

Modernizing Medical Education Perspective from a Developing Country

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INTRODUCTION

The principal aim of undergraduate medical education is to produce competent doctors in a broad range of medical, interpersonal and information-processing skills (1). The challenge for medical schools is to continue to produce graduates who are well-trained and clinically competent to practise for at least two or three decades. This calls for a close match between societal demands and needs, and the curriculum. It is reasonable to infer that it may be virtually impossible to predict these demands and needs as they are likely to change over time. Although the hardest thing may be to predict the future, John Sculley said, "If you want to predict the future, invent it" (2). Furthermore, "The future is not inevitable. We can influence it, if we know what we want it to be," suggested Charles Handy (3).

New challenges in healthcare are being posed worldwide and doctors are being asked to respond. Fundamental issues such as equal access, full coverage, integrated care, consumer satisfaction, ethics, population perspective in healthcare delivery, promotion of healthy lifestyles, protection of the environment, technology assessment and cost containment have led to the search for a new paradigm which can integrate all these factors (4).

Patients' expectations are rising in terms of the quality of healthcare provided by doctors. Patients want to know the nature of their problems and the consequences of the treatment options. Today, the public is more well-informed than ever with regard to health problems and needs. A better educated population is less likely to accept errors in patients' management, is less hesitant to enforce their rights even if this means seeking redress in a court of law, and is unwilling to accept the view that the outcome of individual care cannot always be predicted.

High-quality medical education is central to high-quality medical care. This has major implications for medical schools in both developed and developing countries, which will have to work assiduously to ensure that the curriculum does not lag behind the challenge. Rigorous evaluation of curriculum reform and educational interventions which may require significant investment in money and resources will always be required if we are to be certain that we are doing the best that we can for students and patients (5).

Any discussion on quality medical education must include an appropriate definition, valid and reliable tools for assessing quality of the medical education, a strategy for implementation of change, and methods to monitor the progress of change. Indicators must include not only educational content and process, and availability and use of resources, but also how medical schools implement their social and health mission. Consultation must be initiated between principal partners concerned with the quality of medical education and medical practice at the national, regional and international levels (4).

A major challenge that contemporary medical schools face is the upsurge of 'off-shore' medical schools owned and financed by affluent businessmen who are willing to invest large sums of money in order to furnish their schools with the latest technology. It is therefore exceedingly important that all attempts be made to ensure that conventional medical schools remain viable. This requires prudent and effective leadership of medical schools with cost-effective investment, especially among those in the developing countries whose resources whether financial or otherwise, are usually scarce.

A clarion call is made for modernizing the way 'business' is conducted in most medical schools. This may entail close scrutiny of everything that takes place in the medical schools from admission to graduation, and even beyond. Some pertinent areas in terms of modernization include admission and matriculation of students, curriculum, environment and climate and their interaction with quality and change, assessment, faculty development, action research in medical education and change based on best available evidence. The Association of American Medical Colleges identified four goals of medical education: altruism, knowledge, skills and duty while the World Health Organization (WHO) suggested that the doctor should be a care provider, decision-maker, communicator, manager, and a community-minded person (4, 6). Harden *et al* identified 12 learning outcomes for an effective doctor and represented the outcomes in a three-circle model (7).

In the past, the General Medical Council (UK) accredited many overseas medical schools in developing countries for British registration. The Caribbean Accreditation Authority for Education in Medicine and Health-related Professions, was established with a mandate to accredit medical schools in this region. An accreditation visit is primarily an independent and external appraisal on issues, problems and possible solutions as evident in the medical school. Integral in this appraisal is establishing targets and standards in medical education by the university and faculty, its infrastructure, academic traditions and assessment (8).

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One of the main objectives of this paper is to stimulate dialogue and debate amongst academics on ways in which the standard of medical education can be raised. Furthermore, this paper should prove useful to members of the various committees in charge of preparing their schools in developing countries for accreditation.

CURRICULUM

For most of the twentieth century, medical education was about the accumulation of facts. As biomedical science and clinical practice developed, the range and amount of knowledge facing students increased to an unmanageable extent. This encouraged superficial learning which promoted short-term recall (9). The General Medical Council in its document "Tomorrow's Doctors" recommended the creation of a core curriculum, provision of earlier and more extensive opportunities for students to interact with patients, and development of graduates who display appropriate attitudes towards patients and colleagues (10).

Curricular evaluation must cater for the changing patterns of illness and disease. For instance, the emergence of new diseases such as HIV/AIDS and avian influenza and changing social structure and demography. The role of prevention, early diagnosis and screening of life-threatening conditions with a greater focus on preventive medicine must be integrated in the training of medical students (11). Education in international health, genetics and disease, geriatric medicine, end-of-life care, sexual behaviour and its consequences should feature more prominently in the curriculum (12). The objective in clinical training should be the preparation of undergraduate students in the broad principles of medicine and in the diagnosis and management of conditions frequently encountered. One must be cognizant that the undergraduate is not being trained as a 'mini-specialist' (13).

One of the aims of medical education must be to create self-directed, lifelong learners. Leinster commented that what the modern medical graduate needs is not the ability to simply recall facts but instead the ability to access, evaluate and use new information (9). The new graduate must be able to form conceptual links between seemingly unrelated areas (14).

Outcome-based education, a performance-based approach, offers a powerful and appealing way of reforming and managing medical education. The emphasis is on the product – what sort of doctor will be produced – rather than on the educational process. It emphasises relevance in the curriculum and accountability. It can provide a clear and unambiguous framework for curriculum planning and mapping (15).

Many educational innovations are intended to prepare students to become critical thinkers and effective problem-solvers. This has led to the adoption of problem-based learning (PBL) in many medical schools. Albanese and Mitchell advised caution in implementing comprehensive

curriculum-wide conversions to PBL because data from cognitive-processing studies suggested that PBL students have gaps in their knowledge-structures and ability to engage in forward reasoning (16). A need to know more about what is an optimum balance of teacher-directed and learner-directed instruction and what cognitive processes are developed by PBL dictates that a world sample of medical schools should engage in the relevant action research. The academic world may be more inclined to consider favourably a need for change based on research findings rather than the opinions of some enthusiastic individual proselytes.

The General Medical Council advocated a system-based core curriculum with its component parts being the combined responsibility of basic scientists and clinicians working towards a common purpose to eliminate the rigid pre-clinical/clinical or Phase 1/Phase 2 divide (10). Furthermore, it was recommended that there should be true horizontal and vertical integration with the adoption of an interdisciplinary synthesis of the course. Interdisciplinary teaching implies a higher level of integration where the content of all or most subjects are combined into a new course with a thematic menu (17).

STUDENT SELECTION

Usually faced with large numbers of applications, medical schools must develop an effective and efficient selection policy. Ideally, this would entail a statement describing the academic and non-academic, cognitive and non-cognitive and demographic qualities that the school requires in its students as well as a list of valid, reliable and acceptable selection instruments (18). In practice, the above seldom occurs mainly because these desired qualities are not clearly defined. Frequently, because of a range of pressures from within or outside the medical school, a simpler selection procedure based on Advanced Level grades is usually utilized (19).

Without any doubt, it is of immense importance that a medical school accept students who after training will become doctors "fit to practise" and who are capable of fulfilling the multitude of professional roles expected of doctors. Medical training is long, arduous and expensive and hence, it is necessary to ensure that the attrition rate is minimum in order to reduce wastage of endeavour and resources.

The policy of selecting students based solely on end-of-school-grades presupposes that the applicant with the top score will make the best doctor. This hypothesis is certainly not universal (20). Furthermore, the dangers of over-reliance on school grades may include overlooking excellent candidates as well as the possibility of accepting students with undesirable personality traits (21). Traditionally and even today, many medical schools admit students primarily based on grades in science subjects despite the absence of any consistent data that show a definite link between high grades in science subjects and successful completion of the degree

programme on-time or competence of the doctor. It is evident that success or failure in medicine seems to be related not only to science subject grades but also to human interaction, communication skills and humanistic studies.

There are several reports that suggest that academic achievement *per se* is a poor predictor of ultimate effectiveness as a medical practitioner (22, 23). Others have drawn attention to the predominant convergent personalities of medical graduates, to the diminution in creative and original divergent personalities and to lowered levels of motivation and vocation (24).

Cognitive and non-cognitive skills required of a potential student are dictated largely by the curriculum and assessment style of the medical school. The aim is to optimize the fit between the entrant and the demands of the course. In the clinical environment, the successful and competent student seems to be one who is motivated, mature and emotionally stable, has low anxiety levels, possesses good judgment and perception, shows a high degree of decisiveness and assertiveness, and is moderately extroverted (25). Other studies have revealed that integrity, patient rapport and good peer relationships are also positive predictors in clinical performance (26). It is thus advisable that the selection procedure include an aspect of evaluation of essential personal qualities.

Personality tests have been tried but none has been widely accepted. These tests appear valid for groups but not for individual selection (21). One way of assessing personal qualities is via autobiographical data or a personal statement, as is the case in the United Kingdom and in the Faculty of Medical Sciences, The University of the West Indies, which usually includes information on why one wants to study medicine as well as signs of good interpersonal skills, evidence of a social life, details of one's interests and hobbies, and notable achievements. The main disadvantage with this method is the possibility that the report may be embellished and thus may not be completely true. On the other hand, a student deemed to be deficient in communication, if accepted, could be referred to appropriate courses to remedy this deficiency.

Most western medical schools that attempt to evaluate non-cognitive attributes which may not be easily taught or acquired in the medical school do so by a personal interview (22, 27). At the Newcastle University of Medicine, the interview was found to be a better predictor of honours and of academic failures than grades only (28). If an interview is to be used, it must be structured such that the qualities to be sought in potential students are defined in advance. Furthermore, there must be a calibrated yardstick by which to judge the answers, both qualitatively and quantitatively. It is critical that the admission committee be composed of highly motivated and skilled individuals, who are committed to institutional goals, have a clear concept of the required qualities, and are trained to conduct a well-organized and focused interview.

Although there are many potential advantages of the interview as part of the selection procedure, it may be too expensive and time-consuming to be adopted universally amongst medical schools in developing countries. It is suggested that each medical school should develop a clear, concise and transparent admission policy robust enough to withstand the potential pressures. The policy should include a critical cut-off grade of end-of-school examinations, implementation of an innovative mechanism that must be tailored to the school's curriculum to assess desired non-cognitive personal qualities and at least, on a limited basis, an interview either face-to-face or using telecommunication technology. Admission of professionals from other allied health fields such as nursing may promote a patient-centred and holistic approach to the problems of patients as well as a realistic understanding of the rewards and rigours of medical practice. A range of backgrounds and interests in the student-body also allows the students to meet their multiple responsibilities to contemporary society (29).

Regular on-going audits to compare the selection procedure with not only the percentage of students who graduate on-time and attrition rates but also how well the graduates are functioning as practitioners in the 'real world' should be conducted.

ASSESSMENT

Assessment plays a critical role in the process of medical education, in the lives of medical students, and in society by certifying competent physicians. Furthermore, it is central to public accountability. The very foundation of medical curriculum is built around assessment-milestones for students (30). It is assessment and evaluation that often drive the curriculum of medical schools, and students measure their progress through the curriculum by the examinations they have passed.

Assessment should mirror the curriculum and the learning outcomes, and it must have a clear educational rationale and consistent pedagogical approach (31). Key attributes of an assessment-instrument are validity, reliability, practicality, and impact on the learner and the educational programme. Validity refers to the degree to which an instrument measures what it intends to measure, while reliability of a test is the consistency, generalization or reproducibility of the instrument (32, 33). Impact of assessment on learning is central to the content, structure, frequency, timing and the number of examinations. Whether an assessment tool is practical or not may depend on the resources and expertise available and its cost.

The University of the West Indies (UWI) recently changed the format of its final Bachelor of Medicine and Bachelor of Surgery Examinations with the introduction of multiple-choice questions (MCQs), short answer questions (SAQs), and objective structured clinical examinations (OSCE). Multiple-choice questions enjoy high reliability and can be conveniently administered and marked but they

are time-consuming to construct. With the aid of a 'test blueprint', MCQs can sample a large domain of knowledge in an effective and efficient manner.

The OSCE is an assessment that is primarily aimed to measure clinical competence. Students are assessed at a number of stations on discrete focused activities that simulate aspects of clinical competence. Advantages of the OSCE include its high validity and reliability and effective feedback to teachers and learners. However, OSCE has a potentially negative impact on learning since the knowledge and skills are tested in compartments and thus the learners may prepare for the examination in a manner that can impede understanding of the connection and flow of skills. Thus the assessment of students' competence should not be confined to the OSCE (34). Furthermore, the use of clinically authentic problems in which the student has to integrate a particular skill with the clinical problem and to take action to manage the patient's problem is advised (35).

The oral assessment (*viva*) which continues to be popular among medical schools has potential disadvantages regarding low reliability, varying level of difficulty in questions posed to different students or bias due to the degree of prompting or candidate's personality. Davis and Karunathilake proposed that structured oral examinations with the implementation of a number of orals where all candidates are asked the same questions, and with the utilization of descriptors, rubric or criteria for answers and adequate training of examiners can offset the many disadvantages of the traditional *viva* (36).

Written essays are fast disappearing from final or high-stake examinations in medical schools primarily because of their low reliability. The disadvantage of this trend is that graduates may be deficient in communication, especially in writing. It is suggested that some of the earlier examinations in medical schools should include essays.

In developing countries, the use of portfolios as well as greater emphasis on self and peer-assessment in their toolkit of assessment should be strongly considered. Portfolios can assess learning outcomes relating to professional and personal competence such as critical thinking which are not easily assessed by other means. Furthermore, portfolios provide a record of the student's performance over time and allows for feedback (37).

FACULTY DEVELOPMENT

Faculty development refers to a broad range of activities that institutions use to renew or assist faculty in their roles (38). That is, faculty development is considered to be any planned activity designed to improve an individual's knowledge and skills in areas considered essential to the performance of a faculty member, including teaching, research and administration (39). Furthermore, faculty development includes programmes designed to prepare institutions and faculty members for their various roles and to sustain their productivity and vitality (40).

In the past, it was assumed that teaching expertise was a part of clinical or scientific expertise and faculty members were expected to be effective teachers merely by virtue of their content knowledge and mastery (41, 42). Now it is widely accepted that teaching is a skill that is independent of content expertise. Faculty members are the medical schools' most valuable resource and therefore it is necessary that faculty development should be targeted to the multiple roles faculty members play (43).

Apart from programmes designed to improve instructional and teaching methods, opportunities to enhance leadership and management skills, professional academic skills, and organizational development should be added to the 'menu' of teacher improvement programmes (44). Other areas that should be included are information technology, professionalism, medical ethics, evidence-based medicine, and 'educating' the educators.

In many medical schools in developing countries, faculty development is afforded low priority with little or no systematic faculty development courses. It is usually left to the individual to attend relevant programmes in developed countries at significant cost to the individual. Unfortunately, faculty development seems not to be very critical in terms of academic promotion and reward. There is an urgent need for a new culture amongst many medical schools to foster and encourage faculty development in order to promote teaching as a scholarly activity, and to create an educational climate that encourages and rewards educational leadership, innovation and excellence (40).

In terms of organizational development, initiatives should include creation of participative and empowering organizational policies and structures as well as programmes to enhance curriculum administration and collaboration across departmental boundaries (45). Development of educators who will be able to provide leadership to educational programmes and act as 'educational' mentors for new faculty staff are also required. This should facilitate faculty development at the local level which should provide significant benefits in cost and time to faculty members.

Some factors that must be considered when planning faculty development programmes include matching the institution's culture to the programmes and ensuring that the aims of the programmes are based on students' needs, patients' needs and societies' needs. Activities must be relevant and practical and teaching of concepts and skills must be clear and simple and where possible, utilize the faculty's experience as a foundation for learning and development. Some of the likely hurdles include lack of institutional support, limited funding and resources and pressing faculty time. In order to achieve significant participation, it is necessary that faculty developers work to overcome these problems through creative programming, skilled marketing and delivery of high quality programmes (44). Evaluation of faculty development activities is critical for success. Research must inform prac-

tice and hence findings from research must be implemented in the design, delivery and marketing of such activities.

Wilkerson and Irby stated that organizational vitality depends upon the commitment of resources to the ongoing development of those persons on whom the educational mission of the institution depends, namely the faculty members and their trainees (42). The systematic design and delivery of innovative faculty development programmes can promote and maintain academic growth and excellence. It is time that leaders of medical schools see the significant benefits that will accrue from faculty development. No longer can this integral aspect of an institution's success be left on the back burner. A call is made for each medical faculty to consider the establishment of a Centre for Medical Sciences Education, Development and Research with one of the aims being to promote, plan, develop and evaluate its faculty development activities.

CONCLUSIONS

Without a doubt, planners and implementers of medical education in developing countries must try to benefit from the expertise, practices and modernization taking place in medical education from the first world but this does not mean that one must import wholesale everything that is happening elsewhere. At the same time, there must not be a re-invention of the wheel, but people in developing countries must be effective and critical thinkers, evaluators and leaders in medical education. It is imperative that modernization in medical education should be congruent first and foremost with the needs and aspirations of our people if we are to truly claim that we are producing doctors 'fit to practise'. Change must be welcomed and embraced wherever it can better the lives of the millions of people who still lack quality healthcare, especially in developing countries where medical care remains hopelessly inadequate.

As medical schools respond to changes in society in general and healthcare in particular, there is a need to pay particular attention to the curriculum, with greater emphasis on training in community health and family medicine, in team-working, and in communication. The policy of selecting and matriculating students need to be carefully examined. A student-centred environment that provides the necessary academic and pastoral support as well as one that promotes effective and deep learning is at the heart of training of future physicians. Teaching must be promoted as a scholarly endeavour. An educational climate that fosters and rewards educational leadership, innovation and excellence in teaching is required in many medical schools especially in developing countries (46). Utilization of a multi-modal tool kit of assessment instruments in congruence with the educational goals and mission would more likely earn the stakeholders' trust and confidence.

Educational change is a complex process, particularly when large numbers of people from diverse cultural

background are involved. Change may only be realized if experimental data are available, and thus there needs to be a commitment to educational research (13).

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