculum design or model is not an objective entity but is socially, professionally, academically and politically constructed.

At any one point, curriculum design is a child of its time.

Curriculum models

Curriculum models have been the subject of academic and management theory since the mid-20th century, when Tyler first put forward the idea that: ‘. . . it is very necessary to have some conception of the goals that are being aimed at. These educational objectives become the criteria by which materials are selected, content is outlined, instructional procedures are developed and tests and examinations are prepared’.(32, p. 52)

Although Tyler adopted a relaxed view of how objectives should be framed, this approach still allowed a ‘transmission model’(33) of learning, which focuses on the teacher’s rather than the learner’s activity. Despite Mager coining the subsequent term ‘instructional objectives’, and taking a harder line on expressing objectives in measurable terms, his simultaneous intention was to change that focus and emphasise the importance of student achievement rather than teacher activity.(34) At the same time, he was much more prescriptive about exactly how those achievements should be specified: in behavioural, observable terms that were amenable to assessment. And so the use of the curriculum as the foundation of assessment became a central tenet.

There followed a raft of curriculum theorists who found that the Mager and Tyler models did not encompass all types of valued learning. So, for example, Eisner(11) introduced the idea of problem-solving and expressive objectives or expressive outcomes, leading us on to a current dominant view of curriculum formulation. Some theorists tried to break free from curriculum models that specified outcomes in whatever form. Stenhouse,(35) for example, proposed a process model that focused on the processes of acquiring, using and evaluating the knowledge of the discipline. Outcomes, then, would be truly learner centred, rather than having the contradictory position of a learner-centred rhetoric aimed at their achievement of outcomes specified by others.

This contradiction has been compounded in more recent times, during which the cultural hegemony of a competence-based curriculum model, which was originally introduced in practical vocational subjects, has held sway. Its suitability as a basis for assessments, its common-sense appeal, its apparent analytical basis and its implicit message that if we could define competences, we can ensure that learners acquire them and be assured by relevant testing that this is so, all make a competence model attractive. I have myself argued that competences alone cannot describe even the skills, much less the performance, of a profession.(36) Some prominent writers, such as Hyland, have suggested that the competence movement in curriculum design is little more than an economically driven derivative of the behavioural school: ‘This attempt to specify exactly what is to be achieved and measured is, of course, nothing more than reconstituted behaviourism . . . Constructed out of a ‘fusion

of behavioural objectives and accountability’ . . . the movement provided irresistible appeal to those seeking accountability and input–output efficiency in the new economic realism of the 1980s’.(37, p.49) Perhaps this does ‘ring some bells’ today.

The twin factors of accountability and efficiency of education or training appeal to medicine, which has become increasingly concerned about demonstrating transparency and public accountability in times of increasing litigation. The contextual climate of a hard-pressed health service, limited resources, and managerial and political imperatives has made the appeal of the model very alluring. On the other hand, the rise of competency-based models has possibly increased the tendency to ‘teach-to-the-test’ along with a more instrumental, less creative, approach to learning on the part of the students.(38)

We can see from these examples of curriculum models that their use can be a function of instrumental pragmatism, values and vision, political, social and managerial imperatives, and of the ideas that are current about how people learn. This means that selection of a curriculum model is a process that requires careful thought and open justification. That justification is unlikely to be in terms of research evidence; it will be in terms of ideology.

Theories of learning

An important factor in the development of new curriculum models has been the burgeoning field of learning research and theory. Not unexpectedly, there is a symbiotic relationship between learning theory and curriculum models. While objectives-based curriculum models were predominant, so was behavioural theory. While behavioural theory has declined, however, assessment theory and managerial imperatives have taken over to ensure that the behavioural aspects of curriculum definition still remain, albeit in new guises.

Learning theory has entirely changed its stance on effective pedagogy during the past half century. As with every other aspect of education, learning theory and consequent pedagogical practice is a never-ending work in progress. Ideas change. So, we have seen that at the time of the objectives-based curriculum models, behavioural theory was also in its prime, and the role of the teacher in shaping behaviour was a main focus. High on the best-seller list were books that explained how to teach, not how students learn. But even those books, and some were excellent, strayed into recognising the students’ responsibility for learning.(39)

However, things have changed, and in the past 20–30 years, the focus has moved away from teaching and towards learning. Nicol explains that nowadays, the teacher: ‘. . . encourages participation, dialogue and interaction by students with course materials and with each other. The teacher should function as a facilitator of learning, intellectually critical, stimulating and challenging, but within a learning context that emphasises support and mutual respect’.(40)

Surely in this we can see the roots of curriculum models such as problem-based learning, and the brief phase when it seemed unacceptable to use the word ‘teacher’ or any word derived from it. And just as educational theory devel-

ops and enfold the whole range of education, we have seen problem-based learning applied, and then gradually retreating, in such diverse arenas as design, chemical engineering and the arts. So learning theories, even when they are simply that, are powerful in their practical effects on educational practice.

Around this current view of effective learning requiring activity on the part of the learner has developed a panoply of ideas about the components of this approach. So in medical education, as in every other form of education, we have seen a considerable body of published work on approaches to learning, on learning styles, group work and the social context, on the trainer–learner relationship and the value system in which learning occurs. Such ideas, even when they do not progress beyond being simply declamatory, have a direct effect on curricula and the models of curriculum that are adopted.

Specific theories of learning are too many and varied to report, although there are some key ideas that have persisted and have influenced curriculum design. Adult learning theory,(41) which promotes active self-directed learning towards personally relevant goals, despite its lack of evidence base, seems to have an intuitive or social appeal and has been widely cited as the basis for curriculum and course design. For example, the University of New Mexico School of Medicine, in its own words, ‘gained national and international recognition for its constantly evolving curricular innovations which are aimed at adapting adult learning theory to medical education’.(42)

Other key theoretical frameworks that medical education has chosen to embrace include the dichotomy between deep and surface-level approaches to learning.(43) The former is characterised by an active concern in the student to seek the underlying meaning, the wider picture, the relationship between different information and experiences, the logic of the argument, and the need to question and understand. Surface-level processors, on the other hand, are said to take a passive approach and seek to learn the content, acquire the knowledge and get the right answers. But a surface characterisation of learning styles can fail to illuminate the deep strategic thinking that is actually occurring, and can be culturally determined.(44)

Our knowledge of learning styles and approaches has clear implications for curriculum design in terms of teaching skills and methods, learning opportunities and assessment.(45) Curricula that dissuade students from apparently simple rote learning (although this might actually be productive repetitive learning) and encourage apparently deep processing (although this can only occur in the presence of acquired knowledge) have now become the dominant form. And curricula can affect a learner’s approach to learning. So McManus *et al.* put forward the opinion that:

Formal education, particularly effective formal education, can also alter study habits and learning styles . . . Intercalated degrees increase deep and strategic learning and decrease surface learning at medical school . . . Deep and strategic learning also relate to the clinical experience gained by medical students, making it possible that greater patient involvement during undergraduate clinical training, rather than mere reliance on textbook learning to pass exams, a

characteristic of surface learners, will also reduce surface-disorganised approaches to work.(46)

The learning theories that inform today’s curriculum design seem to be very far from the ideas of behavioural theories of learning, and from the idea that the knowledge base of the discipline must first be learnt before its application can be attempted. Today’s trajectory of learning is flatter, with integration being the hallmark throughout the course, and deep learning in the context of practice its aim.

Yet at the same time as these developments, we also have seen the rise of competence-based curriculum frameworks, which seem strangely to hark back to the days when curricula were based on the attainment of set objectives and the underlying theory was distinctly behavioural. This contradiction remains unresolved in the competence-based curricula of today, which simultaneously claim to rely on student-centred learning methods. And the acquisition of a large body of knowledge still lies at the heart of medicine, as it does in any profession.

Theory and practice of the discipline

Integration

Of course it is not only theories of how students learn that affect the design of curricula. Theories about the discipline of medicine itself have also been paramount in changing the face of curricula. As the Case Western Reserve University School of Medicine describe their own history: ‘Already a leading educational institution for more than a century, the School of Medicine in 1952 initiated the most advanced medical curriculum in the country, integrating the basic and clinical sciences, focusing on organ systems and featuring an introduction to patients and clinical work in the first year. Many other medical schools followed suit’.(47)

Today it seems almost universally accepted that the practice of medicine requires this integration of its component parts: of science and clinical experience, knowledge, skills and attitudes, judgement and problem-solving, even of continuing to learn through reflection on practice. So whereas in former times a curriculum for medicine might have offered in sequence its component constituents of science, clinical skills and experience to facilitate clinical judgement, leaving the integration of these to the learner, this learning trajectory has been superseded and the integrated context of practice now is reflected in the integrated nature of curricula. The curriculum is increasingly for practice.(48) rather than simply to acquire the elements of professional knowledge, skills and attitudes for later application.

Trajectories of learning

It might seem surprising, then, that a traditional curriculum is more effective in encouraging clinical problem-solving skills.(49) On the other hand, educational psychology would tell us that a well-structured knowledge base is a good springboard towards freedom of creative thought.(50) In an environment which demands constant new problem-solving, as each new patient does demand, it a strong and structured base of knowledge, tuned through experience and supported by skills, that is the essential component. The most effective trajectory of learning, therefore, will initially ensure well-structured knowledge which

is almost independent of problems or situations and relates to the learner's stage of mastery of concepts. Such knowledge is therefore transferable, and can be followed or accompanied by its contextual application. But the knowledge must come first and must have its own coherent organisation. It is that which ensures transferability. This might suggest that learning the basic sciences while having the contextual background that, for example, early clinical exposure offers, would indeed yield more effective clinical problem-solvers.

The use of learning trajectories to structure the curriculum has been successfully used at all levels of learning. For example, the approach has been explained convincingly in relation to early childhood mathematics.⁽⁵¹⁾ The three components of goals, the developmental path and instructional activities to link the two, leading to increasingly higher levels of thinking, will be familiar to many medical teachers.

Team working

A further aspect of professional practice that has influenced curriculum design is the advent of team working in medicine. As health care has become more complex, working practices have changed and health care managers seek more cost-effective ways of delivering high-quality care. So, many medical schools (such as Southampton) have developed their curricula to offer prospective students: '... the opportunity to develop the attitudes, skills and knowledge you need to become a skilled practitioner in a modern, changing health service, capable of following a career in a wide range of specialities ...'⁽⁵²⁾

Professionalism

Very recently, the whole question of professionalism and how it is acquired has gripped the profession and its educational institutions worldwide. Such issues have arisen from a series of trigger crises that the profession itself experienced in standards of practice and in changing practices, as well as in the changing role of doctors in society, market forces and accountability within the health care system, and society's changing relationship with the professions in the light of greater universal education and wider access to previously protected knowledge. Each of these ideas has its direct effect on the design of curricula. It has already been suggested by one key working group⁽⁵³⁾ that medical schools should 'consider introducing professional values early into the undergraduate medical course ...' and that '... each student's professional values should be assessed throughout their training to ensure their fitness to practise'.

Another major influence on curriculum design has been the move of health service provision into the community, along with the realisation that medical schools themselves have a social responsibility.

Curriculum design then, is subject to a wide variety of influences in relation to the profession of medicine, the health care service and society as a whole. Each curriculum design team must decide for themselves which of these they will choose to characterise their own work (see Box 3.4).



BOX 3.4 WHERE'S THE EVIDENCE: For comparative curriculum design

Although there is much research published about different curriculum models, and teaching and learning strategies, there is no evidence to suggest that there is a 'best' template for curriculum design. This is partly because a curriculum is made up of many components and there is little evidence to suggest that even for any one of these there is a 'best choice' for all circumstances. Curricula have many different specific purposes and therefore many different designs. Their effectiveness can only be judged against their intended purposes. And few share exactly the same purpose, beyond intending to produce safe and responsible doctors.

This makes comparative or controlled research almost impossible.

So each curriculum designer must decide on the purpose of the curriculum and then search the literature for the relevant evidence about the likely effect of each curriculum component in serving that purpose. Convincing evidence may sometimes be difficult to find. So curriculum designers will often rely on their professional judgement and values and should always seek to gather their own evidence about the effects of their own curriculum.

The purpose and components of curriculum design

Curriculum design has two components: the structure of the curriculum, and its content. Battles are fought and choices made in both arenas on the basis of the values, vision and assumptions of the curriculum designers and their institutions, or their social, economic, political and cultural influences.

Prior to the 1960s, curriculum change was best described as unplanned 'drift'⁽⁵⁴⁾ although even before that time, curriculum ideology was informed by dominant social ideologies and imperatives. For example, the need to reconstruct the world after the Second World War certainly gave rise to the management by objectives movement and so to objectives based curricula, in the race to normalise as quickly and efficiently as possible. But from that point, Kelly⁽⁵⁵⁾ records that educationalists recognised the need for planned innovation to keep pace with societal changes, while maintaining standards and values, and taking advantage of new theoretical underpinnings. At the same time, the idea of the curriculum as a total description of the intentions, mechanisms, context and outcomes of education took hold. The curriculum must explain and justify itself, describe the intended learning experiences and their rationale and explore the likely effects of the students' exposure to them.

A curriculum is therefore a document that must:

- tell the learner exactly what to expect including the methods of student support

- advise the teacher what to do to deliver the content and support the learners in their task of personal and professional development
- help the institution to set appropriate assessments of student learning and implement relevant evaluations of the educational provision
- tell society how the school is executing its social responsibilities.

The curriculum should present a reasoned picture of the subject to be studied and define the teaching and learning processes, and the intended outcomes of that study. But all curriculum decisions must be made on the basis of a prior statement of vision or mission or values. And that statement must be made for the local context. General statements are of limited value. Contextual statements expressed in concrete terms will drive useful change at all levels.

It can be seen that the curriculum is a powerful tool and for that reason is often the focus of battles for power and control. The major theorists of our time have seen that curriculum is the instrument for a more humane and socially accountable society. In medicine, the current trend for greater involvement of the community and its health care needs, and of patients and their families in curriculum development is a reflection of this tenet.

Steps in curriculum design

Despite the differences of view that have existed over the years and between different practitioners and theorists, all are generally agreed that the process of curriculum design must answer the following central questions, originally set out by Tyler in 1949.(32)

- What is the purpose of the educational programme?
- How will the programme be organised?
- What experiences will further these purposes?
- How can we determine whether the purposes are being attained?

The curriculum designer must make choices about how to answer each of these questions. We have seen that those choices are influenced by a number of contextual factors, but what are the options that are available at each stage? The next sections set out some of those options.

It must be said, however, that although these steps and their subsections are discussed below serially, in real life, many such decisions occur in parallel, or in a different order, because they are so tightly interdependent and are a function of local conditions. Figure 3.2 summarises the steps that most curriculum writers agree should be undertaken in the process of curriculum design and lists the sorts of options that the curriculum designer must choose between at each stage. In addition are presented the factors that are required to make the curriculum responsive to its own context.

How do we express the overall purpose of an educational programme?

The purpose of a programme is often based on a set of aims, or a mission statement, such as the WFME standards require, or a statement of professional values such as that

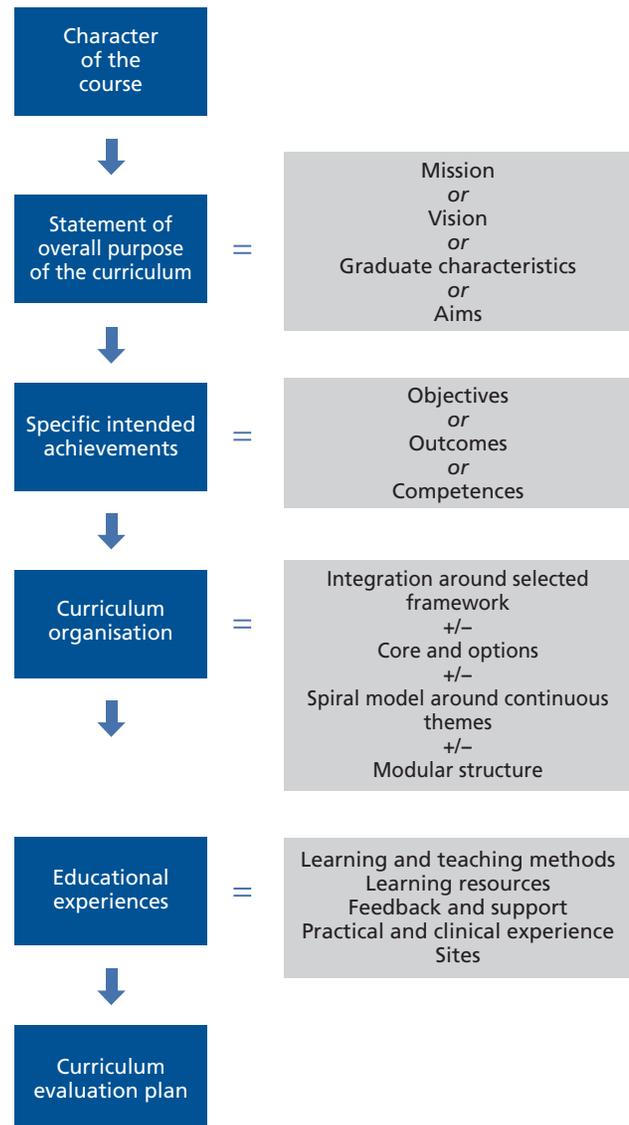


Figure 3.2 Steps and options in curriculum design.

of the CanMEDS project mentioned above, or a 'vision statement' such as that developed by the University of Sheffield Medical School, which encompassed the general intentions, values and characteristics of the curriculum. For example, the Sheffield vision statement dealt with:

- the qualities of the intended graduates
- the method of expressing the intentions of the curriculum (outcomes-based)
- the curriculum structure (integrated, patient contact, community experience, facilitating student learning and student choice)
- curriculum organisation (based on body systems, progressively presenting undifferentiated patient problems)
- the instructional approach (a spine of problem, case- and patient-based integrated learning activities complemented by a range of other teaching and learning activities, with an increase in systematic teaching of some components to ensure competence in key areas)

- student learning approach (progressively more self-directed, supported by information technology resources, distance learning and activities)
- the assessment system (formative and summative based on the defined outcomes)
- the curriculum management system and team
- the curriculum monitoring and improvement system.

Thus a vision statement addresses all the central curriculum design issues and must be the result of extensive discussion and consultation with all the relevant stakeholders and experts. Such consultation is fundamental to a properly managed change process.(56) and in Sheffield, it took nearly a year to complete.(57)

On another level, Brown University School of Medicine (58) chose to think about the intended achievements of its curriculum in terms of the abilities of successful doctors. It derived, through consultation, nine such abilities, as follows:

- 1 Effective communication
- 2 Basic clinical skills
- 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 health care
- 8 Moral reasoning and clinical ethics
- 9 Problem-solving.

In the end, a comparison of the statements of different types shows that they express very similar ideas. What is important is that the statement of purpose of the programme is made to suit the local context. Figure 3.1 shows that this would include reflection on social, academic and professional issues, as well as a local prioritisation of health problems.

How does the curriculum design allow for local choice?

Underpinning the overall purposes of the curriculum will be a set of values that pervade the thinking or the aspirations of the school. Many years ago, these value choices were set out in the SPICES(59) model (Figure 3.3) as a series of dimensions between two extremes. But this analysis has perhaps been superseded by both a lack of subsequent evidence to underpin either its dimensions or its hierarchy, and a more recent value set that suggests that curriculum

purpose and context, have primacy over curriculum organisation. We should be clear that no automatic value judgments should be attached to either dimension; for example, apprenticeship learning is still regarded as fundamental to medical training, and the potential narrow instrumentality of a planned systematic approach is recognised as having its dangers in professional training.

How can we describe specific intended achievements?

There are many ways to express what it is that a curriculum is intended to achieve. We have seen that the choice of how to express this is often as much a function of social context and educational fashion or belief as it is of any objective evidence of effect. The importance of this stage of planning is twofold; it will:

- define the content of the course
- be the basis of the assessment blueprint.(60)

Not surprisingly, this is another contentious area: every department and teacher will want to have their own subject properly represented in the curriculum, and a team-based approach that matches the organisation of the curriculum is advisable, with iterative consultations following a properly managed change process.(56)

Essentially, what the curriculum intends to achieve is most commonly expressed in one of the following ways.

- As *objectives*, expressed as the specific knowledge, skills and attitudes that the student will display at the end of the course. As we have seen, the objectives model became predominant after the Second World War, when reconstruction was most efficiently tackled in a managerial way, leading to observable and measurable changes, after the chaos of the preceding period.
- As *intended outcomes*, stated in clear and precise terms, which will allow the designer to specify the learning experiences that will facilitate achievement of the stated outcomes. For many, this is a return to Tyler's original idea of objectives.(61)
- As *competences* to be achieved and assessed, again expressed in terms that bear similarity to objectives but are often thought of in relation to the ultimate intended performance that the competences underpin.

There has been and still is a furious debate around the use of these terms, and what they mean, how they differ, what they imply and how they are used. It has been argued that

Innovative approaches	Traditional strategies
1 Student-centred	Teacher-centred
2 Problem-based	Information gathering
3 Integrated	Discipline-based
4 Community-based	Hospital-based
5 Electives	Standard programme
6 Systematic	Apprenticeship-based

Figure 3.3 Educational strategies in curriculum development: the SPICES model.

a simple statement of competences alone cannot reflect the complex nature of a profession or the central skill of professional judgement.(36) It was Stenhouse's belief that a statement of behavioural objectives cannot address socialisation and problem-solving,(62) which are processes fundamental to a profession.

It has also been argued that such 'product-oriented curricula' are disempowering for the learners and take control of learning away from the learner,(63) and possibly disempower teachers similarly. In this, an outcomes-based curriculum would be incompatible with a learner-centred approach to learning, yet the two, in many curricula, attempt to coexist.

Specific guidance on the specification of outcomes has been offered and makes its similarity to the objectives-based model clear. In outcome-based education:

Decisions about the curriculum are driven by the outcomes the students should display at the end of the course. In outcome-based education, product defines process. [It] . . . 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.(64, p. 8)

It is not surprising that the instrumental nature of this approach has given rise to some controversy. Key writers have sometimes opted to use these terms interchangeably,(58) equating outcome-based and competency-based as the same thing in practical terms.(65) We could equally say that objectives are not very different. An outcome might be: 'Obtains history in relation to possible underlying causes including cardiovascular and non-organic causes'.(57)

It would be difficult to say in what way this is different from a competence or an objective. And it really does not matter, because statements such as this are fit for purpose. It is a debate with no conclusion, and perhaps the answer really does not matter. What is important is fitness for purpose, and the main purposes of stating the intended achievements of the curriculum are:

- to inform learners of what they should achieve
- to inform teachers of what they should help the learners to achieve
- to be the basis of the assessment system, so that everyone knows what will be assessed
- to reflect accurately the nature of the profession into which the learner is being inducted and the professional characteristics that must be acquired.

Regardless of the rhetoric surrounding these different ways of describing what a curriculum should achieve, the important point is that this is done in terms specific enough to guide planning, assessment and review, and to give students and teachers appropriate expectations. Perhaps it is high time that medicine found a new and more appropriate way of describing its qualities (see Box 3.5).

How will the programme be organised?

Once the overall intentions of the curriculum and its more specific intended achievements are defined and agreed, the curriculum must be written to reflect the



BOX 3.5 FOCUS ON: Competence and competency

The terms 'competence' and 'competency' seem to be the focus of concern and debate. But in education, preoccupation with definition of terms is, perhaps, to miss the point. In dictionary terms, these are alternative words with the same meaning. Both simply mean 'the ability to do something; the ability to perform a given task'. So there is no contest between competence and competency – it is simply a matter of which word you care to use. But this definitional fact does not stop a semantic debate raging.

It seems that in common curriculum parlance, a competence is a specific, measurable entity (knowledge, skill, behaviour) that the learner should display by the end of the programme. But this does not mean that the possessor of the competences will translate these into performance. And so, in education, the term 'competency' sometimes seems to be used to suggest the underlying propensity to turn competence into performance.

The underlying pedagogical theory seems to be that if we can define the competences that make up professional performance, then we can aim the teaching programme at them and make it more efficient and effective. This theory is flawed.

If the acquisition of competences in turn leads to competency to perform, this will be because the separate competences have been used repeatedly in concert in the context of complex professional practice to gather information, to process it, to make judgements and decisions, to solve problems, to make interventions, to deal with and interact with peers, colleagues and patients, and to think in multidimensional terms about personal, interpersonal, ethical, financial, managerial, multiprofessional and evidence-based factors.

So a curriculum that bases itself on the specification of competences is only recognising the first step on a path that leads to the competency that is the precursor of the ultimate complex professional performance. And if we spend too long on debating definition, perhaps we are no more than sublimating our energies and closing our eyes to more difficult questions.

intended organisation of the course. The main current organisational models are:

- integration
- core and options
- spiral model
- modular.

These options are not mutually exclusive and many curricula display elements of them all. So an integrated curriculum with a modular core of mandatory content and student-selected options, which contain topics that are revisited in increasing depth at successive stages of the curriculum, is quite possible and possibly the most common approach among new curricula.

Integrated

A curriculum based primarily on separate disciplines is probably not integrated. Although, as we have seen, a traditional curriculum accompanied by early clinical exposure may well be seen as being integrated. In general, however, in a discipline-based curriculum, the knowledge and skills are presented in silos and the integration has to occur entirely in the student's head through use in practice. There is no robust evidence that this is a flawed strategy. An integrated curriculum, however, organises the material to be learnt around an entity that is more related to practice.

Curriculum integration can be managed as either horizontal integration between different subject areas or vertical integration between the clinical and basic sciences. Integrated curricula in medical schools across the globe are now too numerous to mention and it seems likely that, in time, curricula worldwide will adopt both vertical and horizontal integration. This can be a threatening development for some departments, especially in basic sciences, which often feel that they are likely to lose their identity. But if integration is properly managed, and the curriculum content properly defined, every department should be able to track its own contribution to the curriculum as a whole.

It is a common and strong view(66) that the early clinical experience vertical integration offers students is beneficial to their motivation and satisfaction, their acclimatisation and professional induction, and their valuing and contextualisation of the scientific base. It might strengthen and broaden learning and intensify the relevance of the course to ultimate clinical practice. However, these assertions still only attain the status of claims. Despite the widening adoption of integration as the basis of curriculum organisation, there is still no robust evidence base that shows its actual effects. As with most changes in education, the innovation occurs as a result of belief rather than evidence and gains credibility only through custom and practice.

The adoption of integration implies a significant reorganisation of the curriculum and so decisions must be made about the basis for that integration. In other words, what will be the framework around which the content of the curriculum will be arranged? There are many choices.

- In Sheffield, the curriculum was designed around an agreed list of presenting clinical problems derived from published sources and other curricula, added to locally and then rated by clinical teachers for their importance. A blueprint for each problem was then constructed, which defined the curriculum content and outcomes.(57)
- In Manchester,(67) the core problem-based curriculum was organised around index clinical situations (ICSs) for which new graduates must have a required level of competence. These ICSs were derived in consultation with primary and secondary care clinicians, who then defined the knowledge and skills base for each one in a variety of specific domains, including technical, contextual, intellectual and interpersonal.

Equally, the basis for integration could be bodily systems, age, patient cases or any other grouping. Each approach has its advantages and disadvantages. Within the chosen framework, however, the specific content to be covered can be specified in terms of repeated and consistent curriculum

themes that run vertically through the whole course. This is described further below in relation to modular design.

Core and options

This specification of mandatory and optional sections of the curriculum was a response to the perceived (if not proven) problem of content overload in medical education. Given that this is the central, mandatory content of the curriculum, 'core' can mean different things in different contexts. But if a core and options model is chosen, then the basis on which the core is selected must be known and agreed. To date, there is no adequate evidence base to suggest that one way of identifying the core is better than any other.(68) Harden and Davis(69) set out the possibilities:

- the essential aspects of each subject or discipline
- the essential competencies for practice
- areas of study relevant to many disciplines.

A fourth possibility is a study of only those disciplines deemed essential, but this approach 'has caused great alarm among some teachers, and justifiably so'.(69) At medical school, it is generally thought that students must gain knowledge and experience of all major disciplines since they are being prepared for any one of these.

There are many ways of determining the content of the core curriculum, ranging from modified Delphi processes (70,71) and other formal consultations, to statistical and epidemiological methods, critical incident techniques and more informal consultative and team-based work. Whatever method is chosen, it should be well understood and publicised, and properly managed according to a timescale. It should involve all interested parties and stakeholders and bear in mind the vision of the school.

Options can then be built around the core and given timetabled slots or blocks to offer students choices in their learning and career development, and the opportunity for more self-directed study. Some guidance can be given: for example, options can be provided in different categories such as basic sciences, core extension studies, laboratory specialties, social and community sciences, education and management. Students may then be required to undertake options in a variety of these areas.

Some medical schools have an 'options bank', which departments and teachers add to and students then select from. These would normally be well-defined elements with a specific assessment plan, each of which would be able to accommodate a limited number of students. It is also possible to allow students to design their own options, either within certain headings or freely but according to set criteria about planning, process and outcomes against which the option can be marked and assessed.

Spiral

The principle of the spiral curriculum, first elaborated by the titan educationalist Jerome Bruner,(72) is that students should revisit material at increasing levels of complexity as they progress through the course. This is almost unavoidable, in practice. Thus, for example, the themes of clinical methods, ethics and health promotion, and their accompanying attitudes, knowledge and skills, were designed into the Dundee curriculum(73) to be revisited in more complex ways during the four main stages of the course, which dealt

with normal structure, function and behaviour, then abnormal structure, function and behaviour, then clinical practice and, finally, on-the-job-learning.

Thus the features of the spiral curriculum, which might seem not unlike many other types of curricula, and might even seem unavoidable in practical terms, are that:(74)

- topics, themes or subjects are revisited on a number of occasions throughout the course
- there are increasing levels of difficulty
- new learning is related to previous learning
- the competence of the learner increases.

Modular

A module is a self-contained unit of study. It should have its own outcomes (however expressed), activities and assessments. Students tend to take more than one module of study at a time. Modules are planned according to the curriculum framework selected. In an integrated course, modules will tend to have similar structures, with the vertical themes of the course that spiral through the curriculum being addressed in each module. So, for example, a module on cardiovascular disease might have its content decided in relation to curriculum themes of:

- clinical sciences
- basic sciences
- behavioural sciences
- population sciences
- clinical skills
- interpersonal skills and professional behaviours.

The module might then be taught around a number of index cases, which illustrate these themes and the necessary content. It is in the nature of modules that there is some flexibility in the order in which they are taught.

How do we determine the experiences that will further those purposes?

The experiences that students have will be selected on the basis of the planning and design work that has been carried out in the previous steps. The choices that must be made are in relation to:

- learning and teaching methods, including learning resources, feedback and support
- practical and clinical experience, including sites.

Learning and teaching methods, including learning resources, feedback and support

Decisions about learning and teaching methods will flow from the planning of previous stages. But there is no one-to-one relationship between course intentions and teaching and learning methods. Every curriculum designer has a range of choices that could lead to the same outcomes. And although it might be true, for example, that problem-based learning fosters active learning and encourages deep learning and integration (recognising that all these concepts are difficult to pin down in practice), it is not the only way of achieving those aims. And every strength of any one teaching or learning method is accompanied by weaknesses. There is no pedagogical silver bullet or panacea.

Likewise, although problem-based learning can be an entire curriculum approach, more frequently it is used for

just part of a curriculum – either in the first couple of years or as just one type of teaching and learning method as part of a curriculum that also includes other approaches. Problem-based learning, which might now be seen as having passed its zenith, does itself contain a variety of learning methods, and although there is now no commonly agreed definition of problem-based learning,(75) all definitions do tend to emphasise small group learning, authentic problems that stimulate the self-directed learning process (often carefully defined), and acquisition of knowledge and problem-solving skills.

The curriculum designer can choose from the following, at a minimum – each of which has a positive role to play:

- clinical skills laboratories, including communication skills training
- clinical experience, inpatient, ambulatory and community
- study guides describing what is to be learnt and relating this to available learning opportunities(76)
- lectures
- seminars and tutorials
- independent or guided group work
- simulations
- practicals
- resource-based learning, including e-learning and library work
- formative assessment, appraisal and feedback on learning.

The curriculum designer should state what balance of these methods might be desirable and expected. But the method selected alone will not determine effect on learning unless it is used in an appropriate manner. Thus problem-based learning has variable effects on the acquisition of knowledge,(77) and any teaching or learning method, whether apparently learner-centred or not, which has a heavy workload, high contact hours, excessive material or an emphasis on coverage, is likely to push students towards a surface approach to learning.(78) Likewise, any educational method that displays an appropriate motivational context, a high degree of learner activity, interaction with peers and teachers, and a well-structured knowledge base may encourage a deep approach.(79) But this is not to set any value on a deep approach as opposed to a surface approach. Both have their value. Even rote learning suggests some inner cognitive activity and is passionately defended in some disciplines and cultures. We have no evidence-based reason to demur.(80)

The role of assessment as an instrument of learning, especially if used formatively for that purpose only, should not be overlooked and might be considered with other interventions such as appraisal and regular structured and supportive feedback sessions.

Practical and clinical experience, including sites

In basic medical education, and perhaps even beyond, a wide range of knowledge, skills and attitudes can be acquired as effectively in the community as in hospital settings.(81) So if the curriculum has the intention of producing graduates with an interest in practice in the community,(82,83) then primary care might be developed as a major provider of teaching, learning and experience,

offering effective integrated teaching.(84) Four types of community-based teaching have been identified:(85)

- community-orientated teaching: teaching in and about the community
 - agency-based teaching: teaching involving community health care providers other than primary care physicians
 - general practice-based teaching: either specific clinical teaching or an attachment in primary care
 - specialist teaching in the community: specialist subjects taught by hospital practitioners in a community setting.
- Equally, such knowledge and skills might also be achieved in hospital settings. The choice of location is to be decided by curriculum designers in the light of previous steps. Finally, the role of skills laboratories in helping students to acquire basic and more advanced clinical and communication skills in a safe, structured environment before using these with patients should also be considered as part of the curriculum design process.

How can we determine whether the purposes are being attained?

Whether the purposes of the curriculum are attained might be measured in two ways. First, a robust assessment system that is properly blueprinted on to the curriculum will measure students' attainment of the intended learning outcomes of the programme. Second, a curriculum evaluation strategy that addresses the views and experiences of all stakeholders will offer information about how the curriculum in practice fulfils or does not fulfil its purposes. On the basis of assessment and evaluation findings, the curriculum can be reviewed and renewed to ensure that it remains fit for purpose. The assessment of student learning, evaluation of the curriculum in practice and approaches to curriculum renewal are topics for other chapters in this book.

Throughout all the steps outlined above, and in relation to all the considerations and judgements that are brought to bear in designing a curriculum, there is one principle that must hold sway. And that is the principle of purpose. And purpose must derive from context. That context does not preclude the design of a curriculum that will produce researchers and academics – they also have a key role in determining the scientific and practice basis of medicine; it does not preclude the production of doctors for secondary, or even tertiary care – they too are needed. A contextual curriculum can produce all these. But it does so by recognising local need and circumstances, and not by benchmarking to external contexts which derive from other cultures and practices.

References

- 1 Miller G (ed.) (1961) *Teaching and Learning in Medical School*. Harvard University Press, Cambridge, MA.
- 2 Simpson MA (1972) *Medical Education. A Critical Approach*. Butterworths, London.
- 3 Cox KR and Ewan CE (eds) (1982) *The Medical Teacher*. Churchill Livingstone, Edinburgh.
- 4 Newble D and Cannon R (1983) *A Handbook for Clinical Teachers*. MTP Press, Boston, MA.
- 5 Balla JI, Gibson M and Chang AM (1989) *Learning in Medical School. A Model for the Clinical Professions*. Hong Kong University Press, Hong Kong.
- 6 Boelen C and Woollard B (2009) Social accountability and accreditation: a new frontier for educational institutions. *Medical Education*. **43**(9): 887–94.
- 7 Bleakley A, Bligh J and Browne J (2011) *Medical Education for the Future. Identity, Power and Location*. Springer, London.
- 8 Apple MW (2004) *Ideology and Curriculum* (3e). Routledge Falmer, London.
- 9 Jolly B and Rees L (eds) (1998) *Medical Education in the Millennium*. Oxford University Press, Oxford.
- 10 Gillam S (2011) Teaching doctors in training about management and leadership. *British Medical Journal*. **343**: d5672.
- 11 Eisner EW (1994) *The Educational Imagination: on the Design and Evaluation of School Programs* (3e). Macmillan, New York, NY.
- 12 Toohey S (1999) *Designing Courses for Higher Education*. Society for Research into Higher Education and Open University Press, Buckingham.
- 13 Norcross WA, Henzel TR, Freeman K, Milner-Mares J and Hawkins RE (2009) Toward meeting the challenge of physician competence assessment: the University of California, San Diego Physician Assessment and Clinical Education (PACE) Program. *Academic Medicine*. **84**(8): 1008–14.
- 14 Grant J (2012) *The Good CPD Guide*. (2e). Radcliffe, Oxford.
- 15 Flinders DJ and Thornton SJ (2004) *The Curriculum Studies Reader* (2e). Routledge Falmer, New York, NY.
- 16 General Medical Council (2009) *Tomorrow's Doctors. Outcomes and Standards for Undergraduate Medical Education*. General Medical Council, London.
- 17 General Medical Council (2010) Standards for curricula and assessment systems. (http://www.gmc-uk.org/education/postgraduate/standards_for_curricula_and_assessment_systems.asp; accessed 27 December 2012).
- 18 World Federation for Medical Education (2012) WFME global standards for quality improvement. WFME Office: University of Copenhagen, Denmark (<http://www.wfme.org/standards>; accessed 28 December 2012).
- 19 Grant J, Abdelrahman M and Zachariah A (2013) Curriculum design in context. In: Walsh K (ed.) *Oxford Textbook of Medical Education*. Oxford University Press, Oxford.
- 20 Association of American Medical Colleges Liaison Committee on Medical Education (2011) *Functions and Structure of a Medical School. Standards for Accreditation of Medical Education Programs Leading to the M.D. Degree*. (<http://www.lcme.org/functions2011may.pdf>; accessed 28 December 2012).
- 21 Coles CR and Gale Grant J (1985) ASME Medical Education Research Booklet No 1. Curriculum evaluation in medical and health-care education. *Medical Education*. **19**(5): 405–22.
- 22 Noddings N (2003) *Happiness and Education*. Cambridge University Press, Cambridge.
- 23 Rao KH and Rao RH (2007) Reflections on the state of medical education in Japan. *The Keio Journal of Medicine*. **55**: 41–51.
- 24 Rao RH (2006) Perspectives in medical education. Implementing a more integrated, interactive and interesting curriculum to improve Japanese medical education. *The Keio Journal of Medicine*. **56**: 75–84.
- 25 Segouin C and Hodges BD (2005) Educating physicians in France and Canada: are the differences based on evidence or history? *Medical Education*. **39**: 1205–12.
- 26 Hodges BD, Maniate JM, Martimianakis MA, Alsuwadan M and Segouin C (2009) Cracks and crevices: globalisation discourse and medical education. *Medical Teacher*. **31**(10): 910–7.
- 27 Jippes M and Majoor GD (2008) Influence of national culture on the adoption of integrated and problem-based curricula in Europe. *Medical Education*. **42**(3): 279–85.

- 28 Tharyan P (2005) Traumatic bereavement and the Asian Tsunami: perspectives from Tamil Nadu, India. *Bereavement Care*. **24**(2): 23–5.
- 29 Tharu S (2010) Medicine and government: histories of the present. In: Zachariah A, Srivatsan R and Tharu S (eds) *Towards a Critical Medical Practice. Reflections on the Dilemmas of Medical Culture Today*. Orient, Hyderabad.
- 30 General Medical Council (2013) *Good Medical Practice* (2e). General Medical Council, London.
- 31 Frank JR (ed.) (2005) *The CanMEDS 2005 Physician Competency Framework. Better Standards. Better Physicians. Better Care*. The Royal College of Physicians and Surgeons of Canada, Ottawa, ON.
- 32 Tyler RW (1949) *Basic Principles of Curriculum and Instruction*. University of Chicago Press, Chicago.
- 33 Jacques D (2000) *Learning in Groups. A Handbook for Improving Group Work* (3e). Routledge Falmer, London.
- 34 Mager R (1975) *Preparing Instructional Objectives* (2e). Fearon-Pitman Publishers, Belmont, CA.
- 35 Stenhouse L (1975) *An Introduction to Curriculum Research and Development*. Heinemann, Oxford.
- 36 Grant J (2000) The incapacitating effects of competence. A critique. *Journal of Health Sciences Education*. **4**(3): 271–7.
- 37 Hyland T (1995) *Competence, Education and NVQs*. Continuum International Publishing Group Ltd, London.
- 38 Schwartz B and Sharpe K (2010) *Practical Wisdom*. Riverhead Books, New York.
- 39 McKeachie WJ (1951–69) *Teaching Tips. A Guidebook for the Beginning College Teacher* (1–6e). DC Heath and Company, Lexington, MA.
- 40 Nicol D (1997) Research on Learning and Higher Education Teaching. UCoSDA briefing paper 45. Universities and Colleges Staff Development Agency, Sheffield.
- 41 Knowles M (1979) *The Adult Learner: A Neglected Species?* Gulf, Houston, TX.
- 42 University of New Mexico School of Medicine (2012) *Office of Student Admissions. Curriculum Overview*. (<http://hsc.unm.edu/som/admissions/curriculumover.shtml>; accessed 28 December 2012).
- 43 Marton F and Säljö R (1976) On qualitative differences in learning I and II. *British Journal of Educational Psychology*. **46**(1/2): 4–11, 128–48.
- 44 Kee-Kuok Wong J (2004) Are the learning styles of Asian international students Culturally or contextually based? *International Education Journal*. **4**(4): 154–66.
- 45 Newble DI and Entwistle NJ (1980) Learning styles and approaches: implications for medical education. *Medical Education*. **20**(3): 162–75.
- 46 McManus IC, Keeling A and Paice E (2004) Stress, burnout and doctors' attitudes to work are determined by personality and learning style: a twelve-year longitudinal study of UK medical graduates. *BioMed Central Medicine*. **2**(29). Available at: <http://www.biomedcentral.com/1741-7015/2/29>
- 47 Case Western Reserve University School of Medicine (2012) Bulletin. (<http://bulletin.case.edu/schoolofmedicine/>; accessed 28 December 2012).
- 48 Fish D and Coles C (2005) *Medical Education: Developing a Curriculum for Practice*. Open University Press, Maidenhead.
- 49 Goss B, Reid K, Dodds A and McColl G (2011) Comparison of medical students' diagnostic reasoning skills in a traditional and a problem-based learning curriculum. *International Journal of Medical Education*. **2**: 87–93.
- 50 Cholowski KM and Chan LKS (2001) Prior knowledge in student and experienced nurses' clinical problem Solving. *Australian Journal of Educational & Developmental Psychology*. **1**: 10–21.
- 51 Clements DH and Sarama JA (2009) *Learning and Teaching Early Math: The Learning Trajectories Approach (Studies in Mathematical Thinking and Learning Series)*. Routledge, New York, NY.
- 52 University of Southampton School of Medicine website. (<http://www.southampton.ac.uk/medicine/undergraduate/index.page?>; accessed 28 December 2012).
- 53 Royal College of Physicians (2005) *Doctors in Society. Medical Professionalism in a Changing World*. Royal College of Physicians of London, London.
- 54 Hoyle E (1971) How does the curriculum change? In: Hooper R (ed.) *The Curriculum: Context, Design and Development*. Oliver and Boyd in association with The Open University Press, Edinburgh.
- 55 Kelly AV (1999) *The Curriculum. Theory and Practice*. Paul Chapman Publishing, London.
- 56 Gale R and Grant J (1997) Managing change in a medical context: guidelines for action. AMEE guide no. 10. *Medical Teacher*. **19**: 239–49.
- 57 Newble D, Stark P, Bax N and Lawson M (2005) Developing an outcome-focused core curriculum. *Medical Education*. **39**: 680–7.
- 58 Smith SR and Dollase R (1999) AMEE guide no. 14. Outcome-based education. Part 2 – planning, implementing and evaluating a competency-based curriculum. *Medical Teacher*. **21**(1): 15–22.
- 59 Harden RM, Sowden S and Dunn WR (1984) Educational strategies in curriculum development: the SPICES model. *Medical Education*. **18**: 284–97.
- 60 Newble D, Jolly B and Wakeford R (eds) (1994) *The Certification and Recertification of Doctors*. Cambridge University Press, Cambridge.
- 61 Prideaux D (2000) Emperor's new clothes: from objectives to outcomes. *Medical Education*. **34**: 168–9.
- 62 Stenhouse L (1975) *An Introduction to Curriculum Research and Development*. Heinemann, London.
- 63 Rees C (2004) The problem with outcomes-based curricula in medical education: insights from educational theory. *Medical Education*. **38**: 593–8.
- 64 Harden RM, Crosby JR and Davis MH (1999) AMEE guide no. 14. Outcome-based education. Part 1 – an introduction to outcome-based education. *Medical Teacher*. **21**(1): 7–14.
- 65 Harden RM, Crosby JR, Davis MH and Friedman M (1999) AMEE guide no. 14. Outcome-based education. Part 5 – from competency to meta-competency: a model for the specification of learning outcomes. *Medical Teacher*. **21**(6): 546–52.
- 66 Dornan T, Littlewood S, Margolis SA, Spencer J and Ypinazar V (2006) BEME guide. How can experience in clinical and community settings contribute to early medical education? A BEME systematic review. *Medical Teacher*. **28**(1): 3–18.
- 67 O'Neill PA, Metcalfe D and David TJ (1999) The core content of the undergraduate curriculum in Manchester. *Medical Education*. **33**(2): 114–20.
- 68 D'Eon M and Crawford R (2005) The elusive content of the medical school curriculum: a method to the madness. *Medical Teacher*. **27**(8): 699–703.
- 69 Harden RM and Davis MH (1995) AMEE guide no. 5. The core curriculum with options or special study modules. *Medical Teacher*. **17**(2): 125–48.
- 70 Alahlafi A and Burge S (2005) What should undergraduate medical students know about psoriasis? Involving patients in curriculum development: modified Delphi technique. *British Medical Journal*. **330**: 633–6.
- 71 Syme-Grant J, Stewart C and Ker J (2005) How we developed a core curriculum in clinical skills. *Medical Teacher*. **27**(2): 103–6.
- 72 Bruner J (1977) *The Process of Education* (2e). Harvard University Press, Cambridge, MA.
- 73 Harden RM, Davis MH and Crosby J (1997) The new Dundee medical curriculum: a whole that is greater than the sum of the parts. *Medical Education*. **31**: 264–71.
- 74 Harden RM and Stamper N (1999) What is a spiral curriculum? *Medical Teacher*. **21**(2): 141–3.
- 75 Gijbels D, Docht F, Van den Bossche P and Segers M (2005) Effects of problem-based learning: a meta-analysis from the angle of assessment. *Review of Educational Research*. **75**(1): 27–61.

- 76 Harden RM, Laidlaw JM, Hesketh EA and AMEE guide No. 16 (1999) Study guides – their use and preparation. *Medical Teacher*. **21**(3): 248–65.
- 77 Albanese MA and Mitchell S (1993) Problem-based learning: a review of the literature on its outcomes and implementation issues. *Academic Medicine*. **68**: 52–81.
- 78 Gibbs G (1992) Improving the quality of student learning through course design. In: Barnett R (ed.) *Learning to Effect*. SRHE and Open University Press, Buckingham.
- 79 Biggs JB (1989) Approaches to the enhancement of tertiary teaching. *Higher Education Research and Development*. **8**(1): 7–25.
- 80 Larsen-Freeman D (2012) On the roles of repetition in language teaching and learning. *Applied Linguistics Review*. **3**(2): 195–210.
- 81 Murray E, Jolly B and Modell MA (1999) A comparison of the educational opportunities on junior medical attachments in general practice and in teaching hospital: a questionnaire study. *Medical Education*. **31**(7): 170–6.
- 82 Bligh J (1999) Is it time for a community-based medical school? *Medical Education*. **33**(5): 315.
- 83 Nazareth I and Kaya M (1999) Medical education in the community – the UNITRA experience. *Medical Education*. **33**: 722–4.
- 84 Worley P, Silagy C, Prideaux D, Newble D and Jones A (2000) The Parallel Rural Community Curriculum: an integrated clinical curriculum based in rural general practice. *Medical Education*. **34**: 558–65.
- 85 McCrorie P, Lefford F and Perrin F (1994) *Medical Undergraduate Community-Based Teaching: A Survey for ASME on Current and Proposed Teaching in the Community and in General Practice in UK Universities*. ASME occasional publication no. 3. Association for the Study of Medical Education, Edinburgh.