

Undergraduate medical curricula: are students being trained to meet future service needs?

Susan M Burge

ABSTRACT – The General Medical Council's recommendations for medical education in *Tomorrow's doctors* led to a major review of undergraduate medical curricula. The changes have affected all those who teach medical students. This article discusses the background to the GMC's recommendations to define core curricula but provide choice, including options in the humanities, to 'integrate' courses and to introduce new methods of teaching and learning. The guidance in *Tomorrow's doctors* provides a framework that should ensure that graduates are competent and reflective practitioners, but courses must be evaluated to ensure that goals are realised. It may prove difficult to maintain high standards in medical education as numbers of students increase.

KEY WORDS: adult learning, core curricula, General Medical Council, integrated curricula, medical humanities, problem-based learning, undergraduate medical curricula

Introduction

Calls for a radical rethink on medical education are not new: more than twenty years ago undergraduate medical curricula were criticised for being fragmented and overloaded and for encouraging students to develop attitudes to learning based on passive acquisition of knowledge rather than on curiosity and exploration.¹ Curriculum designers face many challenges, not the least of which is balancing the aim of providing students with a university education with the requirement to produce doctors who are competent.

In *Tomorrow's doctors*, the General Medical Council (GMC) repeated what had been said in previous years about the need to reduce the overcrowding of undergraduate curricula, and emphasised that medical courses should develop the practical skills needed for professional competence and the personal attributes that would enable a medical graduate to build successful relationships with patients and work effectively with colleagues.^{2,3} Undergraduate medical curricula have been revised, but what was the basis for the GMC's recommenda-

tions? Are medical schools still failing to 'grow the appropriate people' as suggested by Professor Alberti?⁴

Defining a core curriculum

The approaches that students take to study need to be considered when designing medical curricula, so that optimal patterns of learning behaviour are rewarded. University teachers hope that students will adopt a 'deep-learning' approach (Table 1) with the aim of gaining understanding by reading widely, by asking questions and by exploring new concepts. Students who take this approach are able to apply knowledge to new situations, understand text and produce written answers at a higher level than those who adopt a surface approach (Table 2).⁵ But teachers may hope in vain if curricula do not foster deep learning. Heavy workloads with an emphasis on coverage, assessments that reward students for recalling isolated scraps of information, and insufficient choice in curricula will all promote surface learning.

Research in the 1980s showed that overloaded undergraduate medical curricula and inappropriate assessments were pushing medical students to learn by rote. Newble concluded that substantial changes were required in the content of undergraduate medical curricula, as well as in methods of teaching and assessment.^{6,7} In *Tomorrow's doctors* the GMC endorsed these conclusions, asking medical schools to revise curricula by defining a core (Table 3), in

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Table 1. Characteristics of students with a deep-learning approach.

Students with a deep-learning approach:

- intend to understand and actively seek meaning to satisfy curiosity
- understand the relationship between facts or concepts
- relate new ideas to their previous knowledge and personal experiences
- can analyse a professional situation and focus on the critical aspects
- question and are able to explain topics by reconstructing knowledge
- enjoy and are interested in their work
- are prepared to spend more time in independent study than those with a surface approach
- are motivated by an interest in the subject and/or recognition of relevance to vocation
- retain facts some weeks later.

which factual information was kept to the essential minimum, supplemented by student-selected components (special study modules) to provide depth (Table 4).^{1,2}

How might the core be defined? The curriculum must ensure that medical graduates are competent to deal with the common or important clinical problems that they are likely to encounter when working in their first jobs, either within hospitals or in general practice. This argument may be used to justify selection of clinical material, although clinicians will still complain that undergraduates no longer 'cover' their specialties. It may prove more difficult to agree just how much knowledge of the basic sciences is essential for understanding – hence the repeated cry that new curricula are 'dumbing down' teaching in anatomy and laboratory sciences. Despite our passions for our own subjects or specialties, we should remember that, in general, 'more is less'. We should not look back with regret to the days when medical students were expected to recall large numbers of undigested facts. Now, more than ever before, students are expected to ask questions, to search for information that answers these questions and to evaluate what they find. Teaching is more challenging as a result.

Although in the first instance the content of the curriculum may be determined by the need to produce competent pre-registration house officers (PRHOs), core curricula should not be limited to the requirements of this year. Curricula should prepare medical students for lifelong learning and inculcate the ethos of self-evaluation. Additional material may also be justified on the basis of importance or generalisability, for example issues relating to the internationalisation of medicine; emerging health needs in local communities; or advances in technology that will impact on medical practice.

Wide consultation will help to produce a balanced curriculum.

Table 2. Characteristics of students with a surface-learning approach.

Students with a surface-learning approach:

- memorise facts for assessments without attempting to understand meaning
- accumulate unrelated facts and treat related parts separately
- reproduce essentials as accurately as possible
- show no evidence of reflection on purpose or strategy
- find an answer to a problem without grasping the underlying issues or principles illustrated by the problem
- meet demands of task with minimum of effort
- are motivated by a desire to complete task or fear of failure.

Table 3. Characteristics of the core.

- The core is common to all students and provides breadth.
- It sets out essential and important knowledge, skills and attitudes.
- Its essential competencies must be mastered for safe practice by graduation.
- The rest of the core requires a high standard of mastery.

The core for the problem-based curriculum in Manchester was identified by agreeing a list of 'index clinical situations' for which a newly graduated doctor must have a required level of competence;⁸ multidisciplinary consensus groups identified the learning objectives and core for the new Liverpool curriculum;⁹ and in Dundee a list of clinical tasks was agreed as the focus for learning in the clinical years.¹⁰ *Tomorrow's doctors* also fostered collaboration on national initiatives: an agreed list of essential skills for medical graduates,¹¹ and essential learning outcomes for Scottish medical undergraduates.¹²

Students are more likely to adopt a desirable deep approach to learning when curricula provide opportunities for them to exercise choice in the method and topic of study, but it is too early to evaluate the impact of new 'core and option' curricula on the skills and behaviour of the next generation of UK doctors. Concerns over deficiencies in new curricula and the competency of PRHOs persist, perhaps in part because the requirements for the PRHO year keep changing.¹³ Medical schools must ensure that curricula evolve in response to changes in clinical practice and the needs of students.

The art of medicine

Culture alone does not make a humane physician; nor are senior figures dependable role models for imparting professional behaviour and values. Explicit training must be provided.^{14,15} The GMC emphasises the importance of addressing ethics and communication skills in the core curriculum, but has also encouraged schools to provide students with opportunities in other humanities related to medicine.¹ Doctors should respect patients, and show consideration, recognising when 'a rub and a pat' may be as therapeutic as any medicine, and their behaviour should justify the trust that is placed in them. Humanities such as philosophy, theology and literature have been included in curricula in the USA for some time.^{16–18} UK medical schools have addressed concerns about the lack of humanity in the doctor–patient relationship by offering a range programmes in humanities.^{19,20}

Will these programmes influence attitudes in professional practice? Perhaps 'good' doctors will just become a little better. Outcomes will be difficult to define, validate and measure. To prove that learning opportunities in the humanities have more than a transient impact, students would have to be evaluated before and for some time after such a course, and the role

Table 4. Student-selected components (25–33% of curriculum).

- Student-selected components should allow students to study in-depth areas of particular interest to them.
- They use local expertise and extend the range of subjects available.
- They provide opportunities for innovation.
- They may allow the development of research skills.
- They may introduce potential career paths.
- They develop self-directed learning skills.

of confounding factors would have to be considered, including upbringing, increasing maturity, the influence of friends, patients and teachers, and the impact of clinical experiences. New curricula have the best of intentions, but sensitivity is no substitute for clinical competence. As Polly Toynbee asks, 'Would most patients rather be cured by a brusque doctor with up-to-date skills than be listened to and respected by one who had hardly looked at new treatments in the past 20 years?'²¹ Courses should ensure that students marry art to the science of medicine.

How do students learn?

In 1993, the GMC promoted the merits of medical schools adopting problem-orientated approaches to learning.¹ The revised recommendations state that: 'modern educational theory and research must influence teaching and learning.'² What does this mean?

Adults are motivated to learn by internal factors, such as the desire to succeed, the satisfaction of learning and the presence of personal goals, rather than external incentives and rewards. They want to see why something should be learnt and they respond best if learning experiences are applicable to real-life situations.²² Problem-based learning (PBL) seems to provide many of the conditions for optimising adult learning. Real-life problems are a stimulus for learning; students work together in small groups and they set their own learning goals. PBL has been claimed to:

- provide a stimulating learning environment
- motivate students
- promote deep rather than surface learning
- enhance self-directed learning skills
- promote interaction between students and staff
- promote collaboration between disciplines
- provide more enjoyment for students and teachers.

Many medical schools have implemented some form of PBL, including UK schools in Manchester, Liverpool and Glasgow. However, a 'problem-based approach' to learning has been in interpreted in different ways, confounding evaluation. Academic standards are high for entry into medical school and most students will cope with the demands of the course, despite unsatisfactory approaches to learning and teaching. Much of the evaluation has been carried out in the USA, where medical students are older than the average British student. Mature adult-learners can draw on previous learning and experience when tackling real-life problems, but school-leavers may be more stressed by PBL and need more guidance. PBL may foster better interpersonal skill and better attitudes towards patients than traditional teaching, but we have no convincing evidence that PBL improves learning or general, content-free problem-solving skills. Graduates of PBL courses do not seem to be any better, or any worse, doctors than graduates from other courses.^{23–29}

A curriculum delivered in one school may provide quite dif-

Key Points

Overloaded curricula and inappropriate assessments promote rote learning

Courses should ensure that students marry the art to the science of medicine

Learning experiences should be applicable to real-life situations

Integration fosters deep approaches to learning and understanding

A strong thread of basic sciences must be retained in curricula

ferent learning experiences from a similar-looking curriculum in another school. The clinical environment, attitudes of teachers, modes of assessment, peer support and other contextual factors will influence students' learning experiences. This informal 'hidden' curriculum is as important as the explicit one. The success of many courses adopting PBL was ensured by dedicating time to defining new curricula, motivating and training faculty staff, acquiring new facilities and investing in new technology. Similar thought, training and resources should be invested in all undergraduate medical courses.

Integrated curricula

Traditionally, pre-clinical courses covering the sciences basic to medicine were taught before and quite separate from clinical instruction in the later years. But twenty years ago, researchers suggested that students were losing motivation, failing to see the relevance of much of what they studied and forgetting what they had learnt for pre-clinical examinations.³ Do medical students need to establish a 'platform' of knowledge before they are introduced to clinical skills or would it be better if clinical training were integrated into the knowledge framework from the outset? Efforts to organise curricula for more effective learning have been made in secondary as well as tertiary education, with questions surrounding the sequencing of courses framing much of the discussion. The GMC has advocated integration: clinical and basic sciences should be taught and learned together, so students can see how scientific knowledge and clinical experience are combined to support good medical practice.^{1,2}

Better communication between basic scientists, clinicians and other healthcare professionals should improve the planning and delivery of curricula. Integration should also foster deeper approaches to learning and understanding by enabling students to make connections between their learning in different topics. It has been suggested that some universities primarily concerned with abstract and theoretical knowledge may believe that a course that spends time in developing student's psychomotor skills belongs in some other (less prestigious) institution.³⁰ These universities may not allocate enough time and assistance

for students to become even marginally competent. Early clinical contact does motivate students and early training in basic clinical skills such as communication, history taking and physical examination has been successfully linked to theoretical teaching in a number of schools.^{29,31,32} If basic sciences are learnt in the context of clinical problems, will students spend sufficient time studying biosciences to gain understanding? Some concerns have been raised. Students taught in traditional medical schools may perform better in basic science examinations,^{24,27} and may be less likely to generate errors when trying to explain clinical problems³³ than those following integrated curricula using PBL. A strong thread of basic sciences must be retained so that students can critically evaluate scientific method and apply scientific knowledge to clinical care.

Conclusions

The guidance in *Tomorrow's doctors* provides a framework that should ensure that UK graduates are knowledgeable, competent and reflective practitioners, but medical schools need sufficient resources to develop new courses and evaluate changes. Medical education should be given greater priority by universities and the NHS. It may be difficult to maintain standards in medical education as numbers of students increase.

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