

MEDICAL EDUCATION

Physicians for the Twenty-First Century

Report of the Project Panel on the General Professional Education of the Physician and College Preparation for Medicine

ACQUIRING LEARNING SKILLS

To keep abreast of new scientific information and new technology, physicians continually need to acquire new knowledge and learn new skills. Therefore, a general professional education should prepare medical students to learn throughout their professional lives rather than simply to master current information and techniques. Active, independent, self-directed learning requires among other qualities the ability to identify, formulate, and solve problems; to grasp and use basic concepts and principles; and to gather and assess data rigorously and critically.

Recommendation 1 : EVALUATING THE ABILITY TO LEARN INDEPENDENTLY

Medical faculties should adopt evaluation methods to identify: (a) those students who have the ability to learn independently and provide opportunities for their further development of this skill; and (b) those students who lack the intrinsic drive and self-confidence to thrive in an environment that emphasises learning independently and challenge them to develop this ability.

At present, most medical students are taught by methods that make them passive recipients of

information rather than active participants in their own intellectual growth. Evaluation methods that principally require recognition and recall make students place a priority on memorising information transmitted to them by the faculty. While some are satisfied to be told what they need to know to pass examinations in order to progress through a set curriculum that provides defined and circumscribed information, others are intellectually stultified and frustrated by such limitations.

Students who learn independently develop abilities to seek out information and to analyse and apply it to the solution of problems. These students become critical, original thinkers who are constructively skeptical. If they are to develop the ability to be independent lifelong learners during medical school, those who have the capability and skills for learning independently should be identified early and accorded the opportunity to develop further.

Students whose self-confidence and prior experience have not promoted a drive for learning independently should be particularly challenged and provided the guidance they need to develop this ability. Methods for evaluating academic performance that stress the importance of these qualities should be used rather than methods assessing only recognition and recall.

Recommendation 2 : REDUCING SCHEDULED TIME

Medical faculties should encourage students to learn independently by setting attainable educational objectives and by providing students with sufficient unscheduled time for the pursuit of those objectives.

Medical students should be afforded both the time and the opportunity to develop skills to learn independently, but their time is heavily scheduled in most schools. In 40 percent of U.S. and Canadian medical schools, the preclinical curriculum consumes 30 or more hours per week. In nine percent of the schools, students are required to be in attendance between 35 and 40 hours per week. In contrast, 19 percent of the schools schedule only 20 to 25 hours per week, without apparent detriment and with the benefit of providing their students with more time to learn independently. Most medical schools should reduce considerably the time scheduled for the instruction of medical students.

Recommendation 3 : REDUCING LECTURE HOURS

Medical faculties should examine critically the number of lecture hours they now schedule and consider major reductions in this passive form of learning. In many schools, lectures could be reduced by one third to one half. The time made available by reducing lectures should not necessarily be replaced by other scheduled activities.

Lectures are the predominant method of instruction in medical school, but the number of lecture hours that faculties deem necessary varies greatly. At 37 percent of U.S. and Canadian medical schools, more than 1,000 lecture hours, are scheduled for the preclinical curriculum. Forty-two percent schedule between 800 and 1,000 hours, while 21 percent provide only 468 to 800 hours of lecture. The difference between schools at the extremes (468 to 1,639 hours) is more than threefold.

Many faculties state that they want to reduce the number of lectures for medical students, and abundant evidence indicates that the educational yield from lectures is generally low. Alternative methods such as tutorial groups and laboratories achieve more

than the transfer of information. They enhance motivation and promote skills in learning independently. The Project Panel is convinced that educational programmes in many schools would benefit from a reduction in the number of hours currently devoted to lectures.

Recommendation 4 : PROMOTING INDEPENDENT LEARNING AND PROBLEM SOLVING

Medical faculties should offer educational experiences that require students to be active, independent learners and problem solvers, rather than passive recipients of information.

Medical students must be encouraged to develop skills to learn independently because physicians must solve clinical problems that do not always fit classical patterns as well as gather and apply new knowledge and technology to diagnose and treat classical clinical problems. Problem solving involves a high order of intellectual activity; it requires knowledge of basic concepts and principles and skills in obtaining and correlating information.

Some medical faculties have developed problem-solving methods of teaching that require students to seek out, rather than be given, information. These methods emphasise the formulation of hypotheses, the critical evaluation of data, and the integration and application of new knowledge to the analysis and solution of problems. Rather than being mere expert reservoirs of specialised factual information, faculty members as tutors are guides who assist students to develop approaches to problems. The Project Panel believes that problem solving through learning independently will better prepare medical students to use new knowledge and new technologies throughout their careers.

Recommendation 5 : USING APPROPRIATE EVALUATION METHODS

In medical schools whose programmes emphasise the development of independent learning and problem-solving skills, the evaluation of students' academic performance should be based in large measure on faculty members' subjective judgements of students' analytical skills rather than their ability to recall memorised information. The Association of

American Medical Colleges should institute a programme to assist faculties in adopting and using evaluation methods to judge medical students' abilities to analyse and solve problems.

The methods used to evaluate medical students' achievement greatly influence their approach to learning. A new emphasis on active, independent problem solving will be undermined if evaluation methods are not congruent with this approach to general professional education.

The present, passive system of medical education is based largely on memorisation and recall. In over 70 percent of U.S. medical schools, students are required to take the nationally standardised, multiple-choice examinations provided by the National Board of Medical Examiners; in more than 50 percent, promotion and/or graduation are contingent upon passing them. To a limited degree, multiple choice tests can be used to assess problem-solving abilities, but they largely measure a student's store of memorised information. They do not assess learning skills that medical students should acquire in order to keep pace with medical progress.

Standardised examinations cannot replace reasoned, analytical, personal evaluations of the specific skills and overall abilities of students. The objectivity of standardised examinations is often lauded in defense of their use. Scaled scores,

measured against the performance of a large population, are considered more valid than subjective judgements by faculties of students' work. Yet, such personal judgments are essential if future medical school graduates are to be analytical, critical problem solvers who know how to manage information rather than simply to recall it. Personal judgment is characteristic of evaluations of performance in the clinical phase of medical education, as well as in the actual practice of medicine.

Recommendation 6 : INCORPORATING INFORMATION SCIENCES

Medical schools should designate an academic unit for institutional leadership in the application of information sciences and computer technology to the general professional education of physicians and promote their effective use.

Computers are powerful tools for education and for information management and analysis. The use of computer systems to help physicians retrieve information from the literature and analyse and correlate data about patients can be expected to grow. At present, the use of computers in medical education and patient care is limited. Many faculty members are less familiar with computer technology than are their students. Basic research is needed on the use of electronic information systems in medical education. Academic units are needed to provide an institutional focus for such research.