Education Guide

no. 5

The Core Curriculum with Options or Special Study Modules

R M Harden & M Davis

An International Association for Medical Education

ISBN: 1-903934-06-0
The Core Curriculum with Options or Special Study Modules

*AMEE Medical Education Guide No 5*

This AMEE Education Guide was first published in Medical Teacher: Harden R M and Davis M H (1995) AMEE Medical Education Guide No 5. The core curriculum with options or special study modules. *Medical Teacher* 17(2): 125-148.

**The Authors**

R M Harden is Director of the Centre for Medical Education and Teaching Dean in the Faculty of Medicine, Dentistry and Nursing at the University of Dundee. He is also Director of the Education Development Unit (Scottish Council for Postgraduate Medical & Dental Education), Dundee, UK.

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

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary</td>
<td>3</td>
</tr>
<tr>
<td>An important trend</td>
<td>3</td>
</tr>
<tr>
<td>Response to information overload</td>
<td>3</td>
</tr>
<tr>
<td>The core curriculum with options or special study modules</td>
<td>4</td>
</tr>
<tr>
<td>Aims of this guide</td>
<td>4</td>
</tr>
<tr>
<td>What is the core curriculum?</td>
<td>5</td>
</tr>
<tr>
<td>The concept of the core curriculum - the seven Cs</td>
<td>6</td>
</tr>
<tr>
<td>Determination of core - who decides?</td>
<td>9</td>
</tr>
<tr>
<td>Criteria for core</td>
<td>10</td>
</tr>
<tr>
<td>Options or special study modules</td>
<td>10</td>
</tr>
<tr>
<td>The value of special study modules</td>
<td>11</td>
</tr>
<tr>
<td>Special study modules and electives</td>
<td>11</td>
</tr>
<tr>
<td>Topics covered</td>
<td>12</td>
</tr>
<tr>
<td>Selection criteria</td>
<td>12</td>
</tr>
<tr>
<td>Problems and management</td>
<td>13</td>
</tr>
<tr>
<td>Relationship between core and special study modules</td>
<td>13</td>
</tr>
<tr>
<td>Integrated</td>
<td>13</td>
</tr>
<tr>
<td>Concurrent</td>
<td>14</td>
</tr>
<tr>
<td>Intermittent</td>
<td>14</td>
</tr>
<tr>
<td>Sequential</td>
<td>14</td>
</tr>
<tr>
<td>Time allocation</td>
<td>15</td>
</tr>
<tr>
<td>Assessment is important</td>
<td>16</td>
</tr>
<tr>
<td>Assessment of core</td>
<td>16</td>
</tr>
<tr>
<td>Assessment of special study modules</td>
<td>16</td>
</tr>
<tr>
<td>Postgraduate studies</td>
<td>16</td>
</tr>
<tr>
<td>The continuum</td>
<td>16</td>
</tr>
<tr>
<td>Postgraduate training</td>
<td>16</td>
</tr>
<tr>
<td>Conclusion</td>
<td>17</td>
</tr>
<tr>
<td>References</td>
<td>17</td>
</tr>
</tbody>
</table>
The Core Curriculum with Options or Special Study Modules

Summary

A core curriculum with options, or special study modules, is a response to the major problem of content overload. Mastery of the core, which may cover knowledge, skills and attitudes, ensures the maintenance of standards: the options or SSMs (special study modules) allow in-depth work and the achievement of higher-level competences, such as critical thinking. Students, encouraged to take more responsibility for their own learning, can choose the subjects they study. The core curriculum can be specified in various ways. This is the responsibility of teachers, of subject specialists, the medical profession more generally, and of the public.

An SSM may entail a more detailed study of part of the core, where the student has already acquired prerequisite basic knowledge or skills. An SSM may cover a medically or clinically related topic, such as sports medicine and the locomotor system. SSMs can be completely unrelated to the core and indeed to medicine, e.g. study a foreign language.

Options or special study modules may be: integrated in the core teaching; concurrent with core teaching, in time set aside for the purpose; in intermittent blocks of time during the course, allocated for the purpose’ or sequential, with an option block arranged to follow each core block. The sequential approach offers many advantages. Time for SSMs is protected from encroachment by the core. It makes possible an ‘assessment-to-a-standard’ approach. This ensures that all students master the core and allows for the different times it may take students to do so.

Any disadvantages of introducing a core curriculum with options or special study modules are greatly outweighed by advantages, both for students and teachers. The core and options concept is one of the most significant current advances in medical education.

An important trend

The concept of a core curriculum with options or SSMs (special study modules) is arguably the most exciting and significant development in medical education thinking in recent years. It features prominently in the recommendations by the General Medical Council (1993) to UK medical schools. “The most striking feature of the new proposals” suggested Stella Lowry (1992) “is the introduction of the concept of a ‘core’ curriculum and ‘options’.” The concept featured prominently in deliberations at the August 1993 World Summit on Medical Education in Edinburgh (Harden, 1994). The strategy that elicited the widest discussion, suggested Warren (1993) in an editorial in the Lancet, was “the development of a global core curriculum flexible and adaptable to change and allowing a large and open menu of options.” Currently, many medical schools, specialist bodies and organisations are actively pursuing the specification of core curricula in their fields.

Response to information overload

Factual or information overload is one of the biggest problems facing the student today. “With the proliferation of new medical knowledge and the desire of faculty to cover everything”, Shumak (1992) suggested, “the factual overload faced by medical students under the traditional curriculum was becoming absurd.” Advances in medicine and the so called ‘information explosion’ have led to an increasing and potentially intolerable burden for the student. Curriculum committees and medical educators are expected to pay attention to new topics or topics of particular current concern, such as cancer, pain management, care of the dying, nutrition, drug or substance abuse, health education and promotion, medical ethics, radiation protection, AIDS and genetics. Teachers of traditional subjects – such as anatomy, physiology or surgery – are concerned about neglect of principles and knowledge bases in their specialities. The problem of information overload was highlighted in an editorial in the Lancet (Anon, 1991): “Especially in good basic science departments and teaching hospitals, the excitement of new knowledge, the presence of research units, conspire to pack the curriculum ever tighter.”

How can we cope with this continuing and significant expansion of medical knowledge? Increasing the length of time allocated for undergraduate studies is not an option. Indeed, there are current pressures, including those of cost, to reduce the time for undergraduate education, from the five years found in many countries to four years. Expectations that
The students will work harder, or that the education process will be made more efficient, are unlikely to bring about the time savings necessary.

The problem of information overload demands a fundamental reorientation of the curriculum, and new strategies such as a core with options. “Until an attempt is made to circumscribe the requirements of the course in respect of factual quantum, the unconfined overload of the curriculum will prevail and will continue to deny students the educational opportunities to which they are entitled. We therefore recommend the introduction of what we will refer to as a ‘core curriculum’ which defines the requirements that must be satisfied before a newly qualified doctor can assume the responsibilities of a pre-registration house officer” (General Medical Council, 1993).

**The core curriculum with options or special study modules**

There are two distinct components to the change proposed. The first is a core curriculum which should be studied by all students. The second is the opportunity for students to have a choice in what they study.

Through the core curriculum, students should acquire the knowledge, skills and attitudes thought to be essential for medical practice. The term ‘core curriculum’ suggests that whatever learning experiences students undertake, there are certain essential activities at the heart of the student’s programme. “The core curriculum” suggests Kirk (1986) “will constitute those attitudes or studies that all pupils will be expected to undertake.” The term ‘core’ can be taken to imply that the core elements of the course constitute only part of a student’s total programme.

‘Options’ let students spend some time studying medical or related subjects of interest to them in more depth. This complements the core.

The 1970s and 1980s saw challenges to the view that there should be a uniform curriculum, with all students undertaking identical programmes of study. It was recognised that students should have the opportunity to select their own programme of work for part of the time at medical school. For the most part however, the proportion of time allocated to ‘electives’ was small and included activities previously scheduled for vacations. In the electives, students had the option of choosing, from a range, subjects they wanted to study in more depth, often overseas or at a distance from their own medical school. The General Medical Council (1980) recommendations recognised the value of electives. “Elective periods provide a useful opportunity for the student to engage in laboratory or clinical research or to obtain additional clinical experience in a particular field, whether in Britain or overseas, in different systems of healthcare.”

The SPICES model of curriculum planning (Harden, 1984) described six education strategies, each of which can be regarded as a continuum. One of these dimensions concerned ‘electives’, the extent to which the curriculum should be built around a series of options or electives, and the extent to which all students should study a uniform curriculum. A curriculum with a strong and carefully planned core, supplemented by options or special study modules is an extension of this SPICES philosophy. Core and options has much to offer medical education in the years ahead.

**Aims of this guide**

A better understanding of the concept of core curriculum with options or special study modules will help the many teachers and educators currently grappling with implementing the approach. Improving understanding will also encourage others, who as yet have only contemplated core and options in undergraduate and postgraduate education, to take the necessary action.

In this AMEE Medical Education Guide we look at:

- the reasons underlying the trend towards core curricula with options or special study modules
- the philosophy underpinning the concept of a core curriculum and the nature of options or special study modules
- the different ways in which the core and special study modules can be delivered in the curriculum
- approaches to identifying the core
- the practical issues in implementing the approach, including assessment.
What is the Core Curriculum?

One problem in discussing a core curriculum is that the concept of core means different things to different people. Here are four different perceptions.

Core as essential aspects of each subject or discipline
The core is viewed from the perspective of the disciplines, subjects or specialities which make up medicine. It can be defined as the essential or key aspects of the subjects studied in the curriculum. Some disciplines – such as the major ones of medicine, surgery or pathology – may have a larger core than the minor specialities such as ophthalmology, plastic surgery or genetics, but all disciplines are included.

Core as essential competences for practice
The core is viewed from the perspective of the key competences required of the doctor for the practice of medicine. Thus, competences would include:

- cardiopulmonary resuscitation
- care of the dying
- the management of a patient with abdominal pain.

The Association of British Neurologists (1995) has specified the core curriculum in neuroscience and clinical neurology in terms of what they expect a recently qualified doctor to be able to do (Table 1). Nierenberg (1990) defined the core curriculum in pharmacology in terms of clinical practice and suggested, “Mastery of the core curriculum should allow the student to prescribe current drugs in a way that maximises the chances of efficacy while minimising the chances of causing harm.”

Core as a study of only the key disciplines
A different view of core, in the undergraduate curriculum, is the study only of the major specialities, eg medicine and surgery. The minor specialities, eg otolaryngology, anaesthetics, dermatology and urology are excluded. It is argued in this approach that the place for consideration of the more specialised disciplines is in postgraduate training. This view of a core curriculum is one which has caused great alarm among some teachers, and justifiably so. It is one which is difficult to defend on educational or practical grounds. It is inconceivable, for example, that students should qualify from a course in medicine with no knowledge or skills relating to urology or no awareness of urological problems. Urology, otolaryngology and dermatology are no more postgraduate subjects than endocrinology or even neurology, which are often seen as extensions of medicine.

The undergraduate curriculum in neurology should enable a recently qualified doctor to:

- appreciate a patient has a neurological problem
- evaluate the common neurological presenting symptoms
- recognise the common neurological disorders
- manage the common neurological disorders using drugs when appropriate, appreciate other aspects of the general management, and know what neurosurgery may have to offer
- appreciate the role of doctors and others in the care of patients with neurological disability
- appreciate ethical issues associated with neurological disorders.

Core as areas of study relevant to many disciplines
A fourth concept of core is those aspects common to all, or a number of, specialities in the curriculum. Thus core courses in science cover the main principles of scientific thinking common to all the scientific disciplines. Such generic competences required of graduates in higher education have been identified as skills in communication, problem solving, decision-making, and time management, with interpersonal skills such as effective teamwork (Levy, 1992). Webster’s Dictionary (Gove, 1971) takes it a stage further, defining the core curriculum as “an arrangement of a course of studies that
combines under certain basic topics, material from subjects conventionally separated, and aims to provide a common background for all students, to integrate the individual student’s programmes and relate work of the school to experience and society.”

Much of the general literature on core curricula is based on this fourth, multidisciplinary, interpretation. In medical education, core can also usefully be thought of in terms of the first or the second perception. In practice, these two may have the same end-point. Table 2 outlines the essential features of ‘core’ in the curriculum.

1. Common to all students.
2. Covers competences essential for the practice of medicine.
3. Includes knowledge, skills and attitudes.
4. Requires a high standard of mastery from the student.
5. Added to and built on, in subsequent stages of the curriculum or phases of education.

Table 2: The principal features of ‘core’ in the curriculum

**The concept of the core curriculum – the seven Cs**

The core curriculum is not just a response to the problem of information overload. The move to core curriculum with options or special study modules is a fundamental and significant change in educational planning. We will here examine the philosophy, the political thinking and the educational thinking underpinning the concept. An understanding of that philosophy will help those charged with implementing the new curriculum – planners, developers and teachers – to be more comfortable with the move. It will also maximise the benefits gained by staff and students. The underpinning philosophies are described by the seven Cs (Figure 1).

**Certification**

Certification, together with the following three issues of capability, comprehensiveness and consistency, constituted a dominating theme in the 800 or so published references to core curriculum we identified from the ERIC database.

As greater accountability is demanded, both within institutions and externally by government and public, students’ achievements by the end of the course are a matter of interest and concern. Will doctors, on completion of their course and receipt of the university’s degree or certificate, have the knowledge, skills and attitudes expected of them? “We move towards a curriculum” suggested the General Medical Council (1993) “that is less ambitious in scope but is more rigorously defined than has been customary”.

Public concern has been expressed about the relevance of the medical school curriculum. Partly in response to this, recent decades have seen significant changes in education. These are reflected in the General Medical Council recommendations, which set out the need for a core curriculum and the assumptions on which progressive medical education is based. The core curriculum is a public statement from institutions. It details the essential competences of their graduates. That statement is open and can be inspected. Certain skills make such a critical contribution to the practice of medicine that they must be mastered by all doctors. These must be included in a core curriculum and recognised by the award of a certificate from a medical school or institution.

The core curriculum can increase accountability in medicine and in education. It can also help meet growing demands from the public for cost-effectiveness and academic standards in education. Are schools meeting the obligations expected of them? Teachers in a medical school have clearly defined professional responsibility for the best ways of promoting learning and the most effective means of education. However, determination of curriculum content has to be vested not only in those teachers and in the medical schools, but also in a national body such as the General Medical Council, which includes representatives from the public.

The core curriculum concept reflects this public accountability. The core curriculum is described by Professor Hirsch (1993) of the University of Virginia as a “prerequisite for excellence and fairness in education “. Certified standards embrace the notion that students have reached the required standard if they demonstrate mastery of the core. A high standard of competence is expected in the key areas

![Figure 1: The seven Cs - philosophies underpinning the concept of a core curriculum with options or special study modules](image-url)
of medical practice. The core curriculum is compatible with the idea of mastery learning – where students have to demonstrate mastery of the subject.

**Capability**
A theme related to the need for more accountability is the ‘education for capability’ movement. This questions the appropriateness of what is being taught, and emphasises the competences required by graduates in the workplace for which they are trained. Education for capability focuses on the need to include in the core curriculum generic competences such as communication skills, interpersonal skills, problem-solving ability and decision-making ability. Students, on completion of the undergraduate curriculum, can thus be assumed to have all the knowledge, skills and attitudes required to enter their pre-registration house officer appointment.

**Comprehensiveness**
Inherent in the notion of standards is comprehensiveness – the notion that all essential aspects of the subject or topic will have been covered and mastered. This has been the driving force behind much past work on core curricula. The setting of boundaries and core extent in particular areas has been the objective of many groups, who have specified core curricula in subjects as diverse as neurology, paediatrics, obstetrics, rheumatology, palliative care and oncology. Concern to ensure that all key aspects of the subject are covered has been the motivation behind many core curriculum specifications.

**Consistency**
Another dimension of certification and standards reflected in the core curriculum is the concept of consistency or uniformity. There is a risk that, with rapid advances in medicine, the curriculum process has become uncoordinated. There may be a need for increased coherency in the curriculum. A group of North American teachers arrived at a consensus on what should be taught in a core curriculum in pharmacology (Nierenberg, 1990). In a recent study in the UK, teachers reached a consensus view on a core curriculum in neurology (Association of British Neurologists, 1995).

As medicine becomes increasingly international, with the breakdown of national boundaries, it is increasingly important to have some consistency and agreement in the content of basic core medical curricula. At the same time, it has to be accepted that each school, in identifying the content of its programme, will bring to the curriculum any special aims, objectives and ethos with which that school wishes to be identified.

**Constructivism**
The constructivist psychology of learning contributes another concept which underpins the philosophy of a core curriculum. Constructivism dictates that knowledge builds on knowledge (Figure 2). We acquire new knowledge just as a tree acquires new leaves. The old leaves actively help to nourish the new. The better and more secure the old growth, the faster the new growth can occur. In the same way, Hirsch, who established in the USA the Core Knowledge Foundation, suggested that learning is an organic process, with new knowledge building on core prior knowledge (Hirsch, 1993). A core curriculum, according to Hirsch, is not dull and boring – it empowers the student, giving him or her the confidence to ask questions and to move on to higher-level objectives. “Core knowledge tremendously increased the students’ ability to question. A coherent approach to specific content enhances students’ critical thinking and higher order thinking skills” (Hirsch, 1993).

The new spiral curriculum at Dundee is an expression of the constructivist approach. Students first master, in Phase 1 of the core curriculum, the essential aspects of normal structure, function and behaviour – as they relate to each body system. Students then build and elaborate on this in Phase 2, moving on to develop their understanding of the normal and adding pathology, abnormal structure and abnormal function as they relate to each body system. Phase 3 builds on the student’s mastery of the core in Phases 1 and 2, and looks in more detail at the application of what the student has learned to the practice of medicine.
Charlton (1991) emphasised the need for clinical teaching to build on a sound core of relevant basic science: “The vocational element of science constitutes a core curriculum which could be constructed from a consideration of the basic scientific knowledge used by clinicians in their medical practice.”

A sound grounding in the undergraduate core curriculum also paves the way for formal postgraduate education and continuing medical education. The move to a core undergraduate curriculum gives a stronger, not weaker, basis for postgraduate education.

The concept of constructivism is expanded in a US book by Jacqueline Brooks, President of the Association for Constructivist Teaching (Brooks and Brooks, 1993). Students have to understand that they are ultimately responsible for their own learning. They have the task of constructing their own understanding of medicine. Students may spend time reading in the textbook about the thyroid gland and the functions of thyroid hormone. They may even dissect the thyroid gland, examine the organ and look at its histology under the microscope. However, when that student actually sees a patient with a goitre and overactivity of the thyroid gland, his or her ideas about the thyroid are transformed. The presence of new clinical information prompts the emergence of new concepts and further development of prior ideas. Deep understanding occurs.

Packing too much information into too little time is the enemy of constructivist learning. Faced with this, the student can only try to memorise the information. He or she gains merely a superficial understanding. Teachers often complain about how quickly students forget the basic sciences they have learned. How little of what students initially remembered and were examined on in the early years is retained during the later years of the course. “Students haven’t forgotten,” suggested Brooks and Brooks (1993) “they never learned that which we assumed they had. In demanding coverage of a broad landscape of material, we often win the battle but lose the war. We expose the students to the material and prepare them for the tests, but we don’t allow them to learn the concepts.” The move to a core curriculum should limit the field of study. Rote learning and superficial recall will be replaced by an understanding of the subject, on which the student can build as he or she works through the curriculum. The interpretation of core curriculum as a mass of facts to be learned – a common misunderstanding – is the very antithesis of the constructivist core.

**Choice**

The core curriculum may be alleged to remove the element of choice. Students have to learn, and teachers teach, what is prescribed. This criticism would be valid if the core occupied 100% of the time available in the curriculum. It does not. The core is supplemented by options or special study modules (Figure 3). These give the student freedom to choose what he or she wishes to study. The teacher is freed to offer other courses. Indeed, the General Medical Council (1993) recommendations advocate that the core should not take up more than two-thirds of the time available.

Based on students’ freedom to choose, one can classify content of the core curriculum into three classes.

i) **Content-related aspects of the subjects studied – knowledge, skills and attitudes to be mastered by all students completing the course – should be included in the core.**

Examples are:

- An understanding of how patients with ischaemic heart disease present
- The ability to measure blood pressure with sphygmomanometer.

While this content is fixed, there may be choice in the learning method or educational strategy. The curriculum can be so arranged that students may choose their learning method, eg working independently alone or in small groups (Harden et al, 1975). They may also be given responsibility for choosing their own educational strategy, although this is more difficult for a medical school to arrange. It is of interest that even in an innovative school, where the philosophy is very much towards the student-centred end of the continuum (Harden et al, 1984), students are given little freedom on whether they adopt a problem-based approach to learning.
ii) **Certain core competences and skills should be mastered and are not subject specific.**

The students may choose the subject or context in which they undertake such studies. Examples are computer skills, use of a medical library, and research awareness. These competences may be acquired during the core or during the options or special study modules – providing these are so organised to permit students to develop such skills. A module on coronary heart disease, for example, may require that students do a literature search and collect information about the incidence of coronary artery disease, then store and analyse that information with a computer. The description of any special study modules must make clear which core competences are covered in that SSM.

iii) **Topics not in the core, which not all students have to study, can be offered as special study modules.**

These optional topics might include medical topics such as special aspects of diabetes or other topics such as a foreign language, management of IT skills, or medical journalism.

In the medical course, we need both breadth and depth of subject coverage. The problem is that there is insufficient time to study *everything* in depth. The core of the curriculum can provide the breadth: the SSMs can let students choose the areas to study in depth.

One major advantage of a clearly defined core with options is that the needs or wishes of individual students are catered for – in subjects studied, special competences gained and the context of medical practice, eg community or hospital. As noted in the General Medical Council (1993) recommendations, “the greatest educational opportunities will be afforded by that part of the course which goes beyond the limits of the core, that allows students to study in depth in areas of particular interest to them, that provides them with insights into scientific method and the discipline of research and that engenders an approach to medicine that is constantly questioning and self-critical. This part of the course we refer to in terms of ‘special study modules’.”

Core and options can also accommodate the varying rate at which students master the core. The model offers the advantage of flexibility and meshes with trends towards modularisation in higher education (Jenkins & Walker, 1994).

**Compacted curriculum**

The six Cs described above – certification, capability, comprehensiveness, consistency, constructivism and choice – represent important philosophies underpinning the concept of a core curriculum with special study modules. A seventh C is also worthy of note – the compacted or accelerated curriculum (Reis & Renzulli, 1992).

This interesting idea, currently being promoted in education, recognises a challenge facing education. How do we provide equitably for the differences in students’ abilities and interest, taking into account the needs of all students from the most able to the least able? The most able students, ahead of their classmates, may be held back by a traditional curriculum and may not be able to realise their full potential. In contrast, the core curriculum with options, like ‘curriculum compacting’, caters for the above-average student. He or she may complete and master the core in the minimum time allocated, then proceed to ambitious and extensive SSMs. That flexibility applies similarly to below-average students.

**Determination of core – who decides?**

A book by Gordon Kirk (1986), the Core Curriculum, begins by addressing a fundamental and perennial question: ”Who should determine what young people learn at school?” The history of education in Britain shows many different answers to that question: “parents, politicians, and pupils themselves questioned the relevance of the curriculum as a preparation for life in a complex changing society; and on all sides, pressure grew for schools to be more directly accountable to the communities they served.”

Perhaps, as with schools, public confidence in medical education is so undermined that initiatives to regulate the medical school curriculum are now seen to be necessary.

At a December 1993 meeting on the core curriculum, organised by the Association for the Study of Medical Education, strong pleas were made by non-medical members of the audience for the public to have a greater say in curriculum content. This ‘external’ input may be particularly appropriate for topics such as medical ethics.

The framework of the medical school curriculum is a matter of legitimate public interest. It should be determined by centrally accountable bodies, such as the UK General Medical Council. In some
countries, central government sets out in considerable
detail what students are expected to learn. Such
central control, however, is anathema to many
teachers. The General Medical Council has
recognised the advantages of promoting the
developing of particular core courses through
relevant national institutions and educationally
concerned organisations. Various bodies, such as the
Association of British Neurologists (1995) have
already responded to this challenge. In a study of
departments of paediatrics in the USA, the
acceptability of a nationally defined core curriculum
was assessed (Gunzburger, 1994). The question was
posed: “If a national advisory board were formed to
establish a minimum paediatrics curriculum, would
you or one of your Faculty participate?” All but one
of 93 respondents said ‘Yes’. Provision must also be
made, in the framework of any national curriculum,
for student choice, for diversity to reflect local
requirements and for teachers to increase their
responsibility for curriculum development.

With greater mobility of doctors and increasing
international collaboration and exchange, there is a
need too for discussion about core curricula at an
international level. “The strategy that elicited the
widest discussion in Edinburgh last week was the
development of a global core curriculum, flexible
and adaptable to change and allowing a large and
open menu of options” (Warren, 1993).

Inside the medical school may be tensions between
curriculum committees and departments. The
General Medical Council (1993) recognised that “it
requires the joint involvement of both basic scientists
and clinicians and medical agreement on the essential
components of the course. Furthermore, their
deliberations should be moderated by representatives
of disciplines not primarily concerned with the
subject under consideration and also by those who
will be involved with later training at the
postgraduate stage.” The determination of the core
should be a team effort, involving all concerned with
the education of medical students. The anatomist has
a role in determining the teaching of anatomy, the
pharmacologist pharmacology, the surgeon surgery,
and the oncologist oncology. However, should the
disciplines continue to have sole responsibility? It is
now almost universally recognised that the decision
about what is taught in any specialty has to be a
shared one. The surgeon, for example, may have a
legitimate view on the teaching of anatomy. The
ultimate decision about content should rest with a
curriculum committee. This has been easier to
implement in integrated teaching programmes,
where the curriculum is system based.

Criteria for core

Core curricula are not absolute, like the structure of
insulin, nor are they fundamental truths, like the
theory of cognitive dissonance. We have already
discussed who should make the judgement. How
should judgements about core be made?

A range of methods is available for the determination
of the content of an educational programme (Dunn
et al, 1985); Laidlaw et al, 1995. These include: the
wiseman approach, Delphi techniques, critical-
incident studies, analysis of current practice and job
analysis of health-care professionals. Factors to
consider include:

- The importance of the topic in key decisions to
  be taken by a doctor
- The commonness or rarity of the problem
- The extent to which one can generalise from the
  subject to other topics in medicine.

It is important to recognise in determining the core
curriculum that it will change with time. The core
should be kept under review. It should reflect any
medical trends or changes in emphasis. It is unlikely,
for example, that prevention and health promotion
would have featured strongly in a core curriculum
from 20 years ago.

Options or Special Study Modules

In the curriculum, the concept of ‘core’ is closely
linked with that of ‘options’. Misunderstandings
based on the use of the word ‘options’ arose following
publication by the General Medical Council’s
Education Committee of an informal discussion
document on the undergraduate curriculum. “This
was taken by many” reported David Shaw (1992)
“to imply that the students should be free to choose
which elements of the course they would leave out
– a proposition that caused some alarm particularly
amongst the smaller clinical specialities. This was
not the intention. It would surely not be acceptable
for a student to qualify without at least some
knowledge of all the bodily systems, of the common
disorders afflicting them and of how to examine
them. ‘Options’ were meant to be opportunities for
choice, not of what to leave out, but of what to add
in to augment the core; choice of topics that excited
the interest and imagination of the student; that led to exploration of the sources of knowledge relating to such topics and evaluation of the evidence on which such knowledge was based, perhaps in some instances involving personal experimentation.”

Competences gained during the options part of the curriculum are important. Such achievements should be included in every student’s programme of work. They should not be thought of as optional: their importance is equal to that of the core. “They are no less important than the core curriculum but they focus not on the immediate requirements of the pre-registration year but on the long term intellectual and attitudinal demands of a professional life that will constantly be challenged by growth of knowledge and change of circumstances” (General Medical Council, 1993).

The value of special study modules

Special study modules can solve many of the current problems in medical education. Linked to a core curriculum, they offer a number of advantages:

- SSMs provide the opportunity for students to study in greater depth an area of their choosing. They facilitate the achievement of higher-level objectives, such as critical thinking and reasoning. This moves the emphasis away from a content-focused (and frequently overloaded) curriculum.

- SSMs facilitate the development of integrated themes, giving a multidisciplinary and multiprofessional direction to the curriculum.

- The importance of generic competences or transferable skills in professional development is recognised. Competences such as communication skills or time management can be gained through SSMs. The student is encouraged to take more responsibility for learning – useful preparation for postgraduate and continuing medical education.

- SSMs allow significant extension of the range of subjects or topics covered in the curriculum. Not all students are the same. SSMs meet their different interests and career aspirations. Though not to be seen as a period of early specialisation, SSMs let students experience and sample an area where they may wish to pursue a career. With greater specialisation in medicine, such experience may not be possible in a traditional curriculum. In otolaryngology, for example, seven areas of specialisation have now been defined – advance ontology, audiological medicine, advanced rhinology, facial plastic surgery, head and neck oncology, phoniatrics and paediatric ENT.

- As schools move towards a common core, the range of SSMs offered in any one medical school may reflect that school’s direction or emphasis. A menu of interesting SSMs may attract potential students and influence their choice of medical school. As suggested in the GMC recommendations, “they will give scope for variation in educational style and content and will provide opportunity for experimentation in curriculum design.”

- SSMs can utilise a range of teaching resources. Teachers of subjects that might otherwise not have a role or a place in the programme, and who currently feel left out of the undergraduate curriculum, can become involved in teaching and in the curriculum.

- SSMs can attract, and reward, staff and students. Teachers from schools where SSMs have been introduced find them rewarding and invigorating. Students, likewise, report positively.

Special study modules and electives

During the past two decades, elective studies have played an increasingly important part in medical curricula (Harden et al, 1984). Conventionally, ‘electives’ are periods of eight weeks or more where students individually choose an attachment or a subject for study. There may be a research element to the study, with a written paper or report produced. Many students choose to undertake electives overseas, looking at medicine in a different context, often that of a developing country.

Since 1973 and the last major curriculum review in the Dundee Medical School, final-year medical students have had to undertake an eight-week elective as part of their programme. The fourth-year elective projects undertaken by students at Dundee, under the supervision of Dr G Donnelly, have been of three types:

- patient related 30%
- laboratory related 30%
- sociological 40%.

Electives can be viewed as a special type of SSM. There are, however, a number of differences between an elective and a standard SSM. These are summarised in Table 3. Often presented as formal courses, the more planned and systematic aspects of the SSMs contrast with the more individual aspect of electives, where more emphasis is placed on research or on-the-job learning. Perhaps the essential difference between SSMs and electives is that teachers play a greater role in the SSM programme.
The teacher offers a planned SSM course with well-defined objectives, and may provide more formal input during the programme. In many ways, however, the distinction between electives and options or special study modules is artificial. Both share the same objectives. Most of what we say here about options or special study modules applies equally well to electives.

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Electives</th>
<th>Special study modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choice of subject or topic</td>
<td>Student usually identifies the subject.</td>
<td>Faculty offers a list of choices from menu.</td>
</tr>
<tr>
<td>Teaching</td>
<td>Infinite</td>
<td>Limited.</td>
</tr>
<tr>
<td>Student numbers</td>
<td>Informal, not ‘taught’ - seen as an attachment</td>
<td>Structured/formal; may be seen as an alternative course.</td>
</tr>
<tr>
<td>Assessment</td>
<td>Students attached individually to an elective</td>
<td>Groups of 5-100 students can study an SSM.</td>
</tr>
<tr>
<td></td>
<td>Less formal; may be based on supervisors’ report or dissertation</td>
<td>More formal; may include an examination as well as inspection of report or other product of work undertaken.</td>
</tr>
</tbody>
</table>

**Table 3: Differences between SSMs and traditional electives**

**Topics covered**
For options or special study modules, the type of subject studied may lie in three categories.

i) **Topic based on the core**
The student may choose to study a subject based on the core. Students, as part of the core locomotor system in year 1, for example, may acquire a general knowledge of the anatomy of the lower limbs. They choose in an SSM to study one aspect, for example the knee joint, in more depth. This might include an opportunity for anatomical dissection, for use of an interactive video or other learning resources relating to the knee joint. Alternatively, they may choose to look at a more clinical aspect of the subject – for example a study of the biomechanics of the knee joint and a clinical attachment to a limb-fitting centre.

The student may choose to study a topic related to the core. For example, in relation to the locomotor system, an SSM could cover sports medicine.

The student could take part in research, investigating the ‘cutting edge’ of medical sciences as they relate to the core area.

The student could undertake remedial or revision work relating to the core.

ii) **Topic related to medicine but not to the core**
The student could choose to study a subject related to medicine, but not specifically related to the core Examples are computing, information technology, the history of medicine, health politics.

iii) **Topic unrelated to medicine**
The student might choose a subject not directly related to medicine, but of possible career relevance or simply an enhancement of personal development. The study of a foreign language, business studies or health economics, might come into this category.

**Selection criteria**
Topics can be selected against various criteria. Two of the most important are contribution to overall course objectives and availability of suitable resources.

The extent to which the study of the module contributes to the overall medical course objectives can be assessed in two ways.

**Content** – is the subject consistent with the school’s aims and objectives? In addition to subject-based themes, SSMs present an excellent opportunity to offer the student integrated subjects or themes. Will mastery of the module’s content lead to the student being a better doctor in some way? Will he or she become more able to practise as a doctor?

**Process of Study** – does the student’s work in the SSM lead to mastery of learning skills, critical thinking and information retrieval relevant to the practice of medicine?
The extent to which resources are available in the medical school to mount the SSM, in terms of teaching staff and learning opportunities, is a factor in the selection of topics for SSMs.

In choosing a subject for an SSM, take care to avoid SSMs where:

- The main aim is to infiltrate more material into the course and to reintroduce redundant detail left out from the core
- The emphasis is on a superficial cramming of a new topic

**Problems and management**

Some teachers may view the introduction of SSMs in the curriculum as a step towards chaos; others see an opportunity for institutional creativity. SSMs can, without doubt, if properly organised, contribute to the education of medical students. To ensure success, a variety of issues must first be resolved.

**Supervision and co-ordination.** At least one senior member of staff must have this as a major responsibility.

**Authority.** The co-ordinator must have the authority of the curriculum committee or undergraduate medical education committee – and the backing of departments, if the school is departmentally organised.

**Resources.** Finances and other resources, including library facilities and self-learning tools, must be available to support the module.

**Flexibility.** There should be some flexibility in the duration of SSMs. A standard module might be equivalent to two weeks of full-time work and carry one credit. Some SSMs may have four weeks allocated, with two credits; some may be one week, with half a credit.

**Number of SSMs available.** The number of SSM slots offered should be greater than the number of places required by students. The number of courses required will depend on the number of students in the class and the number of student places on each module. Places offered in an SSM will depend on the resources available and the nature of the module. Some SSMs might function effectively with only a few students. Others might be organised as a more formal course, with up to 100 students enrolled.

**Student guidelines.** Guidelines and advice should be offered to students concerning their choice of SSMs and what is expected of them. This may be by an adviser of studies, personal tutor or some similar arrangement. It may be appropriate to require a balance of themes. Students might be required to study one basic science or research theme, one hospital-based clinical theme, one community theme and one theme not directly related to medicine.

**Assessment.** SSMs should be assessed as stringently as the core, preferably with an external examiner. The external examiner should be required to ensure comparability between the modules in terms of the amount of work required by the students and in terms of standards to be reached.

**Relationship Between Core and Special Study Modules**

There are four approaches to implementing SSMs and core in a curriculum. Each has its advantages and disadvantages. These are summarised in Figure 4.

**Integrated.** The SSM relates to a subject and is integrated with the core teaching of the subject.

**Concurrent.** The SSM content is not necessarily related to the core, but runs in parallel with the core.

**Intermittent.** Blocks of time (e.g. 4-10 weeks) are allocated for SSMs at different part of the curriculum.

**Sequential.** Each block of core in the curriculum is followed by an SSM.
allocated to the endocrinology course. Students could choose, if places were available, to attend special clinics in endocrinology, to visit laboratories and see endocrinological investigations at first hand, to have additional experience in one aspect of endocrinology (such as in general practice or surgery), or to attend more in-depth tutorials on topics such as neuro-endocrinology.

There are advantages to an integrated approach when the core and SSM are related, with the SSM being an in-depth study of the core. Where this is not the case, the integrated model is inappropriate. There is also one major disadvantage. It is difficult, perhaps impossible, to protect the time allocated for SSMs. This time is eroded. The core expands. Within a few years, the core fills the time previously allocated for SSMs.

**Concurrent**

In the concurrent model, options or special study modules run alongside the basic core teaching but do not cover the same content area or topic. Time slots may be allocated for the SSM, which is then scheduled in the timetable.

An example of this approach in the Dundee curriculum was the first-aid course. This was scheduled one afternoon per week during the first year of the curriculum. Students completing the course satisfactorily were given a certificate. Another optional course, which ran alongside the core course in later years, was a multiprofessional course on medical ethics. Medical students worked with nurses, and tackled ethical problems in medicine.

Students can be left to find the time, from free-study time or other time available, to work on their SSM. The fourth-year project or assignment in Dundee was an example of this approach. The aim was to let the student study an area in greater depth, to complete a systematic literature review and, for many students, a piece of research. No set time was allocated in the timetable for project work. Students were expected to complete it during their free-study periods or at other times. Satisfactory completion of the project was a prerequisite for proceeding to the final examination. A prize was awarded each year for the best project.

One advantage of a concurrent pattern is that students receive a varied diet. At any one time, they have both core material and options. This approach allows time spent on core and options to be spread out over a longer period than each would have if tackled consecutively.

A significant disadvantage, as in the integrated approach, is that core and options may compete for the student’s attention and time. This problem may be aggravated by pressure on the student to study for, and pass, core examinations. A further disadvantage is that, because core and options are not related, the curriculum strategy is far less flexible than in the sequential model (described below).

**Intermittent**

In the intermittent approach, blocks of time are allocated for special study modules. These modules are not related to what the student studied immediately before or will study immediately after. The blocks can be at fixed times, where the whole class is scheduled to work on options or electives, or students can rotate through option blocks while the remainder of the class attends core courses. In Dundee, an eight-week block was scheduled for student electives, or ‘selected studies’ as it was called, during the final year of the curriculum.

This intermittent model has an advantage over the concurrent or integrated models. Time spent on the options or special study modules is protected, and is not in competition with the core subjects. During the special study module, the student spends 100% of his or her time on that module.

A disadvantage, however, is difficulty in relating the content and objectives of the SSM block to those of the core. Overall coherence for the curriculum is elusive, with the possibility of ‘curriculum incoherency’ (Beane, 1995).

**Sequential**

In the sequential model, planning for the SSM is closely linked with planning of the core. Students may study core subjects for a number of weeks (e.g. 17 weeks) then have several weeks scheduled for study of an SSM. The sequential approach is based
on the philosophy that, having mastered the core, students should have the opportunity to study that subject, or some aspect of it, in more depth. Some students, however, may choose to study a subject unrelated to the core.

Students who do not demonstrate competence in the core at the completion of the core block may be required to undertake further study of the core. This recognises the fact that students will learn or master the required core competences at differing rates. It follows that the time they require to reach the appropriate level of mastery will vary. The assumption in the sequential model is that students will not pass on to options or special study modules until they have demonstrated mastery of the core.

Figure 5 shows three students over a 17-week term. The core subjects are scheduled for the first 12 weeks of the term. In week 13, students have an assessment. If they demonstrate mastery of the core, as is the case with the first student, they proceed to the SSMs. If they do not reach the standard required, they continue on the core path and, after a further two weeks, are again assessed. They may then as is the case with the second student, demonstrate mastery of the core and proceed to join the option or SSM track. If they again fail to reach the required standard, as with third student, they remain in the core track. Twelve weeks before the first assessment is only an example. The length of time for each module will depend on local circumstances and on the nature of those modules.

This sequential model allows a fundamental curriculum rethink with an assessment-to-a-standard approach. It ensures mastery of the core and caters for individual student needs. It recognises the need for accountability and maintenance of standards. The sequential approach also avoids many of the difficulties associated with identifying the extent of the core. Core can be defined, say, as what can be achieved in 12 weeks or a 17-week curriculum based on the assumption that 80% of the students will achieve an 80% pass mark at the end of 12 weeks. If fewer students master the core by that time, then perhaps the amount covered in the core is too demanding.

The sequential approach brings coherence to the curriculum and to the educational strategy. It allows the best use to be made of teaching staff. Staff with the necessary training and experience may be assigned to students who do not pass the first assessment and require remedial instruction. Staff with more specialised interest can provide teaching on special study modules. At first sight, the logistics may appear rather daunting. They need not be. This approach to curriculum planning has exciting potential.

**Time allocation**

A question that arises is: “What proportion of time should be allocated to the core curriculum and what to the SSMs?” The General Medical Council (1993) expected that approximately a third of the total undergraduate programme should be devoted to SSMs and two-thirds to core.

The real-life balance is likely to be 20-40% SSMs and 80-60% core. At one end of the theoretical spectrum is the curriculum which consists entirely of core: at the other, the curriculum which exclusively gives the student choice on what to study. Your choice in the spectrum depends on a number of factors (Figure 6). More core to cover forces a move to the right. The need for in-depth studies encourages a move to the left. Resources available may play a part in the decision. Providing a wide range of learning opportunities, each appropriate for a smaller number of students, may make SSMs not only feasible but cost-effective. A school with a number of large traditional departments, whose staff do not embrace the philosophy, may find it easier to mount a more uniform curriculum.

A move towards the left of the spectrum requires imaginative curriculum planning. If this is lacking, and traditional perceptions of education predominate, there will be pressures for the continuation of a more uniform curriculum for all students.

![Figure 5: The progress of three students in a sequential course. Note: The SSMs follow the core and students are required to demonstrate mastery of the core before proceeding to the SSMs](image)

![Figure 6: A spectrum – from 100% SSMs to 100% core](image)
Assessment is important

The introduction of a core curriculum with SSMs has major implications for the assessment of students. Assessment has a strong influence on students’ behaviour (Harden, 1992). “The aim of correcting the curriculum overload by the introduction of the core and special study module concept”, suggested the General Medical Council (1993), “would be wholly frustrated if the present examination system were to continue.”

Assessment of core

Assessment should reflect the aims and objectives of courses. It is likely, therefore, that assessment procedures in the core and SSM parts of a course will differ. The student’s mastery of the core must be “tested regularly, in the interests of the public and of the integrity of professional standards” (General Medical Council, 1993). This implies an assessment-to-a-standard approach. What matters is the standard students reach, not the time they take to do so. Pass marks of, say, 50% in MCQ-type papers are not appropriate to test core competences. They assume that, to pass, the student requires to master only half of the subject and that it does not matter which half. The student who fails to achieve the standard set should have further study prescribed until he or she achieves the level of mastery expected. Students should be expected to demonstrate a high level of mastery of the core of a course at later stages of the curriculum, as well as at the end of the course. It may be helpful to think of an inner core, where this level of mastery is an essential requirement, and an outer core which all students must study but where this level of proficiency is not necessary.

Assessment of special study modules

Procedures need to be established for the assessment of special study modules. Decisions must be taken on whether to adopt a pass/fail system or a grading system. External examiners are important. They help maintain standards comparable among different SSMs.

Students may be required to complete a set number of special study modules before completing their medical course. The student may have to draw at least one SSM from each of a number of specified areas. The examination may be a written test, an extended essay or dissertation, an oral or a practical exam.

Student should be given credits for each special study module completed satisfactorily. These are registered on their records. The number of SSMs completed, and the reports on performance in the SSMs may help discriminate better from poorer students.

Postgraduate studies

We have so far discussed the concept of core and special study modules in the context of undergraduate education. It is also relevant to postgraduate education.

The continuum

In recognition of the continuum of education, those who plan undergraduate and postgraduate education should discuss what to include in each phase of training. The educational programme should be planned so that postgraduate training builds on a sound core of competences and a strong framework developed during the undergraduate phase. This philosophy of constructivism has been described on page 7. Students should enter postgraduate training with a confidence and enthusiasm at present all too often lacking. Students may know less, but they will understand more. They will be more able, self-directed, learners. To realise potential benefits and achieve a seamless interface, there must be collaboration between the planners of both phases.

Postgraduate training

There is a place, too, for application of the concept of core and SSMs to postgraduate training. The ‘undergraduate’ arguments for the approach and benefits can be applied. Increasing demands on postgraduate training, with greater specialisation, rapid expansion, new developments in medicine and time constraints – all these are arguments for, not against, the introduction of a core training programme with SSMs.

The essential general competences, such as communication and management skills, practical skills and techniques, would be further developed during a core curriculum and the early years of postgraduate training. Trainees would also develop
the knowledge and skill-base gained during the undergraduate programme. SSMs would let trainees work in some area to a greater depth. In the later years of training, the core elements would be specified, allowing the trainee to study and specialise for part of the time in his or her chosen area. For those with academic ambitions, this optional part of the training might have a greater emphasis on research.

Conclusion

The notion of a core curriculum with options is one which is at least superficially attractive to educationists, medical teachers, students and the public. The need to liberate the medical curriculum from its present factual overload is well recognised – as is the need to provide both breadth and depth of study. Freedom of choice while maintaining standards, mastery of the essential competences required for medical practice – these are seductive thoughts. They are more than this – they are a real step forward in thinking about medical education.

Even teachers who can appreciate the advantages of core and options may still have an inbuilt unease about implementation. Some problems are philosophical; some are practical. From a traditional perspective, core and options challenges the fundamental belief that all students should have a uniform curriculum throughout their training, completed more or less in the same set time. The arguments and pressures for a move to a curriculum with special study modules are overwhelming – not only in undergraduate but also in postgraduate education. Problems with implementation can be resolved with a little effort. The teacher, however, must think afresh about curriculum planning.

Comparisons between educational strategies such as problem-based learning and more traditional approaches might be likened to travel by different types of surface vehicles. The introduction of core and special study modules may prove akin to the introduction of air travel – allowing great efficiency in the use of time and making attainable the achievement of significant and highly desirable curriculum objectives.

Acknowledgements

The authors wish to thank Neil Stamper for assistance in the preparation of this guide.

References


General Medical Council (1993). *Tomorrow’s Doctors: Recommendations on Undergraduate Medical Education* (London, GMC).


