

Osler, Flexner, apprenticeship and 'the new medical education'

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These are bewildering times for doctors who teach medical students. The UK General Medical Council (GMC) has reminded them they have a duty to teach,¹ yet stirred up such radical change that their task is unrecognizably different from what they themselves experienced as students.^{2,3} This essay draws on biographies of two people who changed the face of medical education in the 20th century to trace the origins of this bewilderment and suggest a direction for the 21st century.^{4,5} Most of today's doctors just associate the name of William Osler with nodes they were taught about but never see. In Michael Bliss's biography, he comes to life as a master clinician, apprentice-master, and humanist role model. I first became aware of Abraham Flexner as the author of a century-old report that got medical education into the mess it is in today. Wrong. He was a visionary educationalist who raised standards of medicine round the world by wedding it with biomedical science. After vignettes of these two men, I describe what the GMC has recommended and read between the lines of its recommendations. To finish, I suggest the wheel has come full circle. Apprenticeship, central to Osler and Flexner's educational visions, needs to be revitalized.

WILLIAM OSLER

Osler was totally dedicated to the training of young doctors, captured in his epitaph 'I taught medical students in the wards'. He was an astute and sceptical bedside clinician and a keen observer, analyst and synthesizer. He was versed in both the humanities and the sciences. For him, medicine was 'an old art [that] . . . must be absorbed in the new science'. As a person, he is remembered for hard work, equanimity, enthusiasm, and a keen interest in people. Although he made major contributions to pathology, he said doctors should care more about the individual than the disease. Born into a large family in 1847, Osler derived his humanism from the strong Christian values of his parents, who lived missionary lives in pioneer Canada. He adopted role models from an early age, under

whose influence he developed a passion for natural history and a discipline of scrupulous observation. He switched his university study from divinity to medicine and from Toronto, where medical teaching was very poor, to Montreal, where it was still far from perfect. Hard work, an irrepressibly cheerful personality, an emerging fascination for pathology, and the mentorship of a Montreal physician supported his education and drew him to the attention of seniors.

Medical qualification was not an entrée to professional practice in the way it is now. Like many aspiring North American physicians Osler visited Europe, where he studied in London, Berlin (under Rudolf Virchow) and Vienna. At the age of 25, this ambitious and knowledgeable but clinically inexperienced self-directed learner was offered a chair at McGill medical school, Montreal. There he taught students and built up a clinical practice. Lucrative work was monopolized by physicians on the hospital staff, which Osler was not, so he took an interest in smallpox. Attending physicians were expected to conduct post-mortems, a duty that Osler regarded as a natural extension of the history and examination. They were often lax and Osler took over the duty, developing a deep understanding of disease which he shared enthusiastically with students. He was such a popular lecturer that the McGill medical students escorted him en masse to the station when he left in 1884 to take up the chair of medicine in Philadelphia. There he built up his private practice but continued to teach in the dead-house and on the wards, nurturing curiosity and projecting enthusiasm onto his learners.

Osler was recruited in 1889 as foundation physician-in-chief and chair of medicine at Johns Hopkins University, Baltimore. This was to be the epitome of a modern medical school, integrating the values of scientific medicine into clinical practice. Osler introduced a clerkship system that gave students a role in the clinical service. Disease, in his view, was the student's chief teacher, and teaching should be at the bedside rather than in the lecture hall. Teaching away from the bedside was a 'bastard substitute'. It was from Baltimore that Osler published his landmark textbook *The Principles and Practice of Medicine*. By then a major international figure, Osler was invited to take up the Regius Chair of Medicine in Oxford in 1905, where he remained until his death in 1919.

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ABRAHAM FLEXNER

Although not a doctor, this son of an impoverished immigrant family became the most influential medical educationalist in the world. He caused many US medical schools to go out of business, and bitterly regretted that those which provided for women and blacks were hardest hit. He was a pioneer of active, learner-centred education with strongly progressive views on such modern themes as education's social responsibility and widened participation. Abraham was born in Louisville, Kentucky, in 1866, the sixth of nine children. Aged 17, he could take just long enough away from supporting his mother and siblings to complete a classics degree at Johns Hopkins University, but then had to return to Louisville as breadwinner. He found employment as a schoolteacher and quickly distinguished himself as a progressive educationalist. His family was eventually secure enough for him to leave Louisville and pursue his career at the age of 38. He took a psychology degree at Harvard then went to Germany to study education.

Philanthropists with fortunes to spend on the common good were a powerful social force in early 20th century America. Abraham was hired by Andrew Carnegie to advise his Foundation for the Advancement of Teaching on how standards of medical teaching in the USA and Canada could be improved. The publication of his report in 1910 made Flexner a celebrity round the world.⁶ Hitherto, any group of physicians could form a for-profit medical school issuing degrees that were scarcely worth the paper they were written on. Abraham's elder brother Simon, for example, qualified in medicine from Louisville in less than a year without dissecting a body or ever seeing a patient. Over sixteen months, Abraham made no fewer than 174 visits to medical schools—a remarkable achievement when one considers the vast size of the country and the means of transport available to him. The American Medical Association, itself concerned about standards of training but lacking the clout of a monied philanthropy, was quick to team up with Flexner and endorse his recommendations. The key to high-quality medical education was to be science. Medical schools should be research-active university departments linked to teaching hospitals with full-time staff. The study of medicine should have stiff entrance requirements, recruiting graduates who would work towards a doctoral degree. After a 'preclinical' grounding in the scientific disciplines, clinical education was to take place through participation in apprenticeship hospital attachments, supported by bedside teaching. The most respected research universities were to be taken as a benchmark against which other medical schools would be judged, and Johns Hopkins provided a model.

Abraham was now so well known that, passing through London later in 1910, he was called on to give evidence to

the Haldane commission, which was surveying UK medical education. Britain, he testified, had a strong tradition of apprenticeship education by virtue of its clerkship system, but was much weaker than Germany in the biomedical sciences—an observation that must have been piquant in the early years of the 20th century. Abraham's elder brother Simon was by this time a top US biomedical scientist. He constantly reviewed and advised on Abraham's work, doubtless supporting his emphasis on biomedical science. So, the 20th century medical curriculum was born at a time when, in Bonner's words, 'the baffling and terrifying world of illness was becoming intelligible and comprehensible' through biomedical research, particularly into infectious disease.⁵

TOMORROW'S DOCTORS

The GMC took one of the boldest steps since Flexner when it published *Tomorrow's Doctors* in 1993,² and added detail to its recommendations in 2002.³ The subject matter of medical curricula was to be reduced in quantity. There should be a core curriculum with defined learning outcomes and protected time for students to pursue their own interests. Disciplines should integrate their contributions into a thematic, perhaps systems-based, curriculum. Students should have real-life experiences in the early curriculum years and they should continue to learn foundation disciplines in the later years. Those foundation disciplines should include behavioural and social sciences and humanities as well as biomedical science. There should be more emphasis on people and populations, on doctor-patient communication, and on ethics. The curriculum should familiarize students with modern fast-changing healthcare systems, multiprofessionalism, and healthcare in the community. Medical students should understand principles rather than rote-learn facts. They should learn through curiosity. Information and communication technology should be harnessed to support their learning. Whilst lacking the fiscal power of the Carnegie foundation the GMC accredits the certifying exams of medical schools, so no UK basic medical curriculum was untouched by *Tomorrow's Doctors*. Happily, new medical schools have come into existence rather than established ones going to the wall as some did 90 years ago in the USA. Flexner would surely have approved of the effort that is now going into widening participation in medical education.

Clearly, medical students should experience the type of healthcare they will practise and the context they will practise it in. We should capitalize on new educational technologies; and postgraduate education is now so much improved that there is sense in holding subject-matter forward to postgraduate training. Flexner advocated learning through curiosity so there is nothing new in that,

but from here on *Tomorrow's Doctors* is unconvincing on the reasons for change. It cites the need for lifelong learning skills and curriculum overload as reasons, but doctors are already lifelong learners,⁷ and pedagogic education seems intuitively a better way of circumscribing curriculum content than active learning. Integration of curriculum content is perhaps the most controversial of all the GMC recommendations. The tribulations of horizontally integrating clinical disciplines are the topic of quite another discussion,⁸ but the call for medical schools to break open the Flexner/AMA preclinical to clinical sequence is very germane to this one. Intrigued by it, we in Manchester set out to develop a rationale for early experience.⁹ We interviewed people from first-year medical students to deans, and from biomedical scientists to doctors who teach interpersonal communication. Quite a coherent pattern emerged. 'Authentic human contact in a social or clinical context', our respondents suggested, could:

- Orientate curricula towards the social context of practice
- Ease medical students' transition into the clinical environment
- Motivate them
- Make them more confident in approaching patients
- Increase their self-awareness, and awareness of others
- Strengthen, deepen, and contextualize their learning of the foundation disciplines
- Help them learn about the processes and contexts of healthcare, and the role of health professionals.

Medical education, we inferred from those responses, is a process of socialization that needs to start earlier and continue throughout. We have since completed a systematic review which, patchy as the evidence may be, shows that early experience can indeed yield some or all of those benefits and, moreover, help recruit primary care practitioners to underserved populations.¹⁰

Conducting the early experience survey, I detected an inconsistency in the minds of some respondents, particularly basic scientists and academic clinical specialists. Asked why we should provide early experience, they offered a strongly humanist rationale. And yet their conceptions of medical education were dominated by biomedical science. They seemed almost to have two epistemologies of medicine that were not reconciled with one another. *Tomorrow's Doctors*, I suggest, recognized that tension and set out to reconcile it, tacitly acknowledging the importance of biomedical science but giving it a place within a wider framework. Osler, for me, had the balance right. Flexner espoused a biomedical epistemology of medicine that was sorely needed in his time, though it later ran riot in the hands of pedagogues. He, I am sure, would not have

approved of humiliating medical students for not being able to repeat from memory topographical anatomy they had not yet seen applied in life.⁹ He would have predicted that problem-based learning would produce just as good anatomy knowledge as didactic education,¹¹ and was an advocate of behavioural and social sciences ahead of his times.

APPRENTICESHIP

The *Oxford English Dictionary* defines an apprentice as: 'A learner of a craft, bound to serve, and entitled to instruction from, his or her employer for a specified period. Also a beginner or novice.' Flexner was able to put his emphasis on biomedical science because universities could recruit humane clinician scientists and assign medical students to them to learn the 'duties of a doctor'.¹² The 'professionalism' that 21st century medical schools are exhorted to teach their students¹³ is the very set of attributes that learners seek out in such clinician role models.^{14,15} And how can those attributes be taught other than by role modelling?^{1,16-19}

Apprenticeship has come under severe strain, at least in the UK, for several reasons. Wealthy patients have always been able to choose not to be treated by novices, but now everyone has that option. Expertise has become super-specialized and technological in its nature, so students have to learn clinical skills from scores of teachers. As attachments have become more numerous, they have become shorter and the number of learners has increased, so education has become less personal. Traditional bedside teaching skills have decayed as each generation is less exposed to them.²⁰ New educational technologies such as skills training²¹ and problem-based learning²² have brought education within the control of the objective-driven curriculum by substituting simulation for reality. All that sounds depressingly like the curriculum 'without the personal influence of [clinical] teachers upon pupils' that Osler likened to an Arctic winter.

Early experience intrigues me because it is the one component of the new medical education that seems to go in the opposite direction. It brings medical students into contact, albeit brief, with doctors and patients when they would traditionally have been confined to the medical school, learning basic science from scientists. Hoorah for that, but now we have another problem. Pedagogy is very clearly prescribed these days. What is the pedagogy of latter-day Oslers? Bedside teaching, role modelling, and apprenticeship are the names most commonly used, but are any of them in good enough health to be standard-bearer for the new century? *Tomorrow's Doctors* is noticeably silent on teaching in clinical settings.

Table 1 Old and new apprenticeship

Prerequisites for traditional apprenticeship	Constraints in current healthcare system	Possible solutions
<i>Clinician-teachers</i>		
Breadth	Narrowness	Avoid overspecialization in secondary care, and offer apprenticeships in primary as well as secondary care
Integrated practice	Specialization	
Continuity of supervision	Discontinuity	Mentorship
Time	Lack of time	Make sessional commitments to teaching explicit
Teaching accorded high priority	Teaching below service delivery, administration and research in priority	Develop promotion tracks for educators (Ref. 34)
Themselves trained by apprenticeship	Lack of an apprenticeship tradition	Faculty development
<i>Learning environment</i>		
Uniprofessional and collegial	Multiprofessional	Capitalize on multiprofessional teams for apprenticeship learning
Personal	Impersonal	Personalize attachments as far as possible, and make them long enough for learners and teachers to get to know one another
Person-focused	Technology-focused	
Space for students	No space	Give students a base close to where care is delivered
Students living on-site	Students and staff living off-site	Organize residential apprenticeship attachments
<i>Patients</i>		
On hospital wards	More care in outpatient department and community	Deliver it in ambulatory as well as inpatient settings
A rich casemix	Less gross organic disease, more psychosocial illness	Teach 'patient-centred care' that acknowledges the experience of illness as well as the disease process (Ref. 35)
Long stays	Short stays, if admitted at all	Follow episodes of illness across the primary/secondary care interface
<i>Students</i>		
Manageable numbers	Huge expansion in numbers	Disperse learning and ensure individual mentorship

CLINICAL EDUCATION IN THE NEW CENTURY

An answer comes from apprenticeship itself, which is coming back into vogue and adapting to the modern age.²³ New apprenticeship theories hold that it is an oversimplification to 'atomize' professional expertise into knowledge, skills and attitudes because they are too intertwined to be learned in isolation from one another. Moreover, experts have 'tacit knowledge' (can be demonstrated better than it can be put into words),²⁴ and students have to learn it through modelling in practice settings.²⁵ Apprenticeship has been defined as 'legitimate peripheral participation'.²⁶ In the 21st century medical context, that means 'getting students involved in service as much as current [over-]regulation permits'. Apprentices develop a professional identity by socializing into a community of professional learning and practice. New apprenticeship theory rejects extreme conceptualizations of self-directed learning,²⁷ recognizing the importance of the chemistry between teacher and learner in the work-place.^{23,28}

New apprenticeship is supported by some of my own research. 'Good firms' are characterized by the quality of their leadership and the supportiveness of the learning environment, and there are hints that 'clinical teaching' is as much a social as an instructional process.²⁹ Clinical teachers, although bewildered by the pace of change, have very positive attitudes towards learners.³⁰ We have been able to create short moments of contact between the teacher, learner and patient that reintroduce apprenticeship principles to the shift-working National Health Service of today.^{31,32} Our students learn seamlessly across the interface between primary, secondary and tertiary care. Table 1 presents those ideas as generalizable suggestions for apprenticeship in modern clinical settings.

CONCLUSION

Apprenticeship is as relevant a word today as it was a century ago. It demands mutual trust and support between teachers and learners, good use of the rich case-mix going through wards, outpatient clinics and health centres, and

imaginative capitalization on new collegial structures such as multiprofessional teams. The goals of education are too important to be left to chance or whim,³³ so they must be defined rather than left to happenstance, but tacit knowledge and attitudes must be given due recognition and allowed to pass from teacher to learner by role modelling. Concern about accountability must not keep learners away from the sharp end of clinical care, though 'see one, do one, teach one' must be banished for all time. Medical students are as able and motivated learners as any teacher could ask for. The UK National Health Service is an ideal setting for integrated learning. The challenge is not to create a new educational theory, but to re-apply an old one to the fast-changing context of 21st century healthcare.

Note This paper is based partly on presentations to the Medical Society of London and the Osler Club of London.

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