

COMMENTARY

The adaptive curriculum

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An adaptive curriculum is one that is able to cater for the diverse educational needs of the students. It is part of the move towards a more student-centred approach to health professions' education that began in the 1970s. Harden *et al.* (1984) summarized the student-centred approach as follows: "the student is the central or key figure. Students, under the guidance of a teacher, may decide their own learning objectives, select appropriate learning resources to achieve these objectives, decide the sequence and pace of their own learning and are responsible for assessing their own learning process."

In many medical schools, however, the educational programme is still uniform. Tomlinson & Kalbfleisch (1998) reported that the traditional one-size-fits-all curriculum can be harmful by demotivating the students at the extremes. The extremes may be thought of in terms of faster or slower learners according to the length of time required by a student to master a particular unit. Repeated unsuccessful attempts at the examinations can erode the confidence of slower learners and lead to dropout, increasing the attrition rate. Some educational systems allow students who have failed exams to progress to the next part of the course but to 'carry' the failed subject, i.e. to continue to study it and to resit the examination at a later date. This seems illogical as it places increased pressure on the slower learners by allowing them to accumulate subjects to be studied, when what they probably need is increased support. Other educational programmes make provision for students who have failed examinations to study during vacation time. This practice may also lead to increased stress either from loss of leisure time or from loss of revenue at a time when many students are required to support themselves through medical school with paid employment at weekends and holidays. At the other extreme the faster learners may feel unchallenged and become bored by the standard pace of learning.

The adaptive curriculum acknowledges that students are not a homogenous group but differ in their preferred learning styles, interests and abilities. Provision of a range of educational opportunities and allowing students to select those that best suit their learning style (Harden *et al.*, 1997) caters for different learning preferences. The General Medical Council (GMC) in the UK highlighted the capacity of student-selected components (SSCs) and elective appointments to accommodate the diverse interests of students (GMC, 1993).

Catering for different levels of ability is somewhat more complex, however. Lawrence Cremin (1980), the American historian of education, suggested that "You can evaluate an educational system by the attention it gives to its extremes". How does medical education cater for the extremes, i.e. faster and slower learners?

Fast-tracking is one option suggested to accommodate faster learners. Leading surgeons have called for a rethink in training to allow high-flying juniors to be fast-tracked to the consultant grade (Royal College of Surgeons of England, 1999). In primary and secondary education curriculum compacting has been suggested as a way to accommodate faster learners. Curriculum compacting consists of three phases: defining the outcomes of a given unit; identifying students who have mastered the outcomes; and providing acceleration and enrichment options for them (Reis & Renzulli, 1992).

On the other hand, slower learners may take longer to achieve the required standard. There is, however, no evidence that they will not be adequate doctors. Although Hunt *et al.* (1987) showed significant differences in the quality of interaction with patients between graduates who had academic difficulties in medical school and those who did not, they concluded that many students who experienced academic difficulties in medical school eventually perform adequately in residency programmes. Weston & Dubovsky (1984), who evaluated the performance of the graduates from a USA medical school using postgraduate year 1 residency evaluations, found that those who had academic problems at medical school performed only slightly lower than the average level.

The challenge is how to give more time for slower learners to achieve the required standard. Several approaches have been reported to date, mostly from the USA. In this issue of *Medical Teacher*, McGrath & McQuail (2004) report on the availability of decelerated options in US medical schools. A decelerated programme enables selected students to spread the highly compressed work of the first year of the medical education programme over two years. Deceleration may also involve the second year. Applicants may be invited to enter the programme if, on selection, they show great promise but present cause for concern because of academic weaknesses or

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have not studied appropriate subjects prior to medical school entry. Students may also be directed to the programme because of academic difficulty during the course. There may be an option to volunteer through self-referral. Kassebaum & Szenas (1994) found that decelerated programmes resulted in a reversal of the growing attrition rates for minority students in the USA.

While deceleration would seem to offer many advantages, there are disadvantages too. McCahan (1991) found that students had concerns regarding being stigmatized: having to start over again with a new set of peers and studying for an extra year with the associated living costs.

Can deceleration and fast-tracking be accommodated in one programme? If so, what is the most efficient way to combine these two different strategies? Differentiated classroom instruction has been suggested in primary and secondary education. In differentiated instruction everybody works toward a common educational goal but students use different content and processes to get there. Differentiation is about providing options and not merely piling on additional work for the more able student (Tomlinson & Kalbfleisch, 1998; Tomlinson, 1999).

Mastery learning provides the educational approach to accommodate faster and slower learners within one educational programme. The mastery learning movement was pioneered by Washburn (1922) and Morrison (1926), who summarized the concept in terms of the educational objectives that all students were expected to achieve, provision of instruction in defined learning units with learning material designed to achieve the desired learning outcomes, a requirement for mastery of each unit before progressing to the next, administration of a diagnostic test on completion of each unit, supplemental instruction and variation in the time allowed to achieve mastery. Carroll (1963) took forward this thinking by developing a model for student learning, based on the principle that student learning is a function of the time allowed for study, perseverance on the part of the student, the aptitude of the individual student for the topic, the quality of instruction and the students' ability to understand instruction. Bloom (1968) further developed Carroll's (1963) theories and produced an effective model for mastery learning, based on provision of the optimal quality of instruction, a wide range of educational opportunities and variation in the time required for learning to take place, to cater for differences among students.

It has taken many decades for Bloom's (1968) model for mastery learning to penetrate medical education, particularly undergraduate or basic medical education, largely because of the need for cohorts of students to progress through the curriculum at the required rate and graduate at a predictable time to supply hospitals with junior doctors.

The introduction of special study modules by the GMC in its 1993 recommendations on undergraduate medical education, however, provided the opportunity to implement Bloom's (1968) model for mastery learning, at least for slower learners. "Occasionally it may be necessary to use periods of elective study to enable students to fill gaps in their experience as a result of absence or substandard performance" (GMC, 1993). The optional part of the course could be used to provide supplemental instruction for slower learners, while their peers who were faster learners could study enrichment options. The mastery-learning approach

was implemented in 1995 by Dundee Medical School, which now has nine years' experience of the approach (Davis & Harden, 2003). What has not been reported, however, is fast-tracking of faster learners through the standard basic or undergraduate programme, although several medical schools provide separate graduate fast-track programmes (Katona *et al.*, 2003; McCrorie, 2003).

However, the challenge of changing to an adaptive curriculum can be overwhelming, particularly to administrators and teachers. Leung (2001) summarized the challenges to be faced when implementing an adaptive curriculum as difficulties in assessing individual learning needs; shortage of staff; shortage of resources; and the need to train medical teachers for the educational approaches employed. Perhaps the major challenge as suggested by Davis & Harden (2003) is the creation of a new mindset that recognizes the needs of different learners and supports slower learners through the curriculum.

These challenges need to be addressed if consideration is being given to the implementation of an adaptive curriculum. If, however, demotivation of high flyers by studying at the standard pace is an issue or if reduced attrition rates, affirmative action regarding admission of students from underprivileged groups or ethnic minorities and admission of graduates with no previous experience of basic science subjects is thought to be important, the adaptive curriculum may be worth consideration.

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