

AMEE GUIDE

Student Selected Components (SSCs): AMEE Guide No 46[†]

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Abstract

Student Selected Components (SSCs) are one of the more innovative recent developments in medical education. Initially established in the UK in the 1990s in response to the General Medical Council's recommendations in *Tomorrow's Doctors* (1993), they provide students with a significant element of choice and depth of study in the curriculum. SSCs have become an integral part of medical curricula throughout the UK, and to a limited extent the rest of the world. In most cases they contribute to the delivery of learning outcomes broadly encompassing personal, professional and research skills, whilst creating opportunities for students to explore future career options. This AMEE Guide is written for developers of new medical curricula, where SSC-like initiatives offering choice and depth of study, in conjunction with core learning, are being considered. Its aim is to provide insight into the structure of an SSC programme and its various important component parts. It is also relevant for those already involved in SSC development by offering insight into effectively managing, assessing and improving existing programmes, to deliver effective, coherent and core-integrated teaching valued by students and faculty alike.

Aims of this guide

This Guide aims to provide practical advice and guidance to those faculty involved in developing and planning medical curricula, in programmes that are both new, or undergoing significant review, with the inclusion of an increased element of student choice. The Guide is of equal practical use to those already running or improving an existing SSC programme. The previous AMEE Guide *"The Core Curriculum with Options or Special Study Modules"* (Harden & Davis 1995) reviewed this new subject, whilst mostly concentrated on defining core and the place of Special Study Modules (SSMs). This current guide will expand further on this, examining the role and value added by integrating Student Selected Components (SSCs) to the core medical curriculum, as well as examining any potential pitfalls and problems. The review covers a very broad spectrum of topics in medical education and will emphasise their relevance in the SSC context, including some up-to-date references as entry points to the current literature in each. It will draw upon examples from existing SSC programmes, highlighting good practice and novel ideas. It is intended that this guide will also help to open the debate on the concept of personal choice in the medical curriculum; the opportunities, challenges and educational validity raised by this somewhat experimental component in use throughout UK medical schools, which is being adopted to a similar or lesser degree elsewhere across the world.

Practice points

An effective SSC programme requires:

- clarity of curricula learning outcomes; where they occur in the programme and how they are to be achieved
- creation of opportunity for choice in depth and breadth of study, linked to either personal interest or career development
- full support and recognition as being highly relevant, important and valuable by both students and faculty
- an assessment system which is valid, robust, and fully integrated into the core curriculum, which adds value to the student's overall performance
- evaluation, innovation and continuous development to maintain high standards.

Introduction

The Student Selected Components (SSCs) can perhaps be regarded as one of the more radical innovations in medical curricula (Lowry 1992; Harden and Davis 1995). The General Medical Council (GMC) in its document *'Tomorrow's Doctors'* (GMC 1993), directed all UK medical schools to profoundly change the design of medical curricula and move into a new framework of 'core curriculum' constituting two thirds of the course, in conjunction with the remaining third, or 'options'.

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component. These options were originally termed Special Study Modules (SSMs), and later relabeled SSCs in Tomorrow's Doctors 2 (GMC 2003). They were to provide opportunities for both choice, and depth of study to prepare students for the *'long term intellectual and attitudinal demands of a professional life that will be constantly challenged by growth of knowledge and change of circumstance'* (GMC 1993).

The main driving forces behind these changes were the fulminating problems of factual overload, and a proposed shift to a more learner-centred and stimulating student experience. In the late 1980s and early 1990s, there was a strong perception of fundamental problems with previous traditional curricula, which were narrow and constrained with far too much emphasis placed upon knowledge acquisition and insufficient on professionalism (Lowry 1992). Indeed, in the introduction to Tomorrow's Doctors (GMC 1993), it quoted the GMC Recommendations on Basic Medical Education report of 1980 with: *'We therefore reiterate the views expressed in the recommendations of 1957 and 1967 that the student's factual load should be reduced as far as possible, to ensure that "the memorizing and reproduction of factual data should not be allowed to interfere with the primary need for fostering the critical study principles and the development of independent thought". The student should also acquire and cultivate the ability to work independently. He must therefore have a certain amount of free time for private study and self education throughout the curriculum'*. Underpinned by significant advances in educational theory, medical education was ripe for major change.

Despite this radical proposal in Tomorrow's Doctors (GMC 1993) to introduce choice and depth of study with SSMs, there was very limited guidance about what or how these changes should be implemented, except that they should make up the very significant proportion (approximately one third) of the total curriculum time. However, this choice element was not completely without precedent. Previous to and through the 1980s there had been some choice in UK medical curricula, with the clinical 'elective' attachments, often taken abroad, becoming well established. Subsequently, Tomorrow's Doctors 2 (GMC 2003) was somewhat more prescriptive about what knowledge, skills and attitudes should be delivered in the curriculum. This guidance also decreased the time commitment expecting *'...that in a standard five-year curriculum between 25% and 33% would normally be available for SSCs'*, with *'...at least two thirds of each student's SSCs must be in subjects related to medicine'*.

It was also more prescriptive about SSCs, indicating *'SSCs support the core curriculum and must allow students to do the following:*

- (a) *Learn about and begin to develop and use research skills.*
- (b) *Have greater control over their own learning and develop their self-directed learning skills.*
- (c) *Study, in depth, topics of particular interest outside the core curriculum.*
- (d) *Develop greater confidence in their own skills and abilities.*

- (e) *Present the results of their work verbally, visually or in writing.*
- (f) *Consider potential career paths.'*

With respect to assessment, Tomorrow's Doctors 2 also stated that *'student performance in both the core and SSC parts of the curriculum must be assessed and must contribute to their overall result. Students who have not satisfied the examiners in both parts of the curriculum must not be allowed to graduate'*.

All UK medical schools have now developed and embedded SSCs into their curricula in a wide variety of different ways, sometimes exhibiting great innovation, and creating diversity between schools (Christopher et al. 2002). These were stated aims in Tomorrow's Doctors (GMC 1993) to reflect the autonomy and the particular strengths of their school and help to define their own programme. Nevertheless, the lack of guidance in Tomorrow's Doctors (GMC 1993), and what represented independent evolution of SSCs in different schools, has resulted in some SSC programmes upon accreditation being deemed unsatisfactory to varying degrees in their learning objectives, content, student choice, timetabling and assessment (Christopher et al. 2002; Murdoch-Eaton et al. 2004; GMC 2009). The lack of guidance is also reflected in those same GMC accreditation reports, which have a somewhat inconsistent view on what is acceptable as an SSC (Ellershaw et al. 2007).

In undergraduate curricula timetables, SSCs are continually under pressure from the requirements of the core curriculum, especially in shorter medical courses such as four year graduate entry programmes. In the GMC document Strategic Options for Undergraduate Medical Education (GMC 2006) *'Most respondents did not support increasing SSCs in the curricula'*. In the subsequent consultation document of Tomorrow's Doctors 3 (GMC 2008) the previous requirement of 25–33% of the curriculum time dedicated to SSCs is absent, and how SSCs integrate into the curriculum is still being reappraised.

Despite these initial problems, help to develop SSC courses and whole programmes has begun to emerge, particularly from consortia groups of schools who have offered definitions of purpose and assessable key tasks (Murdoch-Eaton et al. 2004; Stark et al. 2005; Ellershaw et al. 2007; Scottish Doctor 2007; Riley et al. 2008a). Nevertheless, the long term outcomes and educational benefits of this GMC initiative to implement SSCs, although based on sound educational principles, has not been examined in any depth. The evidence of their contribution to improving medical education remains to be determined.

SSCs in an international context

By and large the underlying reasoning behind the implementation of SSCs by the GMC in the UK is the same as that in the medical education community world-wide. Namely, that there is information overload, lack of choice and intellectual challenge, and a need for learner-centred curricula; all reflecting the need to prepare medical graduates to be adaptable to profound change which is present in the

modern medical profession. Elsewhere in the world student choice can be more constrained depending upon their curricula models. Nevertheless, there is a worldwide trend towards courses with a significant choice component (Karle 2004) and in international collaborations on curriculum design (Harden & Hart 2002), although there does not seem to be the same enthusiasm to implement schemes with anything like the timetable commitment as in the UK. In the USA, similar concerns have been expressed about the delivery of medical teaching, extending back nearly a century (Christakis 1995), with demands for a change of culture (Brater et al. 2007) and an increase in professionalism (Humphrey et al. 2007). There remains a major debate on the best way forward to change the curriculum, with some suggesting “fundamental restructuring” (Cooke et al. 2006). The appropriateness and validity of an SSC type format should be carefully considered in these consultations.

The World Federation for Medical Education (WFME) has produced its document: ‘Global Standards for Quality Improvement’ (WFME 2003), which identifies ‘optional content’ as an important component of curriculum design. In conjunction with the Association of Medical Education in Europe (AMEE), WFME have commented on medical education and the Bologna Process, which aims for convergence of accepted set of standards throughout tertiary education across Europe (WFME 2005). This document also acknowledges the importance of establishing not only pan-European, but also global standards. In this regard, a major project undertaken by the Institute for International Medical Education identified seven domains to make up the ‘Global Minimum Essential Requirements’ for a physician (Schwarz & Wojtczak 2002). As will be discussed in this guide, at least four of these seven domains can in part be achieved through SSCs: ‘Critical Thinking and Research’, ‘Professional Values, Attitudes, Behaviour and Ethics’, ‘Communication Skills’, and ‘Management of Information’. SSCs can potentially contribute to the other domains, namely, ‘Scientific Foundation of Medicine’, and perhaps even include ‘Population Health and Health Systems’ and ‘Clinical Skills’, depending upon the design and content of the SSC programme.

Defining the ‘purpose’ of an SSC programme

Integrating SSCs with the core curriculum

Much care and consideration is required to create a learner-centred educational environment for medicine (Ludmerer 2004; Graffam 2007), and incorporation of an SSC programme should assist in this. In a well designed medical curriculum providing a learning environment which recognises learner autonomy, and delivers its teaching through a timetable with both core and significant student choice elements, an SSC programme needs to be well integrated, with clear purpose. In the UK, where SSCs are required to have a 25–33% curriculum time commitment, most schools have implemented purposeful SSC programmes. These permit choice but also perhaps reflect the strengths and distinctive qualities of their own programmes (GMC 2003). The purpose may be closely linked to

Box 1. Please provide caption.

“Student Selected Components (SSCs) are an integral part of the undergraduate medical curriculum contributing to the overall curricular learning outcomes and providing students’ choice in studying, in depth, areas of particular interest. The principal learning outcome is the progressive development of skills in research, critical appraisal, and synthesis of evidence for maintaining good medical practice. The SSCs contribute to the development of a broad range of personal and professional skills, such as team working, communication, time and resource management and self-directed learning. They also provide opportunities to explore career options”.

(The Scottish Doctor 2007).

complement the core curriculum by providing opportunities to gain a greater depth of clinical skill, insight and knowledge of specialties, which create choice in career exploration. In addition, or alternatively, it may provide a theme outside core or even an opportunity outside medicine, permitting students to explore broad and rich external interests (GMC 2003, 2008; Riley et al. 2008a).

The Scottish Medical Schools SSC Liaison Group has developed a consensus statement on the purpose of SSC programmes in Scottish Medical Schools, as stated in Box 1. The group is made up of the Directors of SSCs from all of the Scottish Medical Schools. They all represent undergraduate medical programmes and consist of a preclinical school, a school with an integrated problem-based learning curriculum, and with three other schools which use a hybrid range of curriculum teaching and learning methodology. Despite these differences, there is good consensus in their courses reflecting the purpose specified in the GMC guidelines in Tomorrow’s Doctors 2 (GMC 1993) and by Murdoch-Eaton et al. (2004).

Deriving purpose from learning outcomes

Core learning is delivered by SSCs

The purpose of an SSC programme is to achieve specific learning outcomes. These learning outcomes should be sequential, progressive and integrated with the outcomes derived from core teaching, with clarity to both students and staff (Hirsh et al. 2007). This clarity and continuity can be demonstrated by curriculum mapping the learning outcomes of both core and SSC programmes (Harden 2001; Prideaux 2003; Willett 2008), although mapping some of the more generic skills represents a different type of challenge (Robley et al. 2005). Alignment of curriculum outcomes with assessment is a critical step to create an integrated, complementary and coherent programme, which should result in an educationally stimulating and successful course (Harden 2001; Willett 2008).

The question now arises as curricula develop and expand: “*should SSCs deliver core learning outcomes?*” The answer appears to be a resounding ‘yes’, when judged in the consultation document for Tomorrow’s Doctors 3 (GMC 2008). Delivery of core learning outcomes by SSCs has

become much better defined since 1993, and this can be best represented in Figure 1, which shows that now in 2009, most of the learning outcomes attained during SSCs are defined as core. The only learning outside core may be knowledge outside medicine, although generic skills developed in this type of learning environment are usually transferable, and hence defined as core.

All students should achieve all core outcomes

If core knowledge, skills and attitudes are delivered in SSCs, then there needs to be equal opportunity in each SSC, so students are not disadvantaged depending upon which SSC they take. It is now perhaps appropriate that a wide range of generic personal and professional skills are delivered in SSCs, and this will to a greater or lesser degree complement the core teaching. This accumulation of overall generic learning outcomes is illustrated in Figure 2. It is also appropriate that SSCs permit the further development of extra clinically-based skills and knowledge that represent greater depth of learning

beyond the basic core requirements, reflecting student choice and interests. A problem in the delivery of the curriculum exists if only some students get the opportunity to achieve this outcome whilst others miss out (Bidwai 2001). This requires achieving a balance between core learning outcomes and providing student choice. It is unlikely that all core clinical skills could be delivered by SSCs, firstly, because this cannot then be defined as providing true choice, and secondly, because consistency of delivery and attainment by all students cannot be assured due to the heterogeneity of SSCs (GMC 2003; Murdoch-Eaton et al. 2004).

It may be appropriate for individual students to take responsibility for mapping the attainment of their own progress, achievements and learning outcomes throughout the programme (Riley et al. 2009), forming an important learning outcome in itself. SSCs are sometimes seen as an opportunity for a student catch up, for instance if they missed part of the course for health reasons, or to take remedial teaching after failing a clinical attachment. In a fully integrated programme, missing an SSC should be regarded as inappropriate because the student may not attain core skills and competencies.

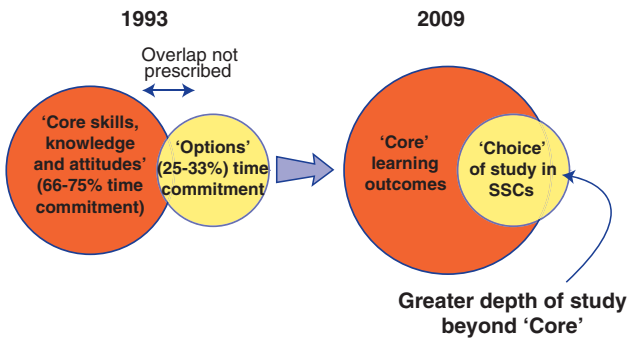


Figure 1. The evolution of SSCs: a change in balance between core and options.

Integrating SSC learning outcomes

A new programme, or an existing programme undergoing profound curriculum change represents an obvious opportunity to construct from first principles a course with fully integrated SSCs. The conceptual framework of a learner-centred curriculum, particularly with the integration between core and SSCs, needs careful planning, and its implementation is dependent upon the course delivery, the medical environment where the teaching is delivered, its assessment methodology and the course ethos or theme (Harden 2000; Davis & Harden 2003; Ludmerer 2004). Succeeding in curricular

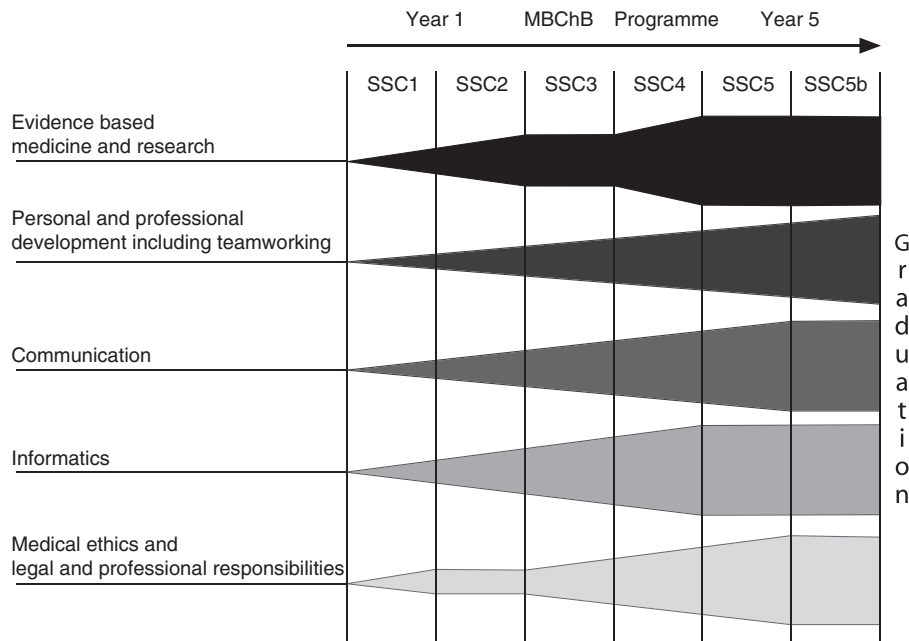


Figure 2. Development of learning outcomes within an SSC programme.

Box 2. Common tensions encountered when designing SSCs.

- Are SSCs designed to deliver a pure options component of the curriculum, or will they be used to deliver some core competencies?
- What is the most appropriate percentage of curriculum time given over to SSCs?
- Do SSCs represent real student-led choice or is there strong faculty-led prescriptive element limiting the real 'choice' offered?
- Is there tension between providing breadth, diversity and choice and ensuring that core competencies are achieved?
- Is there an appropriate balance between breadth of choice and depth of study?
- Should SSCs deliver a student-led 'theme', which may restrict choice and interfere with the need for core learning within the SSC programme?
- If choice is to be given to study subjects "out of the main field of medicine", what percentage of time should be given over to these and how wide a choice is acceptable?

change has been well described elsewhere (Bland et al. 2000; Cooke et al. 2006; Davis & Harden 2003), and the implementation of SSCs as a significant proportion of a whole programme, perhaps being regarded as a more radical feature, may encounter some resistance and hostility during these changes. Nevertheless, with health care being such a rapidly changing environment, SSCs may be an area in the curriculum that can readily respond to these changes, and indeed act as a forerunner to what may subsequently become core.

The purpose of the SSC programme, and how it integrates with the core will be influenced by:

- *Theme of the Medical School* – a medical school may have a particular reputation, ethos, approach, and range of clinical or research expertise. This can provide a theme for the SSC programme, which creates these distinct qualities in the medical graduate.
- *Type of programme* – Most UK medical schools have a five year undergraduate medical programme, although with the newly developing graduate-entry programmes, some of these are over four years. Some UK schools also still create opportunity for an integrated year leading to either an honours programme or the attainment of an extra degree, and a preclinical school should liaise with their linked clinical schools to share learning objectives to prepare its students. Many international schools take six years to graduate their medical students, usually because of a first year course that equips the student in the basic sciences needed for medicine. Hence, there are many variations on a theme. Inclusion of an SSC programme into these variations needs careful planning with clarity of purpose for the various components. Intercalated years were often designed to give the student experience, depth and breadth of an interest, the very purpose of an SSC. Graduate entry courses expect students to have successfully established adult learning and transferable professional skills in other environments (Macpherson & Kenny 2008), some of the competencies that SSC are designed for. Providing challenging opportunities, ensuring that all students achieve all the learning outcomes, whilst avoiding any duplication so students do not become disengaged by repetition are essential to ensure full integration.

- *Type of curriculum* – It is true to say that there is now greater thought given to the way curricula are structured and delivered. Curricula may be based on learning outcomes (Harden 2007), or competencies (Scottish Doctor 2008), but whatever way they are designed and delivered they must also be matched by appropriate assessment (Schuwirth 2007). What is not clear is the way that SSCs influence curricula delivery or how the teaching methodology adopted by the curriculum influences the SSCs. Many SSCs are designed to develop student-centred learning, which represents a quality measure of a Problem Based Learning type course. Despite schools becoming more integrated, many still believe in a pre-clinical, clinical divide. Should SSCs be pre-clinical and clinical and can we assure that there is effective communication of purpose between the two components?

Balance between SSCs and core ("core and options")

There is a balance to be struck between what are presented as core learning outcomes in the main part of the curriculum and what core learning outcomes are derived from SSCs. Some of the main tensions between core and SSCs are highlighted in Box 2. Core 'generic' professional skills, for instance teamwork and critical appraisal, can reliably be delivered in an environment of choice, as long as there is consistency between the choices and each is capable of delivering the same to each student. It is also important to define a list of optional competencies or learning outcomes, beyond the core, which may defined or shaped strategically by the student themselves, and even be aspirational, to reflect their personal interests, motivation and career plans.

Delivering "professionalism" as a learning outcome

Designing a curriculum and creating a learning environment to deliver professionalism can be regarded as a complex and significant challenge, but a well designed and integrated SSC programme can make an important contribution to this. Accreditation agencies have defined the professional standards required in medical graduates and which patients expect (Royal College of Physicians 2005; Medical Schools Council & GMC 2009). However, there is still concern from patients that medical education has not responded sufficiently (Hasman et al. 2006). The appropriate learning environment to ensure professional development has always been the subject of debate, although over the last decade it has become more clearly defined (Cruess & Cruess 2006; Stern & Papadakis 2006; Hilton & Southgate 2007), so that it can be incorporated, (Gordon 2003) and mapped into the curriculum (Humphrey et al. 2007), whilst recognising the influence of personal factors (West & Shanafelt 2007). Our understanding of professionalism and its supportive literature is guided by both sociology and bioethics and the two have developed somewhat independently. A more inclusive and integrated blended approach is probably the most appropriate (Creuss & Creuss 2008), which will also suit students with a wide range of learning styles and background experiences.

There is much extolling the need to develop professional skills, but much less evidence in the literature indicating how development of these skills can be encouraged, particularly in SSCs. This in part reflects the relatively recent migration of professionalism from the informal or 'hidden' curriculum into the declared curriculum (Hafferty 1998; Jha et al. 2002; Whittle and Murdoch-Eaton 2002; Jha et al. 2007). There are both positive and negative influences within the hidden curriculum. Positive influences include opportunistic encounters with excellent role models and mentors and teachers. Negative influences include potential erosion of previously taught ideals, created by inappropriate communication, teaching of poor standard or even teaching by humiliation, and attempts to apply ethical principles in an increasingly demanding and busy target-led working environment (Hafferty 1998; Lempp & Seale 2004). SSCs can present opportunities for longer attachments and interactions with a supervisor, mentor and indeed peers when working within a team, to develop as well as assess these professional competencies as a formal part of the curriculum. The selection of appropriately trained faculty to both lead and participate as teachers in these SSCs is of high priority.

Providing choice and depth of study

The ability to provide a wide choice of subjects and opportunity to study a particular area of interest in depth are key requirements of an effective SSC (GMC 2003). Of these, provision of choice can raise quite significant challenges. For instance, should these choices include topics outside of medicine or should students be able to choose their own topic, without faculty interference? The experiences from the Scottish Medical Schools SSC Liaison Group (personal communication), are that most students wish to sample a range of experiences, although others may want to limit their choices for other reasons. A highly focused and purposeful student may have a clear commitment to a specialty and a desire to gain as much experience in that field as possible, although their rationale may actually be unfounded and inadvertently biased. In contrast, a poorly motivated or weak student may not want to leave the familiarity of a clearly defined curriculum, and face challenge. Student autonomy, engagement, and development of mature learning are key qualities which modern medical curricula are expected to develop, and these should be expressed as explicit learning outcomes.

Provision of Choice – Choice can or should only exist if it supports the attainment of appropriate learning outcomes; appropriate within a wide range of options as defined by an individual school. The essential competencies may not be satisfactorily achieved or uniformly delivered to all students if the learning experiences are too varied, with too much choice and variation in teaching methodology. This has been highlighted by Stark *et al.* (2005), where, in their consortium of SSC programmes, they have determined that 80-90% of their students gaining real research skills and experience. However, this also means that 10-20% of students have not attained what they describe as a core learning outcome, which they may be unlikely to achieve elsewhere in the curriculum.

Designing a series of SSCs within a programme so that all students achieve all the core learning outcomes has to be carefully considered. It can be achieved by each SSC:

- (a) having some design and format constraints to ensure key learning outcomes are achieved,
- (b) a clear list of learning outcomes to be achieved by each student over a period of time, where each student has to manage their own programme of learning, ensuring that they achieve the required outcomes over the course of the programme;
- (c) having a variation of (b) above, whereby students have to attend a specified number of defined SSCs with specified learning outcomes.

However, the management of (b) and (c) may be difficult as students will have increasing incremental or hierarchical levels of skill development as they pass through the course, which will affect the experience, the level of learning, and overall skills and outcomes attained.

Choice – do SSCs create generalists or specialists? – It still remains to be ascertained whether SSCs encourage students to become generalists or specialists, or affect their future career aspirations. Indeed, too much choice at particular stages of the curriculum may cause problems through confusion. In early stages of the course too much choice may be inappropriate because students want to do something perceived as exciting, without having a foundation of true understanding that accompanies choice. Television hospital dramas are a fertile ground on which to base preconceived ideas in first year students! In later years, students should have greater insight and experience. In the experience of the Scottish Medical Schools SSC Liaison Group, (personal communication) very few students select general practice in their first year, although around half of students will enter primary care as their final career. It can of course be argued equally strongly that students need these early formative experiences to gain that insight, but the correct balance needs to be sought.

Selection from a list or self-proposal of projects? – The assignment of students to their chosen project often presents a major problem, with students often and obviously wanting their first choice, and perhaps being unhappy and disengaged with the process if they don't. Allocation systems that allow at least 90% of the student cohort to achieve their first choice, perhaps ensuring preference for first choice in the next SSC, and an open understanding of why SSCs are constructed and their value, can overcome some of these issues.

Permitting self-proposal of SSCs by the student may be regarded by faculty as being more challenging (Riley et al. 2008a). However, they are not without precedent, as medical electives are a well established self-proposed opportunity. Students need to be instructed to start out with clear learning outcomes which, with further development and modification and with appropriate academic support, can be realistically achieved.

At the University of Edinburgh, UK, all SSCs from the middle of year two onwards are self-proposed by students. The student is required to take the initiative, decide on their

field of interest and make contact with and sign up to an appropriate staff tutor, who will facilitate their work (University of Edinburgh, MB ChB overview 2009). Students receive support and guidance to find an appropriate project or attachment. They are given contact details of potential tutors, supplied with clear advice and information about what is expected of them and their tutor, the importance of defining clear learning outcomes and how they may go about achieving them.

Depth of study and increased student involvement – Tomorrow's Doctors (GMC 2003) indicated that students should study a topic in depth to create a more stimulating environment which enables students to develop self-directed learning skills. To achieve this outcome, depth needs to be well defined, as well as being realistic and achievable. Nevertheless, an overall learning outcome indicating 'depth of study' is vague and unhelpful except to indicate the aspiration held. It should be further elaborated upon for each SSC, and can indeed be developed by the student themselves. It may be sub-divided into both core objectives but also more specific non-core objectives, which may reside within any of the educational domains. The purpose behind the student's selection should also be explored, whether it based upon future career identification, interest and enthusiasm, or to improve on a perceived weakness.

Types of individual SSCs: an opportunity for innovation

There are a range of different formats that can be developed to build up an SSC programme, some highly innovative and with a wide range of themes and topics. Box 3 identifies many of these possible themes, and following are a listing of some different format options:

- Clinical attachment to study a subject, over longer time and in more depth – this is perhaps a more familiar format in which most clinical departments can quite readily develop an appropriate attachment. These experiences can offer extra clinical skills and more complex clinical scenarios. They present opportunities in mainstream specialties as well as in specialties that are represented to a lesser depth in the core curriculum. It can provide opportunities for a specialty where core teaching and content is being delivered in a systems-based, integrated curriculum, so the range and boundaries of the specialty become blurred. Examples of less well represented specialties depends somewhat on curriculum delivery, or if the specialty that lies largely outside core, but may include clinical genetics, radiology, ENT, plastic surgery, dermatology, ophthalmology, clinical microbiology, biochemistry, pathology, psychiatry and tropical diseases.
- Elective attachments – In the past, the educational value of elective attachments, often abroad, has very much been based on opportunistic experiences. The validity of this approach has been questioned (Dowell & Merrylees 2009). Learning outcomes for an educationally beneficial elective attachment should be clearly specified and appropriately assessed to ensure they are both achievable and attained.

Box 3. Common themes for SSCs.

- Clinical attachments in major specialties to gain a deeper understanding
- Clinical attachments in smaller specialties, driven by interest
- Clinical audit
- Clinical research
- Laboratory-based research
- Literature-based research project, including systematic review
- Development of clinical skills, sometimes non-essential, driven by student interest
- In depth investigation of a complex clinical issue
- Medical education (teaching and learning skills)
- Working within a team and multi-professional education
- Medical ethics
- Global health, national and international attachment
- Complementary and integrative medicine
- Student community outreach, social and voluntary care
- Medical informatics
- "Outside medicine" – languages, arts, literature, humanities and social sciences, other sciences, music, divinity, journalism, etc

Perhaps by linking to selected international institutions to help ensure quality of teaching and assessment, electives can become an important, well-recognised and accepted activity that resides within the remit of the SSC programme.

- Research project – Students can be involved in a range of research, audit, or blended research and audit projects. There is good evidence that these form an optimal environment for students to develop a wide range of research skills to enhance graduate attributes and professionalism (Kanna et al. 2005; Jenkins et al. 2007; Macpherson & Kenny 2008; Struthers et al. 2008). These types of projects must present a stimulating and enjoyable opportunity for both student and the supervisor for them to be sustainable. They should be well resourced and include effective support for study and questionnaire design and applied statistics (MacDougall 2008). The development of library and literature search skills, including the ability to comprehend and indeed perform systematic reviews often feature highly in such SSCs. Support for appropriate ethical review and approval may be required, with careful consideration on how faculty screen large numbers of projects with a significant educational component. Unless a relatively simple and rapid ethical review process is in place, the ability to offer research projects may be significantly constrained (Robinson et al. 2007). These types of project may also offer a significant contribution to the institution's research capacity and productivity including publications, or pilot findings for further study or for future grant applications. They may also deliver useful audits that influence local care provision. Virtually all projects will provide some clearly defined and valued outcomes for the student. This may include being able to demonstrate attainment of specific skills when applying for their first postgraduate training post or subspecialty training, which is important in the UK with the erosion of opportunities for career exploration in early postgraduate training.

A fundamental requirement to ensure success and sustainability of this type of SSC is to ensure good alignment of

outcomes for student and supervisor, where both have ownership and are motivated. The fourth year 14 week self-proposed research project SSC at the University of Edinburgh has proved to be very successful and sustainable in this way. Over the last five years, it has contributed a large number of useful audits, and to more than 200 conference abstracts, peer-reviewed systematic reviews or research articles, where the student involved is included as an author (University of Edinburgh, MB ChB website).

- Skills-based project – This may take the form of a short term attachment to develop specific clinical or research skills. These can be quite innovative, for instance Queen's University, Belfast, offers an opportunity to learn "signing for the deaf" (Queen's University website 2008). SSCs can also provide an opportunity to fulfill the GMC requirement stated in Tomorrow's Doctors (GMC 2003) that students should develop teaching skills. This can be peer teaching within the curriculum on a topic of choice (Ross & Cameron 2007; Sobral 2008), or externally, in primary (Brown 2005), or secondary schools (Furmedge 2008), for instance delivering a sex education programme (Jobanputra et al. 1999).

A further example may be to use SSCs so students can gain in-depth scientific skills and principles that are functionally useful for understanding the modern science underpinning medicine, rather than a superficial knowledge. These principles, for instance in molecular and cellular biology, systems biology, genetics and public health can be delivered as SSCs from a menu of in-depth topics, where each student has to manage their own learning portfolio, which can then be applied between fields and specialties.

- Providing wider insight into medicine and the care team – This may be arranged by providing a choice of projects themes or topics within the medical humanities and medical ethics. A third of North American schools have this sort of programme (Charon et al. 1995; Downie et al. 1997; Hodgson & Smart 1998; Charon 2001). Teamwork interactions with other health professionals, interdisciplinary working and awareness of the extended health care team provide other essential key professional skills that can be developed. In the third year SSC at the University of Edinburgh, students self-propose and organise a short attachment to shadow a member of the care team who is not a doctor. This SSC is described in more detail in Box 4 (available at www.medicalteacher.org).
- Experience outside the field of medicine – the existing GMC guidelines have indicated that quite significant amounts of time may be spent on study outside medicine (GMC 2003). Evidence from the literature is scarce although many schools do provide at least limited opportunities, reflecting the time restrictions in most curricula. Nevertheless, some students may not want, or regard as worthwhile, this broadened perspective. With careful design and consideration, these types of projects can contribute to developing a range of relevant core professional skills (Murdoch-Eaton & Jolly 2000). These SSCs may be wide ranging, from archeology to zoology. There are many examples in

different schools, through the arts (Lazarus & Rosslyn 2003), sciences (Macpherson and Kenny 2008), journalism (Gibson 2006), language, literature, and creative writing (Thomas 2006). If the opportunity is presented to a student or a group of students to work outside medicine, the options are potentially limitless. Many topics in these fields have been addressed in a second year SSC at the University of Edinburgh, where students self-select both their topic and as a small group sign up their own facilitator, producing a project report as a wiki (Riley et al. 2008b). This type of SSC can provide an appropriate break and a different challenge, and even for the few students who may be concerned that they are on the wrong course heading into the wrong profession, a chance to explore other courses, fields or professions.

This outlines some of the options that can be considered, adapted and developed as SSC courses. There also needs to be a pragmatic recognition by staff at the development stage of what should or could be achieved by students. SSCs should not be overambitious or anticipate too high a skill base, and similarly they should recognise and build on existing prior learning. There is tremendous variety throughout SSCs (Heylings 1998), with opportunities for innovation in topic, delivery, including virtual learning environments and collaborative e-systems (Sandars 2006), and also in the way assessments are designed to ensure learning outcomes are achieved successfully.

Structure and timetable: integration of SSCs with core

Timetabling of any SSC programme needs to be considered within the curriculum as a whole, recognising the individual subject outcomes and the overall learning outcomes and where these can be optimally developed to ensure progressive attainment for the student. There is often some fragmentation across a curriculum, with students attending short attachments in a wide range of different specialties. It should be considered whether SSCs are spread evenly throughout the curriculum, or are there educational reasons to cluster SSCs, perhaps to permit certain skills to be developed at an optimal time, or to facilitate informed career choice. The following should be considered when timetabling the curriculum:

- The skills gained and outcomes achieved should be mapped temporally so that they are both achievable and complement the development of core within the student - e.g. an inappropriate exposure to gynaecological skills prior to any gynaecology teaching is unstructured, unachievable and probably counter-productive.
- Learning outcomes and skills should be incrementally challenging and build upon existing skills. They should not be repetitive by returning to basic levels, nor should they assume a level that has not yet been attained. This is exemplified by the spiral curriculum model (Harden and Stamper 1999).
- The SSC assigned time needs to be protected and equally valued by all, and not be interrupted by necessary attendance at 'core' teaching activities.

- SSCs should not over-duplicate other opportunities, for instance professional and personal development, teamwork, integration between experiences, or mentoring.

It is essential to bear in mind the structure of individual SSC courses which can be highly varied and include:

- Large or small groups with students working on individual aspects of a defined activity
- Students working collaboratively as a team on a defined project
- Individual students working solo on a project

The amount of staff input and their roles in the SSCs is also important and has to be clearly defined. Staff may act as tutors, facilitators, supervisors or mentors. They may communicate with students partially or entirely in the clinical setting, through group meetings or tutorials at different frequencies, or online in a virtual learning environment.

To optimize the learning opportunities different timetable options should also be considered, which others have previously described in detail (Harden & Davis 1995; Hirsh et al. 2007):

- Embedded with other teaching – e.g. “long and thin” – one day per week over a prolonged period of time
- Embedded within a specific specialty
- Using a modular structure, intermittent or sequential
- In a local environment or at an associated peripheral attachment, or away at another institution, including remote or abroad

Further developments: how should SSCs continue to develop?

Is the curriculum design model of SSCs in medical education experiment working? There remain several unanswered questions on the outcomes resulting from integration of SSCs into medical curricula. Some of these questions and areas for future research on the roles of SSCs, their delivery and effectiveness are highlighted in Box 7.

Tomorrow's Doctors (GMC 1993) introduced the SSC element to the curriculum, and the updated Tomorrow's Doctors 3 (GMC 2008) currently published as a consultation document, leaves the discussion on their future open. This new version creates an opportunity for schools to concentrate on SSCs delivering a coherent, integrated and focussed learning programme that complements the whole curriculum, capable of delivering agreed core learning outcomes as well as creating optional learning activities for students. This recent consultation document has omitted the previous requirement for 25-33% of the timetable to be dedicated to SSCs. This original time requirement has been regarded as unrealistic (Ellershaw et al. 2007), and around 20% of curriculum time may be a more sustainable commitment for present day SSCs. The response from medical schools as to how they will use the SSCs in the future, and whether there is an inexorable return to a situation whereby core learning outcomes occupy most if not all of SSC time, remains to be seen. Monitoring of these facets of SSCs are important for the future, and specific timetabling

Box 7. Potential research questions concerning SSCs.

- *Is the SSC choice element over emphasised in a curriculum that has limited time for core learning?* What is really achieved by choice? Does it influence students' future careers? Do they improve student learning? Internationally, choice appears more limited, does this affect outcome?
- *Are SSCs now delivering more core competencies than before? What are these core competencies and is this against previous GMC purpose?* It can be argued that many SSCs programmes are now almost entirely delivering core learning outcomes. Is this appropriate? Are we confident that there is consistency, quality and equity? Have we diverged from the original rationale for SSCs and started to fill up the timetable again?
- *What types of SSC format and organization work most effectively?* SSCs have independently evolved in medical schools, often with a limited exchange of ideas. Is there opportunity to share and compare?
- *How do students use their choices in an SSC programme?* Are they strategic and optimal, for instance to gain insight into career, or to gain skills that they think will be useful later, or are their choices based on more short-term and less challenging criteria? Do certain types of SSCs encourage students to become generalists or specialists? Do we advise students effectively to ensure informed choice?
- *Are the various assessment methods used in SSCs appropriate?* Ensuring robust assessment of SSCs can be challenging in some areas, for instance 'competencies' and 'professionalism'. Peer and tutor feedback, teamwork appraisal, portfolios, 360-degree multi-source, self-reflective appraisal, and other novel methodologies represent a range of methods to assess these.
- *Do SSCs identify a sub-group of struggling students? Are they of predictive value?* Can SSCs recognise the characteristics of a potentially struggling student? How can it do this? What are they? Can SSCs be used for remedial support for struggling students?

and curriculum mapping of learning outcomes and where they are to be achieved, essential.

SSCs offer an ideal proving ground within the medical curriculum for new, even somewhat radical ideas, including newer assessment methodologies to assess professionalism and / or clinical skills. To continue to improve SSCs, there is a necessity to have a more coherent and regular dialogue between medical schools, national and international, and with regulatory bodies to identify and share good practice and research opportunities.

Since the inception of SSCs, their purpose and outcomes can be described as having undergone something of an evolutionary process, responding to pressures from medical educators, faculty, students, local academic institutions, care providers and regulatory bodies, to be purposeful and deliver defined learning, whilst adapting to local circumstances. Nevertheless, the problem with content overload in medical curricula remains, which medical curriculum designers and policy makers need to continue to recognise; SSCs may be one way of resolving this difficult issue by providing opportunity for the basic sciences as well as the clinical sciences. However, taking cognisance of the original purpose of SSCs (or SSMs as they were originally called) which was to create options for student learning remains important if not only to stop a return the original medical curricula.

Are SSCs a successful element of the medical curriculum? When the limited literature reports and commentaries on SSC programmes, together with extensive evaluation data from students are taken into consideration, it would seem appropriate to indicate 'yes'. However, some skepticism does

remain, perhaps where SSCs are poorly integrated into the curriculum, faculty and students are under-supported, or the opportunities presented are not fully appreciated.

Conclusions

The original aims and objectives of SSMS as detailed in Tomorrow's Doctors in 1993 have evolved, from the ideals of one third of the curriculum giving the student choice and diversity. Subsequently, SSCs in Tomorrow's Doctors 2003 became more constrained, and their learning objectives better defined. SSCs are now well embedded and integrated in most medical schools in the UK, and to a lesser extent internationally, providing opportunities for innovation and learner-centred medical education. SSCs are now delivering core professional and personal skills in an environment of choice for the student. This element of choice allows our high quality course entrants some flexibility and opportunity to develop and utilise these skills, as well as explore future career options.

Internationally they may even address shortages in certain specialties. At present there remains little empirical evidence on the longer-term benefits of SSCs, and this still remains an important challenge in medical education research, if only to support their continued existence and form.

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