Teaching and learning

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It is unlikely that a student who is unskilled in untangling negative statements:

- (a) will quickly understand multiple choice items written in this way*
 - (b) will not quickly understand multiple choice items written in this way*
 - (c) will quickly understand multiple choice items not written in this way*
 - (d) will not quickly understand multiple choice items not written in this way*
- University of Victoria, British Columbia (Web site 3 listed below)

All health care professionals owe a debt to the next generation and to the community in which they have the privilege to serve. The responsibility is not only to teach learned skills but also to actively acquire new knowledge for improving one's own practice so that the next generation can build on this foundation. In this regard, teaching and learning are one and the same. The means of knowledge transfer in medical education that has been used for generations is simply apprenticeship with a measure of shame-based learning. Although tried, these means are certainly not true. The field of educational psychology is devoted to understanding and improving the process of learning.

Unfortunately, the practical benefits of educational psychology are only applied to those who are 'gifted' or have learning disabilities. Clearly, applying these techniques to just the two tails of the bell curve leave the vast majority of the population untouched. The problem perhaps lies in an imprecise self-assurance of one's own learning abilities. If the self-taught skills have been previously successful, there is little need for improvement. Hubris aside, educational psychology details techniques that can correct deficiencies and fortify strengths to transform average learners into exceptional learners.

For example, suppose one is given a list of concepts and course objectives. What strategy should be employed to internalize or learn these items? The brute-force strategy would simply be to make a list and continually

repeat them or generate a mnemonic device until they are committed to memory. While this may be suitable for some types of learning, this technique merely emphasizes recall and does little to promote true understanding. As such, there will be no such application of this knowledge to seemingly unrelated contexts (so-called far-transferance). Another technique may be to generate a concept map. This graphic form of learning puts core ideas in the centre and links to peripheral ideas with further arborization of more specific concepts. This type of active learning not only fosters recall, but also promotes linkage of concepts. Add to this peer review and evaluation by which learners motivate and dispel one another's educational anxieties, and you have taken a major step toward true learning.

Classical theories of learning and development are elegantly explained on the Web. Reviewing these theories allows one to evaluate one's own learning style and to learn from other unrealized methods. The application of these theories must be done with a clear understanding of their limitations. For example, operant conditioning reduces education to the Pavlovian dog, in which a reward is offered for performance. Critics of this approach charge that this removes intrinsic motivation for further learning once the reward is withdrawn. To my ken, another key limitation of these theories is that they emphasize socialization as the major influence and pay little regard to intrinsic nature, which may have a genetic basis. For example, is a child who comes from studious parents still likely to be studious if he or she is placed in foster care? Perhaps such questions are best left to child psychologists or even criminologists, but they do serve to emphasize that students bring their own unique background to the learning encounter. This is composed of innate aptitude and personal experience. As such, teaching and learning are not one-size-fits-all methodologies. Both teachers and learners need to focus on individual student characteristics such as motivation, curiosity and anxiety.

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For comments or to suggest a Web site for discussion in a future column, write to pgmalik@hotmail.com

The cognoscenti of medical education have decreed that optimal learning is relevant, integrated and active. The foundation for medical knowledge is set forth in objectives by the Medical Council of Canada and the Physician Competency Framework developed by the Royal College of Physicians and Surgeons of Canada. These documents are integral to ensure not only national educational consistency but also to spearhead grassroots quality improvement. The actual logistics of how to achieve these objectives and competencies vary greatly among institutions, courses and professors. Fortunately, medical education committees, with the assistance of educational psychologists, have distilled methodologies proven to engage students and that are easily integrated into modern curricula.

At the core of education lies evaluation. For some students, this is the only motivation for learning, but it is much more than that. It forms part of a safeguard for future patients from incompetence and is also used as an internal quality check of teaching methods. Unfortunately, evaluation is rarely done well in that it gives a superficial assessment of understanding. To rectify this, a useful schema for evaluation, known as Bloom's taxonomy of educational objectives, may be incorporated. This hierarchy establishes learning as starting from a base of foundational knowledge and progressing sequentially to comprehension, application, analysis, synthesis and evaluation. Many evaluations only focus on the first tier – knowledge – in the form of fact-based recall questions. Questions that ask one to list, identify, define and describe are examples of knowledge evaluation. In contrast, questions that ask one to combine, integrate, rewrite and modify are

synthesis-probing whereas those that ask one to assess, rank, grade, explain and defend probe the student's ability to evaluate. Bloom's taxonomy can be used not only to examine the learner, but also to form the basis by which a lecture is delivered. Facts are presented at the beginning of the lecture and the application of those facts is demonstrated toward the end.

As is typical for hierarchies, Bloom's taxonomy stipulates that learning cannot progress without mastery of lower levels. A contrasting approach to education, and one that is proving popular, is problem-based learning (PBL). In PBL, students start with a relatively straightforward real-world problem and work through the problem in small groups, with teachers being facilitators rather than repositories of knowledge. Components that add complexity are gradually added and guidance by the teacher is gradually withdrawn (guidance-fading). PBL has many advantages including, but not limited to, learning in a real-world context, fostering curiosity and actively processing new information on the basis of learned concepts. In some ways, it is more difficult to do because facilitators must be more actively involved; they cannot simply give the same lecture year after year. They must adapt to the discussion generated by each group.

By and large, health care professionals are motivated to learn and have at least average if not above average learning skills. One may even go so far as to say that they are intelligent, although this is not universally accepted. Regardless of whether an affiliation with an academic institution exists, all physicians must be both students and teachers for the sake of professional development and enjoyment.

Selected sites

1. Wikipedia
 http://en.wikipedia.org/wiki/Educational_psychology
 http://en.wikipedia.org/wiki/Bloom%27s_taxonomy
 http://en.wikipedia.org/wiki/Problem_Based_Learning 2. University of Victoria, British Columbia
 http://www.coun.uvic.ca/learning/critical-thinking/concept-mapping.html
 http://www.coun.uvic.ca/learning/exams/blooms-taxonomy.html 3. University of Victoria – Multiple choice questions
 http://www.coun.uvic.ca/learning/exams/multiple-choice/ | <ol style="list-style-type: none"> 4. Queen's University – e-Teaching Collaborative
 http://meds.queensu.ca/eteaching/help/article.php?id=026
 http://meds.queensu.ca/eteaching/help/ 5. Medical Council of Canada
 http://www.mcc.ca/Objectives_Online/ 6. The Royal College of Physicians and Surgeons of Canada
 http://rcpsc.medical.org/canmeds/index.php 7. Thinkmap Visual Thesaurus – Concept Map for Words
 http://www.visualthesaurus.com/ |
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