

# Educational methods at McMaster University, Canada

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**SUMMARY.** The methods of education currently being used at McMaster University, Ontario, Canada are new and radical and the principles are described. Some of these methods may have special application in education for general practice.

**T**HE building looks more like something out of "Star Wars" than a medical school, but then the McMaster University Medical Centre was intended to give physical shape to a revolutionary concept of medical education.

McMaster University was first established in Toronto in 1887, but by 1930 it had moved to the nearby steel town of Hamilton at the west end of Lake Ontario. In 1964 the Ontario government committed itself to a new medical school in Hamilton, which was established the following year. Hamilton already had the reputation of being a family doctors' town, and from the start the new school was intended to move away from excessive specialization towards a more holistic view of family and community needs. In particular, the founding fathers of the medical school conceptualized an approach to medical education which has become known as the McMaster philosophy. This meant that learning should be self-directed by the student, based on problem solving and centred on small-group tutorials with continuous evaluation and feedback. While none of these ideas was novel on its own, their combination into a unified approach was unusual, if not unique, in medical education, especially when translated into the physical and administrative structure of a new school. The McMaster University Medical Centre was purpose built to reflect an integrated hospital and medical school in which traditional departmental divisions were broken down. The Medical Centre also has an extensive family medicine unit to which I was attached for three months as a research fellow.

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### Undergraduate curriculum

The undergraduate curriculum at McMaster lasts for three years instead of four, as at other Canadian schools. Not only is it shorter and without formal lectures or examinations, but it is not essential to have done science to be accepted. There are over two thousand applicants for the 100 places a year. These are selected by a complex process which puts as much emphasis on personal characteristics as on academic ability, and involves assessment by members of the community and existing medical students as well as by medical staff. Medicine in North America is a post-graduate subject, with most medical students having a previous degree and being older than their British counterparts. Nonetheless, adequate motivation and the ability to function as part of a group are important assets if a student is to flourish in the McMaster course. The traditional pattern of sequential discipline-based learning with structured examinations has been completely replaced by self-directed learning in small groups with continuous evaluation. This implies a great deal more than the integration of pre-clinical and clinical science, because students are not taught by teachers in the traditional sense, but instead teach themselves by solving problems and develop skills enabling them to keep up with changing knowledge, which is necessary if doctors are to be life-long learners. In addition, students become used to evaluation as a constant informal process involving themselves and others.

### Four phases

The three-year course is divided into four phases, during which students are randomly allotted to tutorial groups for 10 weeks at a time, so that there is time to develop group cohesion without any one student being committed to a small number of fellow students throughout the course. The tutorial group sets its own goals and the tutors are there as facilitators rather than experts on a particular subject. During the first three phases, students are given a series of biomedical problems relevant to the objectives of each phase. A problem

consists of a description of a patient or clinical situation, and questions are posed which can be related to issues such as structure, function, behaviour, and response to stimuli. These issues can then be studied in depth by individuals and the group, using the educational resources of the medical centre. This approach challenges the usual assumptions that blocks of classified knowledge should be learned in an organized sequence, before problem solving, and that emphasis should be on content rather than process. Problem solving encourages active learning and enhances the skills expected of doctors, not least in general practice where patients present as undifferentiated problems. Traditional departmental and disciplinary divisions are blurred so that members of staff have a number of different roles, such as tutors, clinical supervisors, or resource assistants to whom students can go for expert knowledge in particular topics. The organization of the medical school is based on matrix management which recognizes these multiple roles; one person can be a member of a discipline as well as working within the resource of a unit and contributing towards programmes such as undergraduate teaching.

The fourth phase consists of rotating clerkships in which clinical cases rather than biomedical problems form the basis of learning and discussion for each tutorial group; although there is exposure to patients from the beginning of the course.

### **Electives**

In addition to the broadly structured phases there is generous provision for electives. These give additional flexibility to the curriculum and are an integral part of self-directed learning. These electives are the only time during the McMaster course when a student is not part of a tutorial group.

### **Family medicine**

Family medicine is one of the phase four clerkships and can be a major part of electives. Family medicine, like its counterpart general practice, is comparatively recent as a recognized discipline. One of the main differences is that in Canada university departments of family medicine are responsible for postgraduate training whereas in the United Kingdom departments of general practice are primarily concerned with undergraduate teaching. As a result, such departments are much larger in Canada with a strong service commitment so that trainees (residents) can receive practical experience. At McMaster this involves a considerable amount of supervision through one-way glass, with which every consulting room in the teaching unit is fitted. The approach is much more structured than the apprenticeship of vocational training in the United Kingdom. Paradoxically, at McMaster it is the undergraduates who have to teach themselves, albeit in a carefully chosen environ-

ment, whereas postgraduates, at least in family medicine, tend to have their hands held.

Family medicine or general practice is therefore very much part of the McMaster course, and as a discipline is particularly suited to a problem-orientated approach. Students are given a considerable amount of experience in family medicine especially as the distinction between primary and secondary care is blurred, with most family doctors in Canada having hospital privileges. However, because vocational training is based almost entirely on university departments of family medicine, some academic staff may not be involved with undergraduates but are concerned with providing primary care for postgraduates in a teaching environment. This emphasis on providing a model for trainees often takes precedence over research and reflects the need for academic departments in Canada to attract patients for financial purposes, as there is no system of patient registration as in the United Kingdom. Even so, the funding for such departments comes increasingly from sources other than item-for-service payments, and there is occasional concern about the lack of patients for teaching purposes. In these respects family medicine at McMaster is similar to other Canadian medical schools, where such departments are geared to postgraduate training. The main difference is the way in which family medicine is integrated into the revolutionary undergraduate curriculum.

### **A unique experiment**

McMaster is a unique experiment, and the chance of those with such an approach to medical education coming together at the right time and place must have been very small indeed. Attempts to graft the McMaster system onto existing medical schools are not necessarily successful. A considerable commitment and re-orientation of thinking is required by medical staff, and there were some at McMaster who did not adjust to the matrix management with its multiple roles. Others who came after the initial recruitment of staff might not really subscribe to the philosophy of the founding fathers. Indeed, it seemed necessary to have a sort of continuous cultural revolution of educational development to prevent new staff from slipping back into old discipline-based habits.

During my stay there was a workshop on educational objectives which generated a certain amount of controversy. While objectives in the sense of destination are necessary for any educational enterprise, objectives in the sense of how to get there could quickly become self-defeating in the McMaster context of self-directed learning. These tensions were again reflected by specialists who felt that only they had sufficient knowledge and skill to be tutors in certain units, which again ran counter to the philosophy of self-directed learning with tutors being facilitators rather than experts. What was impressive was the genuine commitment to the business

of medical education. A great deal of time and effort went into the preparation of problems and teaching aids such as simulated patients, although tape/slide presentations tended not to be used extensively. On the other hand, computer simulations of human physiology (such as McPuff and McPee) and learning resource material in the anatomy department were in frequent use; and it is worth emphasizing that there were no formal courses either in anatomy or physiology.

### Conclusion

The question is often asked, does it work? The answer is that in three years McMaster produces a doctor from someone with no previous science, and without formal lectures or examinations. After a short period of revision such graduates do as well in the licensing board examinations as those from other Canadian medical schools. It is salutary to recall that in 1975 a Council Directive for the EEC established a minimum requirement of six years for basic medical education (Brotherston, 1979). Whether McMaster graduates make better doctors is another question, and the subject of long-term follow-up studies. It is probable that influences before medical school, and the context within which medicine is practised after qualification, are at least as important as the medical curriculum in determining how a doctor performs. While the McMaster system may leave some gaps in students' knowledge, the majority will certainly know how to learn and most work extremely hard under the subtle influences of continuous evaluation and peer group pressure. If anything, it is the more highly qualified students with specialist knowledge in a subject who become most anxious with the uncertainties of problem-based learning. The length of the curriculum is certainly short by any standards, and the McMaster course has been likened to a gourmet meal taken standing up, but it remains both a stimulus and a challenge to medical education.

### Reference

Brotherston, J. (1979). The EEC Advisory Committee on Medical Training. *Postgraduate News No. 31*.

## Training for family practice in the USA

Eleven years ago, give or take a month or two, there were *no* family practice residency programmes in the United States. Today, there are approximately 375, all of them three-year programmes.

Although a leap from zero to 375 is impressive, it becomes even more impressive when compared with the number of residency programmes in other primary specialties, all of which existed long before family practice received serious consideration as a full-blown specialty. Here are the approximate number of approved residency programmes in the specialties which constitute the core content area of family practice. Compare them, please, to the existing 375 family practice residencies:

Internal medicine	450
General surgery	360
Obstetrics/gynaecology	315
Paediatrics	255
Psychiatry	235

It thus becomes apparent that family practice boasts more approved residency training programmes than any other core content specialty—with the single exception of internal medicine. All figures, incidentally, were provided by the Liaison Committee for Graduate Medical Education.

How many family practice residency training programmes will exist a year from now? Five years from now? Who knows? It's probably safe to say (a) that the *total* will continue to increase and (b) that the *rate* of increase will almost certainly drop some time in the early 1980s. (The rate of increase has been phenomenal and phenomenal growth cannot continue, unabated, forever.)

All of this is especially satisfying to those of us who remember being told that family practice residencies would never materialize because "no one need them". To err is human.

### Reference

*American Family Physician* (1980). Publisher's memo. 21, No.3, 11.

## Comparing dothiepin and amitriptyline

In a double-blind parallel group study, 32 patients suffering from a primary affective disorder received either dothiepin or amitriptyline. Serum concentrations of total dothiepin plus northiaden or amitriptyline and nortriptyline were estimated. A similar therapeutic response was seen with both drugs but there was no correlation with serum concentrations of amitriptyline

or nortriptyline, whereas serum dothiepin correlated positively with clinical response.

### Reference

Mendlewicz, J., Linkowski, P. & Rees, J. A. (1980). A double-blind comparison of dothiepin and amitriptyline in patients with primary affective disorder: serum levels and clinical response. *British Journal of Psychiatry*, 136, 154-160.