

MB ChB curriculum modernisation in South Africa – growing doctors for Africa

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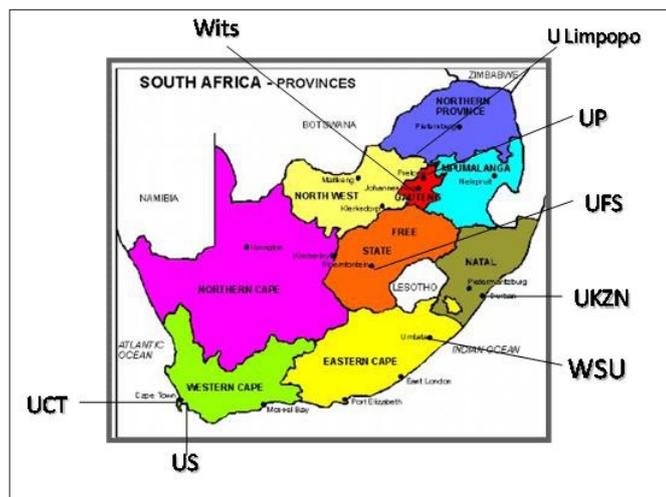


Fig. 1. Map indicating all eight South African medical schools.

Over the past two decades, all eight South African medical schools (see Map (Fig. 1) and Table I) have undertaken renewal of their MB ChB educational programmes.

As I write this in mid-2010, all programmes are settled and have been accredited by the Undergraduate Education and Training Committee of the Health Professions Council of South Africa (HPCSA).

Nevertheless, the educational leadership at all universities continues to undertake steady evaluation and research with a view to refinement of their educational offerings and assessment strategies.

In this paper, I seek to outline the triggers to medical educational transformation in South Africa, then to show the options selected, and finally to posit the successes that South African medical schools have achieved, while highlighting the challenges that remain.

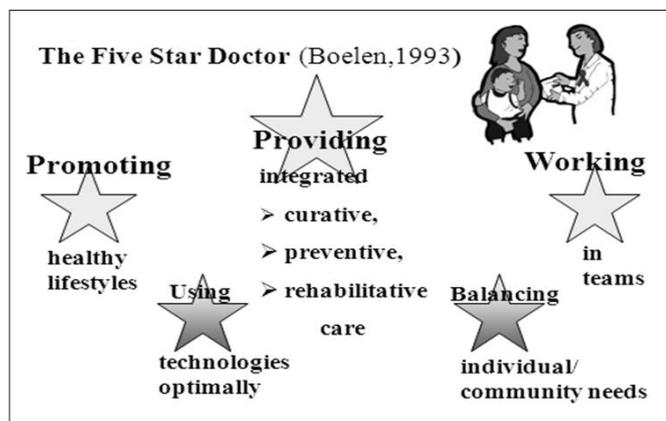


Fig. 2. The five-star doctor.

The main triggers to educational reform were:

- The acknowledged ‘ills’ of the so-called ‘traditional’ curricula developed, and hardly modified, over nearly a century ago following the report submitted to the Carnegie Foundation’s Committee on Higher Education by Abraham Flexner in 1910.¹
- A belated acceptance of the concept of the *adult learner* and of the importance to that learner of contextualised learning,² while accepting, nevertheless, that the adult learner of medicine might not be so different from learners in general, and moreover that too much self-direction in the course of training a doctor might actually be undesirable!³

The chief driver of curriculum reform during the late 1990s was the call to all South African medical schools from the HPCSA to modernise their medical curricula. In 1997 the HPCSA issued a discussion document, the final version following in 1999. Entitled *Education and Training of Doctors in South Africa*,⁴ it was along the lines of the General Medical Council’s *Tomorrow’s Doctors*⁵ delivered to UK medical schools in 1993. Continued accreditation, it was made clear, would be dependent upon schools undertaking the broadly stipulated changes.

There were three main imperatives:

- to mitigate the ‘ills’ of existing curricula which had come to characterise the established programmes (all of which mirrored the so-called ‘Flexnerian’ model (see below))
- to acknowledge the realities of so-called adult learning
- to produce a graduate fit-for-service in *post-apartheid* South Africa. This latter key reform was consonant with adoption on the part of the new national government that was elected in 1994 of a National Health Plan⁶ aimed at strengthening and reinforcing the primary health care (PHC) approach to health care delivery. In the words of the *Education and Training of Doctors in South Africa* document, the five-star doctor of Boelen (Fig. 2) was viewed as likely to provide the ‘best fit’ for delivery of health care to the country’s communities.

The then Deputy Vice-Chancellor responsible for the Faculty of Health Sciences’ affairs at the University of Cape Town (UCT) responded by asserting that it would be necessary ‘to find new and innovative ways to sustain the enterprise of medical education and to reform that system so that it produces doctors who are both excellent and relevant, “excellence and relevance” being defined in the context of the present and future South African realities’.

In essence curriculum change informed by the PHC approach demanded the training of graduates who would combine preventive, promotive, curative and rehabilitative care in their practice and who would demonstrate an understanding of the patterns, aetiology and natural history of common diseases and disabilities in rural and urban South Africa. These graduates would acquire knowledge and skills enabling them to practise with confidence at multiple levels (primary, secondary and tertiary) of health care in a restructured South African public health sys-

Table I. List of South African medical schools and year established

Province	University (U)	Established
Western Cape	UCT – U of Cape Town	1912
	US – U of Stellenbosch	1956
KwaZulu-Natal	UKZN – Nelson Mandela School of Medicine	1947
Eastern Cape	WSU – Walter Sisulu University (formerly University of the Transkei - UNITRA)	1985
Free State	UFS – U of the Free State	1969
Gauteng	Wits – U of the Witwatersrand, Johannesburg	1919
	UP – U of Pretoria	1943
Limpopo	U Limpopo – Medical University of South Africa	1976

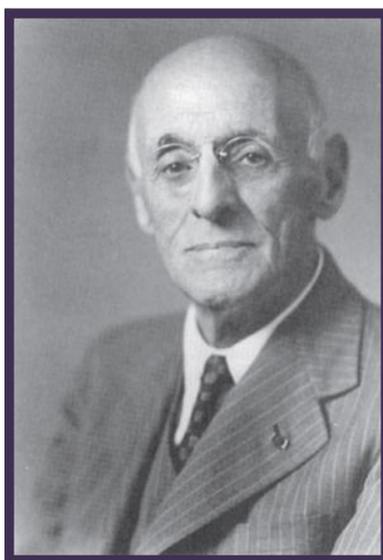


Fig. 3. Abraham Flexner.

tem. They would, moreover, acquire an overview of the organisational structure of the national and provincial health systems, while being required to demonstrate an understanding of human rights and ethics as applied to population-orientated health care and research.

The medical educational environment

With a single exception, all of the medical schools in South Africa were established in the last century ... that of UCT is the oldest and the first of its kind in sub-

Saharan Africa, having been established in 1912 (Table I). The exception is the Walter Sisulu School of Medicine, established in 1985. During the years of apartheid there were those medical schools that were 'white' and English-speaking (UCT, Wits, and 'white' and Afrikaans-speaking (US, UP, and UFS), and those that were 'black', but in which the medium of education was English (UKZN, U Limpopo and WSU).

Owing to apartheid policies in place prior to the 1980s, individual black students were admitted to the MB ChB programmes of 'white' universities on grounds that the particular medical school was closest to the student's home and then only with special Government dispensation. Nevertheless, from the early 1980s onwards, this dispensation did permit the traditionally 'white' medical schools to begin to make concerted efforts to recruit black students.

What had to be acknowledged, however, were the deprived educational backgrounds – the legacy of apartheid-driven educational policies at school level – from which such black students were recruited. As a consequence, the universities that chose to admit such disadvantaged learners (who were seen to be academically at risk of not succeeding with their training) had to put special academic development strategies in place to facilitate these students' success.

Even into the late 1990s, with the exception of the youngest medical school at WSU, the MB ChB programmes of all universities were of the traditional kind, reflecting a Scottish pedagogy typical of the medical schools founded in British Commonwealth countries in the early years of the 20th century. Given the dates of establishment of the South African schools, their curricula had developed to reflect the Flexnerian model – that inadvertent distortion of Flexner's hopes for medical education (see below) which were contained in his catalytic 1910 report and which sparked medical educational change in the early decades of the 20th century, particularly in the English-speaking world.

At this juncture, it is worth reminding ourselves that Abraham Flexner (Fig. 3), who deserves to be recognised as the world's first 'medical educationist', recommended that all medical school entrants receive a solid training in biology, chemistry and physics, followed by an education in anatomy (including histology and embryology), physiology (including what came to be termed biochemistry), pharmacology, pathology and microbiology, with active use of the laboratory before undertaking clinical training. Flexner had believed – mistakenly, as it turned out – that departments of the basic sciences would be led by 'medical men'. Flexner was not to know that the burgeoning of medical scientific research following the two world wars would leave basic science departments short of 'medical' men and necessitating the increasing recruitment of pure scientists.

Flexner's insistence¹ on the appointment to medical schools of full-time clinicians as members of faculty, and moreover that medical schools should control hospital beds, was aimed at ensuring the presence of 'true university teachers' and at securing authentic clinical training for medical students.

I have alluded to the distortion of Flexner's insights and hopes for 20th century medical education. Apropos, it is worth noting how prescient Flexner was with regard to the MB ChB curriculum reforms undertaken around the world to prepare doctors for the 21st century. In his report Flexner argued that medical practitioners should be scientists treating each patient encounter as an exercise in scientific enquiry – observation leading to hypothesis leading to action, but also that the physician serve as a 'social instrument ... stating that ... the physician's function is fast becoming social and preventive, rather than individual and curative'. He further advised that medical education should be 'marked by small classes, personal attention, and hands-on teaching'! His views of lectures bordered on the cynical ... lectures in his belief enabled colleges 'to handle cheaply by wholesale a large body of students that would otherwise be unmanageable and thus give the lecturer time for research'.⁷

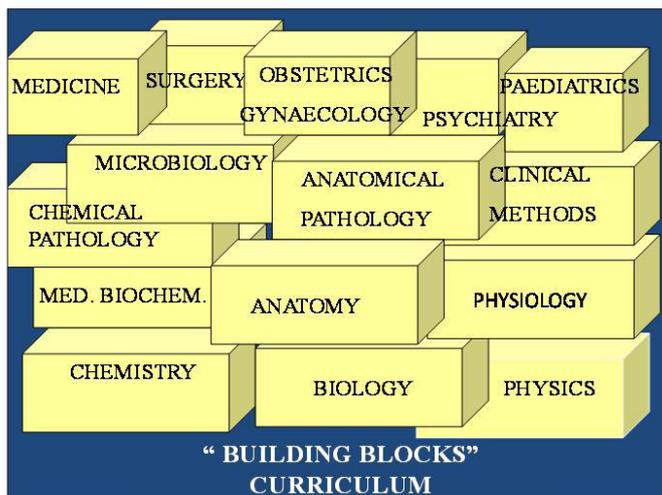


Fig. 4. A building block system of individual courses.

Regrettably, from our current vantage point, the curriculum model that evolved and remained virtually unchanged for nearly a century and that characterised medical education in South Africa, as well as throughout most of the Western world, was a sorry distortion of Flexner's vision in that:

- there developed a clear separation of the basic sciences from the clinical clerkships
- there developed a 'building block' system of individual courses (Fig. 4), the content of which was determined by the scientists who, as stated, were increasingly not 'medical' men. This led to the establishment of courses with little reference to adjacent courses and certainly scant reference to what might be necessary for clinical practice. To be fair, it was believed that students must be given a sound foundation in the basic sciences, but there was unfortunately no general consensus about what should be included in this foundation!

Before too long students were beginning to be overwhelmed with the details and facts required of their basic science courses and were being forced to depend for success upon memory. As Tosteson⁸, Dean of Harvard, observed: 'as medical science advanced, adding new knowledge, and new disciplines developed the curriculum was simply added to, to the point of crisis for students whose only way of coping was to become superficial rote learners'. To paraphrase Harden,⁹ '... a curriculum which exposes students first to animals (in biology and physiology), then to dead humans (in anatomy) and parts of humans (in pathology) and only later to humans' had come to incorporate all the ills to which he drew attention (Fig. 5) and was 'an unsatisfactory preparation for a career in medicine'.

Courses tended to be knowledge based and teacher centred and offered in full-class lecture format in both the basic and clinical sciences. Clinical training was wholly discipline based with minimal integration. Moreover, clinical clerkships were undertaken typically in tertiary referral hospitals with students receiving minimal exposure to patients at primary or secondary levels of care or to patients in ambulatory settings.

And

- There was no accommodation of the social sciences or of public health or of anything akin to the bio-psychosocial model of patient care or learning about population health, health policy and the organisation of health services. Rather, the bio-scientific model of illness prevailed. South African students might have made the

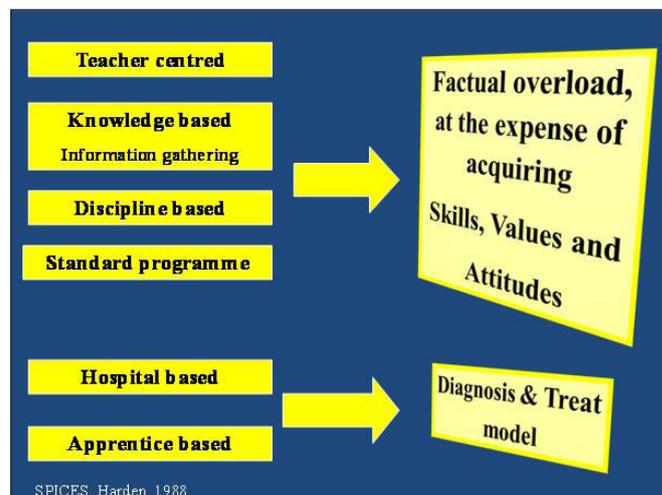


Fig. 5. The ills of the 'traditional' medical curriculum (drawn from Harden⁹)

claim, as did Beeson in 2000 reflecting on his training at McGill University, that 'certainly no teacher, at any time, reminded us [he and his fellow students] that patients are people, with differing life situations and backgrounds'¹⁰

- As Stephen¹¹ observed 'one error ... is common to all countries: no medical school appears to understand, or considers itself responsible, for meeting the needs of the health service it is supplying with doctors'.
- Increasingly, research productivity became the measure by which faculty accomplishment was judged.
- Teaching, caring for patients, and addressing broader public health issues were viewed as less important activities and teaching became subordinated to research.

Regarding the last two points, Beeson commented that the medical schools of the 1950s and 60s had become submerged in large academic medical centres which he labelled as *biomedical factories*, incorporating teaching hospitals staffed by clinical faculty, nearly all of whom were specialists and super-specialists who tended to restrict their interests to narrow segments of medicine which related to their research fields.

Desiderata of curriculum reform

With the above as background, three leading educational themes informed the processes of curriculum change:

- the introduction of **student-centred learning** in small groups utilising **problem-based strategies**
- a shift in emphasis **from the bio-scientific model** of illness to the **bio-psychosocial model**
- an increased exposure to **community-based learning opportunities**, also encompassing rural settings.

It is notable that WSU, perhaps because of its youth, adopted problem-based learning and community-based clinical training soon after its founding in 1985, thanks to the courage and foresight of the founding Dean of the medical school, Professor Marina Xaba-Mokoena.

In addition, it was determined by all medical schools that the new curriculum would, in generic fashion,

- **be outcomes orientated.**

A description of what is to be expected of the South African brand of doctor at the end of undergraduate medical education and training was developed as the Profile of the Graduate or similar. These qualities and skills that define 'fitness for purpose' are still being worked on by sub-committees of the HPCSA and Committee of South African Medical Deans.

- continue to employ **academic support strategies**, where necessary, to facilitate success. Students who struggle receive additional tuition, provided they continue to meet certain minimum performance criteria, while academically strong students receive additional opportunities to pursue new interests and develop new skills.
- offer **multidisciplinary and multiprofessional learning opportunities**, whenever educationally feasible and appropriate, exploiting the presence in most schools of students pursuing undergraduate degrees in physiotherapy, in occupational therapy and in speech therapy and audiology.
- employ an **integrated, systems-based approach to the study of the sciences** basic to medicine, incorporating early clinical contact in the form of clinical scenarios and patients as the focus of learning. Thus, **case-based learning** in a structured problem-based format was introduced with the aim of blurring the pre-clinical/clinical divide which characterised the former 'traditional' curriculum.
- require students to acquire **core knowledge and core skills** while also enjoying the opportunity of selecting additional study opportunities through the medium of **special study modules** or **electives** or **selectives**. The integrated systems-based approach and identification of a core of learning, deemed essential to medical practice, benefit the learner by reducing the factual overload that had characterised the former traditional curricula.
- make use of **computer-based technologies** (for learning and assessment) where appropriate, while ensuring continuation of the close tutor/student interaction that has been the great strength of South African medical faculties.
- deliver teaching of **clinical skills, clinical reasoning and diagnostic and management skills** to ensure development of clinical competence. South African institutions have always justly prided themselves on the strong clinical skills acquired by their graduates, culminating in strong diagnostic and patient-management abilities. This has continued and, if anything, been reinforced through the teaching of clinical skills in the early semesters of medical programmes and the development of clinical skills centres.
- ensure the acquisition of **generic competencies** such as study skills, IT skills, communication and second language (typically an African language such as Xhosa or Zulu and Afrikaans) skills, interpersonal skills, problem-solving ability and decision-making ability.
- maintain a strong commitment to **high ethical standards, professional values and human rights** to impart the moral and ethical responsibilities carried by those entering the health professions and develop an ethics curriculum which 'spirals' through the course.

Change

Change did not prove easy to effect ... not least because there appeared to be no overt problems with the existing traditional programmes and no apparent shortage of applicants for medical training. And, as has been shown, there existed several compelling barriers to change¹² which included:

- faculty members' inertia
- lack of leadership
- lack of oversight of the educational programme as a whole
- limited resources and lack of a defined budget for medical education
- the perception that there was no evidence that implementing change would result in the necessary improvements
- predominance of the status quo (faculty members who were once students in the traditional system had been conditioned to value that system and to support it)
- perceived loss of control on the part of senior staff members
- pressure of service delivery on the part of particularly clinical faculty members
- perceived lack of rewards for teaching and sense of the importance of research for promotion (and tenure) on the part of faculty (to which may be linked)
- lack of staff development.

Arguably, the two most potent of these barriers, highlighted above, were:

- that **faculty members who were once students in the traditional system had been conditioned to value that system and to support it**. These members could, and did, assert that they had enjoyed professional success, citing also colleagues who had risen into the highest academic positions.
- **the perceived lack of rewards for teaching and sense of the importance of research for promotion (and tenure) on the part of faculty**. This perception – that there is scant academic recognition for participating in policy development and implementation of teaching – remains current, as an international survey of medical educators carried out in 2007 revealed.¹³

Ultimately the 'big-stick', in the guise of the threat of loss of accreditation of medical training programmes on the part of the HPCSA, forced curriculum renewal.

Fortunately, there were several 'pioneers' of curriculum reform around the world from whom all South African medical schools could learn – among which were the *new* medical schools at the universities of McMaster, Limburg in Maastricht (the Netherlands) and Newcastle (Australia), those that had adopted problem-based learning such as Liverpool, Manchester and Sydney, those that had community-based curricula such as Ben Gurion University at Beer Sheva (Israel), University of New Mexico and WSU here in South Africa, and those that had led the way in educational reform such as Harvard where the 'new pathway' of problem-based learning was adopted in 1985.⁸

Prompted to change, there was at last an acknowledgement on the part of those concerned with medical education, and who found them-

selves leading the processes of curriculum transformation at their particular medical school, that:

- **adults do indeed learn differently:** the work of cognitive psychologists has shown that adult learners see themselves as self-directing and responsible and possess an accumulation of experience as a resource for their own learning ... medical students learn best if provided with a clinical context for their learning.^{14,15} Such contact with real patient problems, research has shown, leads to deep levels of processing, and thus memorising of information and the development of concepts in contradistinction to the superficial, even rote, learning resorted to in a largely lecture-based course. There is acceptance of the caution offered by Norman,³ a cognitive psychologist/medical educationist based at McMaster University, who insists that **all** learners achieve best if provided a context for their learning but warns that, because a degree of mastery of knowledge and skill is demanded of a doctor, medical students deserve a fair level of direction from their tutors throughout their learning and training.

Underpinning curriculum reform in South African schools, as in those around the world, has been the acknowledgment that ...

- full-scale mastery of knowledge is beyond anyone, and accepting that much of what is mastered soon becomes obsolete, that there has been the need to define a 'core' curriculum with options/special study modules/selectives/electives
- the habits and skill of active inquiry, research, and learning must be inculcated for a lifetime
- medical education requires the active participation of the student
- small groups are more advantageous because they concentrate on the student rather than the faculty member and increase the experience of working together
- problem solving should become an essential part of the learning process

- basic and clinical sciences must be integrated in order to train students to act scientifically when they practise medicine
- medical education should be research based.

These important insights have led to the introduction of problem- or task-based learning with early clinical contact on the part of even the most junior medical students. And, there are, as Federman¹⁶ points out, many 'little heralded benefits' to problem-based learning, which include person-to-person contact, 'implied intelligence' on the part of the student, a focus on patients, opportunity to address moral/ethical issues and the ability of the student to learn to develop hypotheses (a key part of the clinical diagnostic process).

Mazwai¹⁷ (Fig. 6), recently-retired Dean of WSU, made the signal observation in the South African context that PBL will always take the character of the environment of the people and as an educational strategy will greatly enhance local graduates' appreciation of the health issues and needs of the populace whom they would serve.

No South African medical school has adopted a doctrinaire approach to PBL ... rather a 'mixed economy' of PBL *and* lectures has tended to be put in place. Students tend to more avidly attend lectures in the course of their PBL, viewing them as a key resource, provided that lectures are crafted in such a way that they offer clarification, correlate with the tutorial components of the patient problem being addressed and provide a general approach. Lectures also offer an opportunity for students to meet those members of faculty who, through their academic endeavours, have achieved national and often international profiles; students may then take pride in this and deserve to receive this affirmation of their choice of medical school.

Given the depredations of the apartheid years of under-resourcing of black education in particular, South African students are variably under-prepared for their medical studies; this is particularly true in relation to the sciences and mathematics. Unfortunately, this continues to be the case as a result of deteriorating standards of teaching in our secondary schools.

South African medical schools have therefore had to respond with a number of interventions which include:

- use of alternative tests of a student's intellectual ability and potential to succeed; these are considered alongside a school leaver's 'matriculation' scores for purposes of deciding selection for admission into the medical programme
- academic support strategies of various kinds to assist the student who is identified as being academically at risk of failing his/her course(s)
- the reservation of (some) places for graduates, a proven success record at tertiary education level in the view of some medical schools being deemed preferable as a preparation for medical studies. Wits reserves up to 25% of its medical places for those students who have obtained a prior (preferably science) degree.

If one surveys the educational changes that have been implemented in South African medical schools according to the mandate contained in *Education and Training of Doctors in South Africa*, it is clear that a great deal has been achieved:

- The introduction of **problem-based** learning strategies aimed at reducing the teacher-centredness of learning and demanding a greater student-centredness, while retaining a certain orthodoxy as befits the relative under-preparedness for such learning of our mainly school-leaving medical students.



Fig. 6. L Mazwai.

- Apropos, it is reassuring that early research¹⁸ carried out at the UCT suggests that PBL may be advantaging students who have weaker prior educational preparation; findings, albeit preliminary, indicate higher retention rates and improved clinical clerkship performance in students who have educationally disadvantaged backgrounds. Further research is necessary but work from WSU¹⁹ does suggest that PBL may benefit disadvantaged students by producing more versatile learners.
 - The evolution of *core* basic science and clinical syllabi to achieve **unloading of the factual content** of the curriculum.
 - The **racial transformation** of graduating medical classes at the previously so-called 'white' institutions (the traditionally 'black' institutions, in their turn, are striving to attract white and Indian students to their faculties).
 - The establishment of **academic support** strategies to ensure that the traditionally high throughput rates, with regard to *graduativeness*, have been maintained. Indeed, South African medical schools continue to boast graduation rates in excess of 95%.
 - Greater **integration of the basic and clinical sciences** achieved through **early clinical contact**; students, from the earliest phase of their programme, are presented with real patient problems as the context for learning (this being referred to as **vertical integration**).
 - **Multidisciplinary learning** (an example of which is the blending of courses in obstetrics and neonatology) (this being referred to as **horizontal integration**).
 - The establishment of **computer laboratories** to enable student access to a university intranet and the internet, e learning, computer-based assessment, etc.
 - The establishment of **clinical skills laboratories and centres** to facilitate students' learning of skills of procedures (e.g. siting of an intravenous line or achieving endotracheal airway access) and of clinical examination.
 - **Multiprofessional learning and practice** whenever it has proved educationally sound and practicable in order to exercise medical, physiotherapy, occupational therapy and speech therapy students together in addressing patients' problems, thus ensuring that students understand the scopes of practice of the different health professions.
 - Greater emphasis on clinical experience gained in community-based and rural settings, and in ambulatory practice, in contrast to the traditional tertiary teaching hospital setting. This is in line with the 'new' health service delivery in South Africa.
 - Golden thread status afforded to teaching of issues of **professionalism, ethics, human rights and language and culture**; such teaching is introduced in the earliest phases of the programme and continues to be addressed, and assessed, throughout the programme.
 - **Modernisation of assessment** strategies in line with best practice and research, and the alignment of assessment with curriculum content.
 - The establishment within faculties, and their staffing with specialists in education, of **medical education units** whose roles are several but are key to the modernisation of health sciences education, viz.:
 - providing leadership with regard to the choice teaching and assessment strategies, maintaining oversight of the entire programme(s)
 - undertaking staff development (through provision of 'scientist-as-educator' and 'doctor-as-educator' short courses)
 - conducting research which leads in its turn to continuous refinement and improvement of teaching, and finally
 - preventing reversion for 'the academic landscape is littered with the skeletal remains of brave curricular innovations' ... and ... 'the half-life of medical educational reform is short, the tendency to revert to type is seemingly irresistible, and human enthusiasm for sustaining change is short-lived'²⁰
 - **Our graduates demonstrate** ... 'acquisition of a specific body of knowledge and the ability to move about within it with ease and the confidence to use it in a more patient-driven practice thus to serve as a doctor ... but also to have practice in thinking by virtue of his/her university education.'²¹
- Despite these obvious successes, it cannot be claimed that curriculum reform is complete.
- Many challenges remain:**
- Teaching '**Generation Me**', who, among other characteristics,²² has grown up digital, believing that if the subject matter is not on the internet, it is not real ... the textbook may never be read or only be skimmed. This will have to be managed, and as academics we shall have to guide students towards quality resources on the internet.
 - Getting the **basic sciences** right. Weatherall,²³ reflecting on basic sciences, states that 'one of the greatest challenges is to protect unusually gifted young people from the numbing uniformity that some of the reforms in medical education are demanding ... given the extraordinary complexities of sick people ... we must ... influence at least some institutions to train and nurture such gifted young people to ensure that the extraordinary potentials of the current biological sciences become available for the better treatment of our patients'.
 - Getting **assessment** right and achieving testing of clinical reasoning,²⁴ particularly at the end of the programme. This acknowledges that the South African graduate is 'special' and must demonstrate an unusual degree of clinical maturity as s(he) will be required to work in a health system ill-equipped to cope with one of the most severe HIV and TB epidemics in the world together with huge burdens of non-communicable diseases, high rates of maternal and child mortality and soaring rates of violence and injury.²⁵
 - **Teaching** the teachers/assessors and ensuring ongoing staff development.
 - Achieving greater opportunities for **community-based** learning and authentic **rural experience**.
 - The possible request that the **training** of greater numbers of doctors be undertaken in view of the inadequate human resource capacity, especially given the extremely low number of doctors in the public sector²⁶ of the health system.
 - The **feminisation** of the profession where graduating classes are now over 60% female and the responses required with regard to systems of postgraduate training to facilitate specialisation and

sub-specialisation of women who choose to marry and raise families.

- Defining and measuring **professionalism**.

Professionalism has been defined in terms of the practice of medicine as a vocation in which knowledge, clinical skills and judgement are put in the service of protecting and restoring human well-being and wherein the attributes of integrity, compassion, altruism, continuous improvement, (striving for) excellence, accountability, and working in partnership with a wider health care team are sought in the medical practitioner.²⁷

It is revealing in this context to read the new *Tomorrow's Doctors*,²⁸ recently released to UK medical schools by the General Medical Council. As expected, standards for delivery of teaching, learning and assessment are highlighted under a series of headings, as are also the desirable outcomes for graduates in terms of the doctor as a scholar and a scientist and as a practitioner. What is particularly notable is the emphasis placed on the professionalism of the graduate and his/her fitness to practise.

This – the issue of ensuring professionalism, and all that it stands for, in our medical graduates – I would argue, constitutes the next frontier in medical education.

This paper is based on the Arthur Landau Memorial Lecture delivered by me at several of our South African medical schools during 2009.

The chosen topic arises out of the leadership role I have recently played in medical curriculum reform at my own institution.

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