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EDITORIAL

Knowledge: A Mountain or a Stream?

Theories about the nature of knowledge and methods of education have been debated since the days of ancient Greece. Is knowledge a mountain of fact for the learner to conquer or is it an ever-changing stream of theories and new conceptions through which one must learn to swim? Should students master facts or develop problem-solving skills? Today, medical and graduate education in the biomedical sciences is failing to balance these two approaches. Unless we begin to confront this imbalance soon, our future physicians and researchers will not be adequately trained for the emerging health care environment.

Far too much medical and graduate education imprisons students in dark rooms to be force-fed lumps of information. At varying intervals, after students have digested mountains of facts and the occasional abstract intellectual morsel, they are asked to pass examinations standardized to reflect a consensus of current knowledge. This process encourages students to observe rather than engage the world. In my view, the professional education produced by this method is not only too static and too passive, it is too narrow and too arrogant, lulling our future leaders into a false sense of wisdom.

Medicine, like all branches of science, needs scholars who are able to develop appropriate "rules of evidence" and then apply those rules to the continuously flowing stream of new data to determine what is relevant. Successful professionals will need to be able to use information technology to access critical information quickly and integrate it into their constantly changing perception of the world. They will be committed to staying in the stream, despite its fast current, in order to grasp the rare informative nutrients as they flow by. In the basic biomedical sciences and in clinical disciplines, we also need far more individuals who are capable of synthesizing concepts across streams of data from many different disciplines. Their quest must be to acquire insights that transcend individual data streams to capture the whole of a problem and its potential solutions.

Our academic health centers are white-knuckled in fear that their historic missions of education, service, and research are threatened from the outside. One major concern is the rise of managed health care and its accompanying decreases in clinical earnings, which have traditionally helped to subsidize the costs of medical education. Yet I believe that a greater threat may lie within the halls of academe. If we remain dedicated to minor revisions of past educational approaches, our prospects will be dim indeed. In addition, education, research, and patient care are all increasingly relying on a new set of evaluative disciplines: biomedical and biotechnical ethics, clinical epidemiology, informatics, health services research, outcomes analysis, and value management. These emerging knowledge bases must become part of a constantly evolving biomedical curriculum.

If we survey the current curriculum and look toward future needs, a strong argument can be made for turning our lecture halls into learning laboratories that are focused on the most serious issues in health care, including health care delivery. We all learn most easily when the learning experience is directed toward solving a real everyday problem and uses a rigorous approach in which the effectiveness of an intervention can be readily measured. Multidisciplinary teams of faculty and students can thus pursue, as legitimate educational projects, some of the real problems facing our clinicians and our health care and health education institutions. Solutions found in one location can be shared with neighboring institutions, so that all will be able to learn from each other.

Tackling real problems will require searching the data streams with tenacity, nimbleness, and a sense of humor. The initial attempts at integrative stream-based education will most likely be messy. But when a few classes achieve the first amazing successes, more and better strategies for data streaming and integration will emerge. Such successes in the health sciences could prove useful to the entire university.

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