

Occasional Survey

Undergraduate Medical Education: Perpetuum Mobile

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Abstract

Medical undergraduate education in Britain has undergone radical change in the last ten years following recommendations by the General Medical Council in the early 1990's to "liberate the curriculum from factual overload and passive acquisition of knowledge". Some new curricula are chiefly problem-based; others, such as that in Cardiff, embrace more the philosophy of greater integration between disciplines, with special emphasis on breaking down a previous pre-clinical/clinical divide and improving communication skills. New curricula have established the concept of a core programme complemented by special study modules that encourage initiative and curiosity building on knowledge and skills acquired in the core. Clear definition of educational aims is essential. But the actual delivery of the curriculum, especially where so much clinical training takes place in the hospitals and community settings away from the main teaching base, poses challenges to ensure the core programme is adequately covered.

Key words

Curriculum; Education; Learning; Medical

Introduction

This article offers some personal views of current undergraduate medical education, viewed through my own involvement in developing a new curriculum in Cardiff over the past eight years. Our new curriculum is not problem-based – unlike that in some other British medical schools. It follows more the philosophy of greater integration across all five years of the medical course and with a special emphasis on breaking down the previous preclinical/clinical divide.

This article is in two parts. The first provides a background against which changes in the approach to undergraduate education have had to take place. The second describes the contributions made by paediatrics and child health to our integrated curriculum and the challenges and threats posed by integration to preserve the integrity of paediatrics as an autonomous specialty. I hope this article will be of interest to those in Hong Kong who are also involved in curricular changes.

Background to Curriculum Change

Undergraduate medical education should prepare the student for a lifetime's commitment to one of the many disciplines within the broad church of medicine. Once, the major emphasis of medical education was on "training" (instruction followed by practice under supervision until competence is achieved). Diagnosis was by "pattern recognition" of organic illness. Earlier medical curricula expected a doctor graduating to be proficient in medicine, surgery and midwifery. How times have changed! The emphasis now is more on a university education on broad and general lines, as first enunciated in the Goodenough Report as long ago as 1944. "To instruct less and to educate more: to encourage individual critical thought, initiative and self learning... to achieve a balance between training and a critical study of principles and the development of independent thought". The newly qualified doctor now needs to have an understanding of health and disease along with an attitude to learning based on enthusiasm and exploration of knowledge.

But, these broad educational aims cannot be considered separate from the major changes in the outside world in which students find themselves and which, indeed, provide so much of the impetus and motivation for change. Newly qualified doctors enter a complex world of rapidly changing knowledge and values in the medical sciences, against a background of the most revolutionary

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changes in the National Health Service that are continuing to take place since its inception in 1947. Patients' expectations of the level of health care delivery are now much greater. Demands to explain illness, its management and outcome and possible prevention have never been so exacting. Patients have moved from passive recipients of care to active participants in all decisions. Shared management of problems between many groups of health care professional workers is now the rule. No longer do doctors have a monopoly of caring, investigation, research or even treatment – a challenge to their previous omnipotence that some find difficult to cope with. Diagnostic and therapeutic tools are not only more powerful but in many ways, and especially in regard to diagnostic tools which are becoming increasingly more and more non-invasive, paradoxically more open to abuse. There is a clamour to achieve a better balance between technology and humane care: ethical, moral and legal issues surrounding clinical problems are intruding far more into decision making than before. With greater awareness of how financial resources available for medical care need to be spent there is an increasing need to more efficiently deploy resources – a concept disguised in the word "rationing": priorities in medical care, often an unpalatable matter for debate, have to be made – often between provision for acute medical problems on the one hand (kidney transplantation, neonatal intensive care, in vitro-fertilisation etc.) and services for chronic disability on the other (care of the elderly, neuro-developmental handicap etc.) – and all this at a time when new drugs, ever more costly, are becoming available on the market.

The world, with modern travel, is now "much smaller": awareness of problems in parts of the world far removed from an individual's personal base is now no longer of academic interest alone. Awareness of cultural variations in illness, attitude and behaviour is essential. We live and practice medicine in a multi-ethnic society. Computers have infiltrated all aspects of medical care: record keeping, data analysis, clinical audit, diagnostic assistance, learning and training resource availability are but some examples. The "Web" has revolutionized the world of information accessibility, not always for the best with real problems of uncritical information overload and worries about plagiarism:- the concept of e-mail ethnics was recently a topic of "recent advances" in medical ethics. The influences of these innovations on personal confidentiality are considerable yet, at the same time, the help they give modern medicine, if suitably harnessed, is enormous.

Many people in western countries are paying more attention to "unorthodox" medicine – almost as a revolt against what is a sometimes seen as dehumanization in medical care, and not necessarily cure – increasingly demanded with an ageing population and, in the case of children, those with chronic disability. The public now

demands better communicative and counseling skills in their doctors.

Communications skills deserve special mention, since it is an aspect of practice in which the public does not have much faith in doctors as they perhaps should, perhaps with some justification. Maybe the public expects too much of their doctors. They want an educated person, someone with not only the requisite clinical knowledge and skills but who can appreciate each patient and a human being with feelings and in turn, explain suffering and illness. This, in turn, requires the doctor to think reflectively and it is this that underlies a belief that the humanities (and especially literature in its many forms to illuminate aspects of life to better understand human emotions and predicaments) need to be very much a part of the medical curriculum.

There is much greater scrutiny of medical practice. Ethical issues assume increasingly greater importance. Disciplinary matters are ever-increasing. The erstwhile "cosiness" of the medical profession in its protection of failing colleagues is no longer acceptable. The public now demand much greater accountability. Standards are more openly discussed in the media and other public fora. Medical students have now to acquire the seeds of knowledge, understanding and application of ethical and legal issues relevant to the practice of medicine. It has also to be recognized that doctors have to involve themselves more and more (often with reluctance) in administration that includes resource allocation, let alone an ever-increasing responsibility for their own continuing professional development and competence. Many hospital, striving to cope with an "efficiency" drive in the new NHS, have a much shorter average length of inpatients' stay – this applies especially to children whose average stay is two to three days. In the intensive biomedical model of tertiary care hospitals (admittedly with much of their work of dubious relevance to undergraduates) implications for hospital-based teaching are changing, fuelling a drive for more community-based teaching. Abnormal physical signs in clinical medicine are now around for a much shorter time than yesteryear.

For these reasons (and many more) the undergraduate medical curriculum had become more and more overloaded with an enormously heavy burden of expected knowledge of very short half life, and under constant pressure to adapt itself to changing demands. There had also been a tendency to overrate the capabilities of young students to cope personally with clinical problems. Many find contact with ill patients distressing (for many the clinical encounter will be their first contact with serious illness and death): indeed, depression and peculiar health fantasies are not uncommon in medical students. Time to relax and ponder is important. Mindful of the need to prevent overload, the Education Committee of the General

Medical Council in their 1991 publication "Tomorrow's Doctors" set out a framework for all British medical schools to look carefully at their approach to medical education:- "to liberate the curriculum from factual overload and the passive acquisition of knowledge". Out of this emerged the concept of core plus elective special studies throughout the medical course, with core occupying no more than 70% of total teaching and learning time, to better integrate basic sciences with their clinical application and to have more teaching in the community. They (the GMC) wanted students to approach their studies with a greater spirit of enquiry and to enjoy the intellectual challenges of science and to encourage student centred learning based on problem-solving in small groups. To break down traditional departmental boundaries, remove spoon feeding and examine interfaces between disciplines.

The New Cardiff Curriculum

In October 1995 the first group of students enrolled in Cardiff to study in the new curriculum that set out to embrace many of these recommendations. We set ourselves several tasks: (i) to rid ourselves of the traditional pre-clinical/clinical divide that had been oppressively rigid, creating, instead, a science continuum to prevail throughout the entire curriculum that would merge the basic with the applied medical sciences into a more coherent and relevant whole; (ii) to introduce clinical learning models early in the course through direct patient contact that also serve to develop clinical skills and awareness from a very early stage; (iii) to involve students in the ethical dimension of clinical problems along with key elements of counselling and communication skills from a much earlier stage than before; (iv) to remove the traditional, and often unfair, dominance of departments in curriculum design and, instead, to manage the curriculum through thirteen subject panels (foundation studies; health and society; muscular-skeletal, cardiovascular/respiratory/alimentary; homeostasis; neuroscience; development, growth & reproduction; infection and immunity, mechanisms of disease and therapeutic clinical methods) with representation from many disciplines that "commission" teaching, learning and assessment in the four major "themes" of learning – molecules, cells and tissue systems; people and population; clinical practice; professional skills.

The core programme (approximately two thirds of study time) is presented collaboratively by basic medical science and clinical departments to provide continuity and to ensure that appropriate emphasis is given to topics that are developed at each stage of the course. Followed by all students, this provides instruction on specific key skills

(clinical, communication, numeracy and scientific) and the acquisition of "a defined level" of knowledge to foster an appreciation of the nature of medicine.

The second component of the curriculum (about one third of teaching and learning time) is the Special Study Modules (SSM) that offers a diversity of activities with students able to exercise personal choice and preference at each stage. Initiative and curiosity are the keys to this component which serves to build on knowledge and skills already acquired in the core programme. Activities are complementary and do not encourage simple repetition of areas of study previously completed. Project work forms the main element of SSM's, with the elective period in the final year coming into the SSM category as a good example of such a module.

Teaching and Learning in Child Health

A threat? Any five-year medical curriculum that sets out to integrate vertically and horizontally between specialties and disciplines creates a theoretical danger of blurring the margins between specialties that the understanding of the role of the existence of a particular specialty is weakened, so that when later career choices are made a specialty might be disadvantaged. Fortunately, paediatrics and child health is already well integrated in its clinical practice so this became not such a worry as I had originally anticipated. It also helps if, from the earlier possible stage of introducing students to paediatrics, they can appreciate the common aims of paediatricians and all others who deal with the health of children throughout the world – namely, to foster through the various levels of healthcare (primary, secondary and tertiary) normal development and growth and to minimize as far as possible the effects of adverse genetic and environmental factors and to reduce the emotionally damaging, socially disruptive and financially embarrassing effects on children and their families of illness and disability.

The curriculum: We have continued to have a seven-week specialty attachment in Child Health in the fourth clinical year that provides the main in-depth focus for the medical, surgical and behavioural problems of children. But, and in contrast to our previous curriculum, students beginning this attachment already have a much better insight into the problems of children. Core teaching in the first year will have provided a short attachment to hospital paediatrics, along with other hospital specialties. Ethics, principles of informed consent and confidentiality, understanding the importance of communication and all aspects of good medical practice are part of general teaching in the first and second medical years, with children's problems highlighted at various stages. A course

on growth, reproduction and development in second and third year, gives students a grasp of the basic science of childhood and some common anomalies that arise from abnormal growth throughout the continuum of development. SSMs from the first year onwards have given many students clinical, laboratory and community opportunities to learn about children, including, especially, the importance of multi-professional care and health education. Disorders of children are also, where relevant, included in a lot of other subject panel teaching throughout the early years of the course. The other specialty rotations in the fourth year, especially the medical and surgical subspecialties (ENT, ophthalmology, dermatology, infectious diseases, psychological medicine, reproductive medicine), also provide many learning opportunities to understand and deal with children's disorders. I liken the appreciation of children's problems to a jig-saw. Each piece is part of the course. What we have to do is help students complete the puzzle and, in this, clear definition of educational aims is essential.

Our main clinical attachment is complemented in the fifth year by an eight week course "Medicine in the Community", which provides further opportunities to look at the problems of children "outside hospital" (special needs, social disadvantage, accident prevention, looked after children, etc) and to see how these issues are dealt with in the context of a community network. This is a generic module that demands a break from compartmentalized medicine, builds on earlier specialty training and looks at the interfaces between community, hospital and primary area of care. In this attachment students see patients of all ages under headings that (almost) equate to Shakespeare's "the seven ages of man": i) pre-pregnancy, ante natal care and perinatal care; ii) infancy and childhood; iii) young adulthood and child raising; iv) maturity and service to the community; v) ageing and adapting; vi) death and preparation for death; vii) post death responsibilities, family care and spiritual values. The opportunity to explore the continuity of problems through the ages, especially the long term outcome of children's disorders (an aspect we deal with poorly on the whole) is a major strength of this block of learning.

But, it has always to be emphasized that, with the

comparatively little time available, paediatric teaching for the undergraduate can at most only serve as an introduction to the subject, with emphasis on the common and important problems, to provide a foundation for continuing training after graduation for those wishing further experience in paediatrics and to inculcate attitudes for life long learning. The undergraduate exposure has inevitably, therefore, to be concerned more with principles and perspective than with detail.

Curriculum Delivery: The actual delivery of the curriculum, especially where clinical training takes place in hospitals and community settings away from the main teaching base, as is the general rule in Britain, often poses problems. In Wales, an important mission, and one of which we are proud, is that students have carefully planned clinical attachments throughout the country outside the main teaching center in Cardiff. This inevitably means that in hospitals and other settings (each with their own administrative structures, staff resources and local patterns of paediatrics morbidity) similar experiences cannot be given to everyone. Students learn and are taught largely by serendipity on ward rounds, in clinics and tutorial groups and, even with a syllabus to guide them, there will inevitably be gaps which students must make up for themselves. Table 1, based on 216 anonymously completed independent student appraisals over a 12-month period in 1999, summarizes a range of their experiences with marker core topics during their clinical attachment. There is an unacceptably wide range of educational experiences in marker core clinical topics - whatever the reason for this might be. It is simple to design a syllabus, far harder to deliver it. A real challenge!

Work Place Learning: We often take for granted in medicine what an enviable opportunity is provided for learning with such close involvement with real clinical problems. This experiential opportunity is too little valued by students when compared with the more formal learning opportunity in seminars and lectures. When one or more specific points can be learned from one patient, and this prompts further reading, reference searching and discussion, so much can be learned "at the coalface" - the concept of service-based delivery of teaching. But

Table 1 Student appraisals (n 216) of a sample of core learning experiences

	Clerking experience		Clinics attended		Newborn experience			Teaching
	Children clerked	On call days	General clinics	Specialists clinics	Saw neo-natal resusc	Shown newborn exam	Babies examined	Protected teaching hours/week
Median	19	8	9	4	39%	88%	5	5
Highest	65	18	30	10	-	-	30	20
Lowest	2	2	0	0	-	-	0	0

this, of course, is not new. Complementing these clinical experiences will also be learning opportunities in X-ray meetings, journal clubs, problem-solving sessions, case presentations, lectures etc. But my experience over the years is that students (and also doctors in training) do not always know how best to benefit from these wide varieties of learning opportunities, so full advantage is not always taken of them. Writing down what is being learned (the "doing" part of learning) is not widely implemented. How many wasted hours continue to be spent on seats in clinics, standing at the tail of business ward rounds, observing in operating theatres? To help this "coalface learning", I have developed work pages that are used in parallel with the teaching syllabus. An example is given in Table 2.

Conclusions

The first students to study in our integrated curriculum graduated this year and I am optimistic that the new generation of doctors will be suitably prepared to face the new and varied challenges I outlines earlier. But, it will be many years before we can really judge the success or otherwise of the new approach to undergraduate medical education in Britain. Indeed, will it ever be possible to judge such innovations? Education, in general, is renowned for innovations that are not thoroughly

evaluated. However, only a small amount can be achieved before graduation. Medical education is a life long continuum. "It is necessary to continue a broad education beyond the stage of graduation and into the period when the qualified doctor assumes responsibility for patient care" (GMC Education Committee 1993).

As a clinical teacher, I enjoy the multi-professional contacts that an integrated curriculum brings with it far more than before. But, there is a downside. I find there is far more written work to mark, since paediatrics features, to a greater or lesser extent, in all five years of the course. SSMs are a great new initiative but very time-consuming to direct and mark. In the harsh "new" world of academic accountability, with research assessment placing massive demands on departmental resources, delivering education with equal rigour – but without additional resources – is difficult.

The quality of our students' written work is often outstanding but I do have a concern that sometimes the work produced is simply a "downloading" from other written work that blurs what are really the students own thoughts and analyses. Sometimes, a particularly bright student in print is far from being the same student I might see during a clinical examination or during a clinical teaching session. With spell and grammar checks etc, the final product is often too "sanitized" for my liking. There is still room for end-of-phase "unseen" assessment,

Table 2 Work pages: Examples of how they might be used in an out-patient clinic

Diagnosis/Problem: Child of 11 months with a first urinary tract infection
Learning Issue(s): Importance of keeping on prophylactic trimethoprim until mict cyst also DMSA scan performed
Further Study: Check methods for diagnosing UTI, also national history of reflux
Diagnosis/Problem: Ongoing management of asthma
Learning Issue(s): Importance of reducing house dust mite in the bedroom. Pointless prescribing expensive drugs if emphasis also not given to discourage smoking at home
Further Study: Read more about house dust mite sensitivity. Ask for references on passive smoking and asthma.
Diagnosis/Problem: Short stature in a boy aged 9, picked up a GP surgery because of mother's worry.
Learning Issue(s): Importance of parental size (mother 4'8", father 5'4") in determining final height. Commonest cause of shortness in this country – genetic (familial). Don't forget to measure bone age accurately – help to estimate final height.
Further Study: Arrange to be taught how to measure height properly. Also ask to see how to do bone age. Revise growth charts, distance/velocity growth.

although this might go against current educational theory where continuous assessments seem now to be more important than unseen written work. I wonder if the pendulum has gone too far, another reason why it is so important to keep the clinical examination, the epitome of unseen assessment in clinical medicine.

But, within the intricacies of modern education approaches there must not be forgotten the cornerstone of clinical training, namely acquiring clinical skills. With children now in hospital for such a short time it is often difficult for students to see continuity of patient care. Opportunities for clerking are less than ideal. As a consequence, the depth of the clinical exposure is less and there seems too little time to rehearse the clinical skills of history taking and examination. With the increase in student numbers, this dilution of clinical opportunities will become an increasingly serious problem. Also, if we wish to improve our students' understanding of the

problems and disorders of children and young people, we have to interface better than we have in the past with other specialties who also see children. Reality in the average district general hospital (where so much undergraduate teaching takes place) is that, at any one time, there are as many, if not more, children under the care of the adult specialists than under the care of paediatricians. This has to be recognized in curriculum delivery in an integrated course. But this must be seen not as a threat but an opportunity for students to build up a more comprehensive understanding of children's problems than they had in a more traditional curriculum.

Further Reading

General Medical Council Education Committee
Tomorrow's Doctors, London 1993