HOW TO LEARN AND TEACH IN MEDICAL SCHOOL: A LEARNER-CENTERED APPROACH

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By

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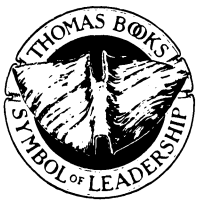

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For Jan, Mike, Shaun, and Kev

PREFACE

This book can be used by students, faculty, and administrators to enhance the process of medical education. Medical students can use it to develop and refine their learning skills, assess their individual learning needs, identify resources to meet these needs, and to prepare themselves for critical learning events and transitions. Faculty can use this book to understand the learning process and develop teaching skills, thereby providing a framework for critically assessing how they teach. Administrators can use it to expose inadequacies in the medical education process and to strengthen the teaching and learning environment.

Certain chapters of this book could serve as required readings for a medical school course on learning. The development and implementation of such a course, and the commensurate application of the espoused principles of learning and teaching to the educational process, would signal true medical educational reform. It would signify that critical attention is being paid to those aspects of learning medicine thought to be crucial: reading the literature, self-directedness, critical thinking/problem solving, lifelong learning and creativity. Such a course would be as important as any basic science course or clinical rotation to the training of future physicians who would use these skills throughout their professional lives.

The book also could serve as a foundation for faculty development with medical educators. In this regard, Part I provides insight into *how* medical students learn and has significant implications for teaching. Parts II and III provide *practical guidelines* for teaching and curriculum development from a learner-centered perspective.

M.E.Q.

INTRODUCTION

Learner-centered medical education focuses attention on the student. This title implies a rather radical shift from the status quo which focuses primarily on medical content.

Several problems with a *content-oriented* approach have developed. First, much of the knowledge gained in medical school will be invalid, or at the very least outdated, by the time the student enters practice. Alfred North Whitehead, an eminent educator in the early twentieth century, reminds us of the ephemeral nature of knowledge when he states: "Knowledge does not keep any better than fish" (1929, p. 98). This rather unappetizing notion is particularly applicable to medicine, where the half-life of knowledge is more short-lived than in most disciplines. Concerning the medical literature, which is a repository for this knowledge, John S. Billings, the founder of *Index Medicus* states: "Nine-tenths at least, of it, becomes worthless and of no interest, within ten years after the date of its publication, and much of it is so when it first appears" (1887, p. 63).

A second, related problem with the content approach to medical education is that because the volume of information continues to escalate at such a rapid pace, there is *too much* content to be learned. This problem has been raised by many medical educators. As Derek Bok says: "The growth of scientific knowledge itself is pressing hard against the familiar notion of what it means to think like a doctor. The constant flow of new discoveries makes impossible demands on human memory" (1984, p. 36). Although many have alluded to the problem, few have offered viable solutions.

A third problem with this current orientation is that the heavy volume of content to be learned (along with the accompanying educational methods chosen to *bestow* it) has completely *turned off* many students. Learners enter with high expectations for learning and teaching and shortly lose them along with their motivation to learn. The ever-increasing volume of information presented forces students to superficially learn

material which they view as only peripherally related to their impending professional lives. The *system* also forces them to neglect learning some of the content which they may feel is relevant to the practice of medicine because it *won't appear on an exam.*

Finally, a content-oriented approach fails to prepare learners to continue to learn on their own. With such an emphasis on content, the *process* of learning is neglected and often devalued. Despite the medical information implosion, and *lip service* paid to *self-directed, lifelong learning,* such a prerequisite to competent clinical practice is not adequately addressed.

Learner-centered medical education is a viable alternative which addresses the shortcomings of a content-based curriculum. It is not simply a shifting or re-packaging of content (e.g., organ-based approach) which is commonplace today in curricular reform. Instead, it focuses on preparing the student (and ultimately the physician) to be a competent, effective, efficient, and motivated learner. The emphasis is on the development of a set of learning skills which will enable the medical student to learn in medical school *and beyond* from teachers, from him/herself and from patients.

Because learning content is secondary to learning skills, the inevitable demise of *truth* is no longer a problem. It is fully expected that this will occur and the learner is poised for this occurrence. With the pressure off the teacher to convey, and the student to learn *all* of the content, both can be selective in the content chosen as the raw material for developing necessary learning skills. With the emphasis on learning skills and the reduction of volume, true learning with understanding can take place.

The experience of greater and deeper mastery along with exposure to teaching methods which are engaging and exciting will restore motivation and creativity to the medical students's learning experience. For this type of learning to take place, teaching must take on a new meaning. Teachers must not only know how to plan a learning experience but must prepare the student to plan a learning experience for her/himself. Teachers must become *flexible* in the use of teaching behaviors depending upon the needs of the learner.

Finally, for learner-centered medical education to flourish it must be set in a *proper milieu.* This entails a setting where the learner and learning come first, growth on all levels is fostered, and differences among learners respected.

Learner-centered medical education is the inevitable next step in the process of revitalizing medical education. In this book some principles and guidelines for undertaking such revitalization are put forth. It will be up to faculty, administrators, and the students themselves to apply these principles and guidelines to the learning-teaching process.

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HOW TO LEARN AND TEACH IN MEDICAL SCHOOL: A LEARNER-CENTERED APPROACH

Part I

THE LEARNER

INTRODUCTION

In this section I will examine the ways in which medical students learn. I will describe the skills necessary to learn medicine and present exercises that students can use on their own, or within a course, to refine such skills. Mastery of these skills will enhance academic performance in medical school and residency and facilitate independent learning after formal training is finished. Medical education must undergo a paradigm shift in favor of the learner; a move away from predominately providing medical knowledge and skills toward teaching *how* to learn medicine. The need for such a shift has been recognized in the medical education literature for many years. Consider the wisdom and foresight of Willard Rappleye, head of the Commission on Medical Education for the Association of American Medical Colleges in 1932: "... medicine is not taught by a faculty but is learned by one's own efforts, and the teaching is a question of stimulating each student instead of spoon-feeding him" (1933, p. 366).

Alan Gregg (1957), director of the Division of Medical Sciences of the Rockefeller Foundation, echoed this call for educational reform some twenty years later. He also began to characterize what was required:

> No school of medicine is worthy of the name that does not teach its students how to learn from experience as well as before experience, how to observe and reason wisely.... He teaches best who shows his students how to learn: not what to think in 1953 but how to think and learn to think in that long stretch of days awaiting you till, let us say, the year 2000. (p. 50)

Those concerned with medical education had not been alone these years in calling for a new paradigm for learning and teaching. Theorists concerned with higher education in general also were calling for reform with emphasis on how to learn. (Rogers, 1969).

Medical educators gradually have come to recognize that providing

the necessary medical knowledge and skills is both an unrealistic task and insufficient preparation for future medical practice. It has now become increasingly apparent that medical education must focus on the *process* of learning to overcome the constraints associated with expected mastery of an increasingly excessive volume of medical content in a limited time, and the continuously shrinking half-life of medical knowledge and skills. This gradually unfolding enlightenment has been accompanied by a perceived need to view learning as a lifelong process for which medical students must be fully prepared. Smith states (1985):

> The true physician never graduates from medical school; he simply transfers from Harvard, Yale, the University of California at San Francisco, or wherever medical education has been started into a new and personalized "medical school." In this self-created school, he himself will be both faculty member and student. . . . It is imperative that we prepare our students for faculty membership in this second, intensely personal, and infinitely more important medical school, if, in fact, we know but how. (p. 108)

Unfortunately, we have not yet demonstrated that *we know but how.* Over the years, we have been told repeatedly that it is time to focus on skills which would enable learners to find solutions to complex problems and to ensure that they were prepared to continue learning independently throughout the practice of medicine. There has not been a commensurate unified process of developing medical school programs and strategies to meet these defined learning needs as there was in the early part of the twentieth century when the standardized medical school curriculum was adopted. We have not demonstrated a clear understanding of how *learning how to learn* can be implemented in the medical school curriculum.

Evidence that little progress in implementation has been made is reflected in the "highest priority" of the Proceedings of the Josiah Macy, Jr. Foundation, published more than three decades after Alan Gregg's proclamation, and more than a half century after Rappleye's report. This new priority states:

> Give more educational freedom to our medical student colleagues, trust them, and help them develop the skills they need to become self-reliant and effective lifelong learners. (Neufield, Bearpark & Winterton, 1989, p. 21)

As the perceived need for a new paradigm has strengthened in recent years, bold new initiatives which attempt to address some of the shortcomings have been implemented (Johnson & Shuster, 1992). Despite these noble efforts, we still lack a uniform notion of how medical students learn most effectively. What is needed for true reform is a clear and

comprehensive picture of the skills required to learn medicine during medical school and beyond. This picture must be framed by solid learning theory.

It is the scientific approach itself which should guide our journey into the medical learning process. Eisenberg (1988) states:

> The fact is that medical education, far from being *too scientific,* suffers from too much emphasis on memorizing evanescent *facts* and too little on science as a way of framing questions and gathering evidence. (pp. 485–6)

Clearly, critical thinking, which includes the ability to solve problems, must be an important learning skill in the new paradigm.

The role of memorization, on the other hand, has been called into question. It has come to be associated with the term *rote* and has been overemphasized in the attempt to manage the *swelling* of content. Effective memorization, however, is essential to establishing a knowledge base.

The new paradigm for learning also would include the skill of self-evaluation. Barrows (1989) highlights the importance of this learning skill to clinical education:

> Students should be asked to assess their own performance with a patient, determine what they must learn to make a more satisfactory diagnosis and treatment plan, and identify the learning resource to employ. They should then be given the opportunity to dig out what they need to learn and come back to re-evaluate and improve their performance. (p. 49)

Critical thinking, memorizing, and self-evaluation are three examples of the skills necessary to learn in medical school. Barrows (1985) helps us to differentiate and integrate the levels of learning represented by each of these skills:

> . . . the medical students we educate must acquire (1) an essential body of knowledge, (2) the ability to use their knowledge effectively in the evaluation and care of their patients' health problems, and (3) the ability to extend or improve that knowledge and to provide appropriate care for future problems which they may face. (p. 3)

Using these three levels to frame our learner-centered approach we could describe the necessary learning skills as follows. First, to master a body of knowledge and to continually upgrade it, students must be able to effectively and efficiently read medical literature with comprehension and observe and record information presented verbally as well as visually. To store this information for use as knowledge, they must actively memo-

rize this information with meaning and be able to access medical information now and in the future using new technologies. To use their knowledge in a clinical context with patients, students must acquire the basic learning skills of problem solving and communication. Finally, to be able to continue to learn independently after formal training, students must learn in medical school how to assess their own needs and to plan for, and evaluate, their own learning. The learning skills are summarized in Figure 1. Formal training in all of these required skills should begin on the first day of medical school.

Level	Task	Skills
I. Knowledge	Gathering, encoding and comprehending information	• Reading • Listening • Observing
II. Application	Using knowledge to gain new knowledge and solve problems	• Memorizing • Problem-Solving • Communicating
III. Self Instruction	Planning and implementing self-directed learning	• Analyzing needs • Developing goals • Identifying methods • Self-evaluating

Figure 1. Levels of learning with associated tasks and skills required for lifelong, learner-centered medical education.

This list of learning skills is not meant to be exclusive but rather to provide a foundation of *core skills* upon which the paradigm for learning in medical school will be built. They are the tools necessary to gather, encode, integrate, transfer, retrieve and use knowledge. As such, they are the foundation of *understanding* and *action.* The progression of skills from top to bottom represents an inverted hierarchy in which *higher order skills* incorporate elements of *lower order* skills. That is, gaining proficiency in skills at the top will help the learner to become proficient in the use of skills at the bottom. Conversely, students may experience difficulty becoming proficient in *new* learning skills if they haven't mastered *earlier* ones. The progressive order of skills reflects potential increased complexity and depth of learning gained from the use of each skill.

In sum, the evidence suggests that true curriculum reform in medical