Jennings B, Killeen T, Skinner J, Loke Y
MedEdPublish
http://dx.doi.org/10.15694/mep.2016.000013

Case study Open Access

Student Selected Components - a modern curriculum to complement a systems-based medical degree.

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Categories: Assessment, Curriculum Planning, Educational Strategies

Received: 03/06/2016
Published: 09/06/2016

Abstract

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The 2009 version of the GMC's *Tomorrows Doctors* describes student selected components as *"an integral part of the curriculum, enabling students to demonstrate mandatory competences while allowing choice in studying an area of particular interest to them*". The definition of SSCs and guidance for their delivery and assessment have been interpreted in a variety of ways by individual medical schools and by regional consortia of medical schools.
To complement our systems-based MBBS modules we have developed a longitudinal Student Selected Studies (SSS) curriculum which has been reviewed and modified since 2011.
Throughout the SSS curriculum, students develop academic skills and competences such as literature review or developing a clinical or research question. In years 1 to 3 these competences are acquired whilst focusing on topics from a given theme of study, for example physiology, pharmacology or ethics. In year 4 the students apply the skills acquired in the earlier years to the evaluation of a case described in their own clinical-placement log-book.
In the first three years when students learn how to deliver formal presentations, using PowerPoint, conference-style posters, or anatomy demonstrations, they are given specialist tutor support, and feedback is given in formative assessments; allowing the students to make corrections and refine their skills before summative assessments take place.
Our curriculum development has been shaped by the use of a competency-based teaching and assessment strategy with a focus on the student's longitudinal development through the use of a *feedforward* strategy (Hattie, 2007) during and after formative assessments.

Article

Introduction

In 2002 Norwich Medical School (NMS) was launched at the University of East Anglia. The inaugural

curriculum and the ethos behind its MBBS degree have been described previously (Cavenagh, 2011) but can be summarised as a 5 year systems-based programme that integrates theory and clinical practice from the first of 14 study modules. Teaching is delivered in a variety of ways; for example, through problem based learning; clinical placement; structured and simulated patient teaching and via formal lectures. Core themes such as physiology, pharmacology and ethics run longitudinally through the 5 year course and spiral delivery allows students to re-visit topics with increasing complexity and integration. At NMS we use student selected components (SSCs) organised by core theme teams or clinical specialties to complement our modular curriculum, we refer to these as Student Selected Studies (SSS). As well as offering choice, SSCs were envisaged by the GMC to reduce the knowledge burden placed on medical students, and to offer the opportunity for students to study an area of interest in-depth. However, by 2010 we noted that our module-linked-SSS-curriculum was creating a significant assessment burden, linked to the risk of attrition; and it was favouring some superficial strategies rather than deep-learning and engagement. We acknowledged an essential tension between the delivery of diverse, enjoyable SSS experiences and the delivery of a uniform and valid summative assessment. Therefore, we undertook a review and modified our SSS curriculum significantly. During this process we focused on GMC guidelines (GMC, 2009), student and staff evaluations at NMS, the practice of competency-based medical education (Frank et al., 2010) and the experiences from other medical schools (Murdoch-Eaton et al., 2004; Murphy, De, Remers, & Davis, 2009; Murphy, Seneviratne Rde, McAleer, Remers, & Davis, 2008; Riley et al., 2008; Stark et al., 2005), particularly those discussed at a review meeting co-hosted by the GMC and the Northern Medical Schools SSC consortium held in spring 2011. This report summarises the key principles of the SSS curriculum that has emerged at NMS.

Programme Development

To review the programme and complete the subsequent changes we developed an SSS steering group that included student representation and administrators in addition to academic leads. We recruited experienced and novice SSS tutors at an annual MBBS *Away Day* to scrutinise student (quantitative and qualitative) evaluations, and to draw up an outline curriculum with the following mission statement: *"Our aim is to have a curriculum that is enjoyable for students and staff and that matches guidelines for the best practice in delivering and assessing student selected components within a medical degree"* Subsequent curriculum development has been an iterative process but the significant features of the 2015 programme include the following:

1. We have increased the menu of SSS themes offered to each student. Each option permits the in depth study of core disciplines (such as anatomy or genetics) or engagement in career planning activities (such as surgical attachments) or engagement in an active research project (in clinical and laboratory settings). Each student is supported by an expert academic tutor during an annual SSS attachment. We have 20 themes of study available in total (see figure 1).
2. The longitudinal SSS curriculum has defined objectives coupled to the assessment of mandatory competences; these are of increasing complexity with progression from years 1 to 4 (see Figure 1). Whichever topics the students choose to engage in, each cohort is assessed against particular criteria. Individual assessments include the delivery of PowerPoint presentations, conference-style posters and evidence-based case presentations.

3. Formative assessment is used to allow rehearsal before any summative assessment. Assessments have a rubric of skills linked to each competency, these skills are examined on a scale of 1 to 5 (with 3 marking the milestone of the proficient student who is ready for progression). This, coupled to qualitative feedback and ongoing tuition, allows students to clearly identify areas for improvement and to prepare for summative examination.
4. There is a tension for SSC assessments between serving student choice (coupled with access to expert tutors) and robust assessment validity. In an effort to inform all SSS tutors about inter-examiner variability, data from summative assessments is subject to statistical analysis for outliers and this is disseminated to each SSS theme team. The number of summative fails is now too small for statistical analysis, but the proportion of distinctions per theme is analysed using a funnel plot and themes above or below a 95% confidence interval assuming a common binomial distribution are identified. Standard setting is included in all staff training sessions and the use of electronic briefings has improved the access of staff to training opportunities.
5. A single SSS curriculum guide coupled to the assessment scheme is produced for staff and students for transparency. Curriculum documents and supporting electronic teaching material (including podcasts and screencasts) for each SSS theme are made available via the virtual learning environment, Blackboard.
6. To promote equity of access to limited places available for some particularly popular themes, we have an electronic sign up system for all students that is available for a prescribed period each year. Students use this to rank 4 possible SSS choices. The themes available to them in year 3 are contingent on the selections made in years 1 and 2, with the students having to study at least one science subject and one social science subject in the first three years. The program works by picking a student at random, giving them their first choice theme if this still has places and, if not, their second choice if this still has places, and so on. Then another student is selected at random and the process repeated. The program is run multiple times and the selection in which the greatest number of students get one of their preferences is used. For example, for the first year in the academic year 2015/16, 83% of students were allocated to their first choice theme, 6.5% to their second choice, 6.5% to their third choice and 4% to their fourth choice.

Figure 1.

A Summary of the Longitudinal SSS Curriculum

The menu of SSS themes that NMS students can select is shown for each year of study. The longitudinal development of mandatory competences with increasing complexity is illustrated by the assessment heading above each option list. Formative assessment is carried out in each year of study and summative assessments are held in years 1 to 3.

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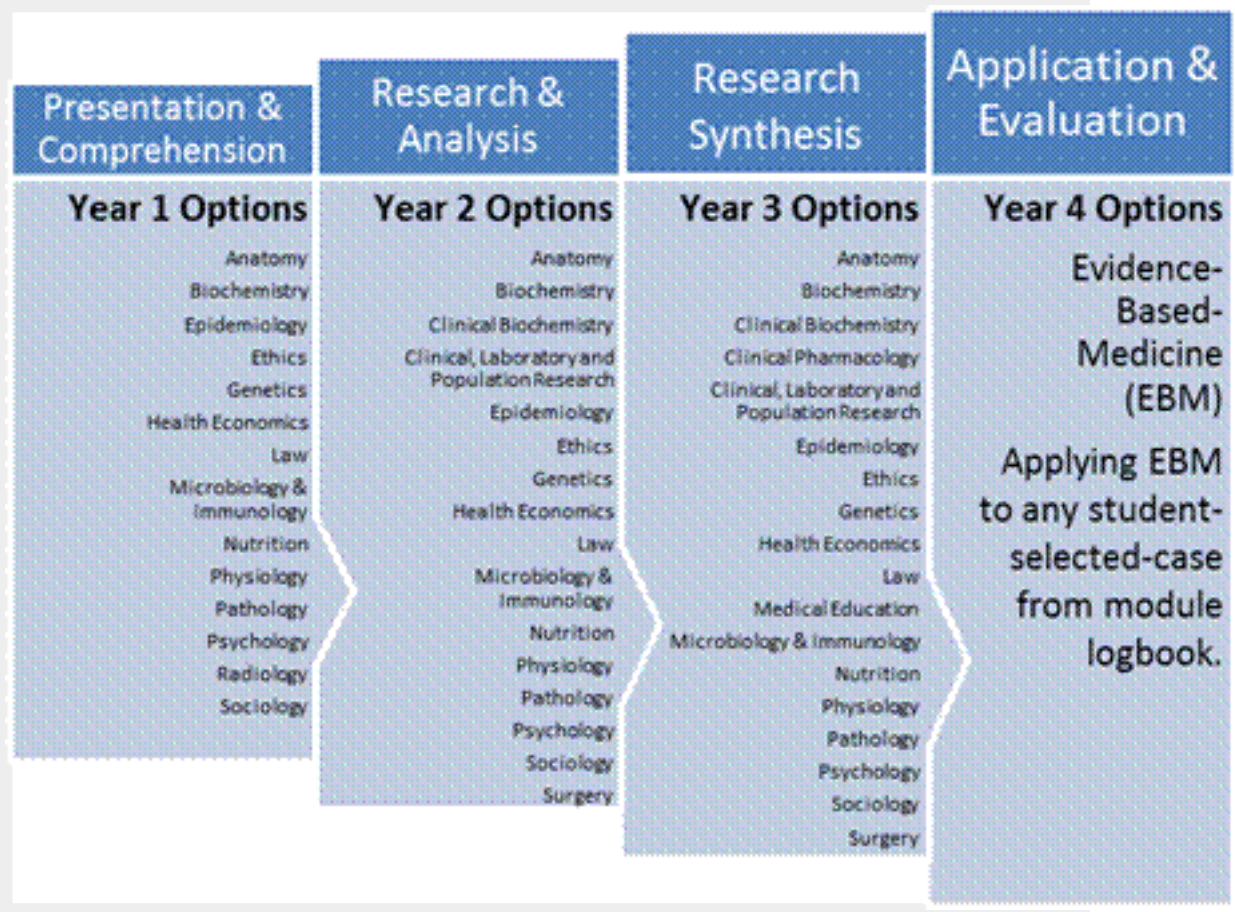

Outcomes (the good, the bad and the uncertain)

We are confident that we have kept a clear focus on the mission statement that we set for ourselves at the start of this curricular development, and the following observations make for encouraging reflection.
We have noted that SSS evaluations improved for those students who experienced both the expansion in the SSS theme menu, and the change of practice to always use a formative assessment step. The use of a longitudinal or *feedforward* strategy may have been beneficial given that feedback centred on corrective, rather than learner-focused aims, has been shown to be counter-productive in some contexts (Kluger & Van Dijk, 2010).
We have noted a marked reduction in the number of summative assessment re-sits and an increase in the number of distinctions. Staff training and sharing performance data for the SSS curriculum may have modified examiner behaviour and assessment validity; we have seen fewer outliers over time, which is the experience described by Murphy *et al*. (Murphy et al., 2009). The mandatory competences for our SSS curriculum translate into core research and presentation skills, and increasing numbers of our students are now applying for support for conference presentations or intercalated research degrees.
One area for future attention is to better support and guide students as they make their SSS choices; some students are highly strategic, others can be disappointed if they miss out on career-planning opportunities because of a lack of clear communication on our part.
We acknowledge that this report is not describing a controlled scientific experiment and changes in the MBBS admission process; NMS infrastructure; external changes to the foundation programme application system; and faculty expansion could explain the observations that we tentatively record as much as, or more than, our planned curricular changes.
As we refine the SSS curriculum we will continue to audit student choice; student and staff experience; assessment validity; tutor development; and student progression rates. One of the authors has completed a systematic review of publications of SSC assessments in UK medical schools and did not identify any published primary studies that considered validity or reliability (Killeen, 2014). This finding highlights a need for research to address the use of high-stakes exams for this mandatory component of a UK medical degree.
Local research priorities, about this aspect of the undergraduate medical curriculum, include qualitative and quantitative studies; firstly, with cohorts of foundation-year, junior doctors to consider whether SSCs affect subsequent career planning, and secondly to monitor the uptake of intercalated research degrees and student conference expenditure at NMS, in response to local SSS curricular changes.

Conclusion

Our SSS curriculum allows students to select diverse topics of study and educational experiences but the learning objectives and assessment criteria are uniform. Whatever vehicle-of-study is chosen by each student they have a curriculum that results in the longitudinal development of competences, of increasing complexity as they progress from year to year.
Our curriculum development has been shaped by the use of a competency-based teaching and assessment strategy and the practice of using *feedforward*, formative assessments.

Take Home Messages

- Student selected components (SSCs) are integral to undergraduate medical curricula and are examined summatively. There is a tension between the provision of student choice, in both topic and educational experience, with the delivery of high stakes assessments that have robust validity and

reliability for the whole cohort.

- The assessment validity and the enjoyment of SSCs at Norwich Medical School have been enhanced by the use of a longitudinal competency-based teaching and assessment strategy including the practice of using feedforward strategy in formative assessments.

Notes On Contributors

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Acknowledgements

The authors are grateful to Deborah Murdoch-Eaton and Brian Stewart for useful discussions about student selected components within undergraduate programmes. The authors are also grateful to their colleagues and students at Norwich Medical School who have contributed to the design and delivery of our SSS curriculum.

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Appendices

Declaration of Interest

The author has declared that there are no conflicts of interest.