

The Importance of Becoming a Medical Educator

The Importance of Becoming a Medical Educator:

*The Case for Teaching Doctors
to be Teachers*

By

Anthony Berman

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This volume is dedicated to the many learners, from pre-K through medical school and beyond, whose learning was facilitated by the author and who convinced the author many times over that good teaching is good teaching, regardless of the learning arena or the subject to be explored.

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INTRODUCTION

Why do doctors need to be teachers? Physicians (and other healthcare professionals) are often thought to be effective medical educators simply because they have completed the required courses leading to their degrees. They undergo many years of education in order to graduate, but instruction in the learning sciences and in effective techniques for teaching adults and children is usually not included in most healthcare curricula. Physicians are rarely provided with instruction in teaching others; they are expected to teach without the support they need in order to become effective medical teachers.

The word for doctor comes from the Latin *docere* (“to teach”) ¹, and in Latin the word *doctor* is defined as a teacher or an instructor ². A *doctor* was once defined in English as a teacher or a learned man ¹. Some doctors develop a knowledge of learning science and a repertoire of effective teaching skills on their own, but most need guidance and/or mentorship in order to become effective teachers. Yet in most practice settings, especially in academic medical centers, they are expected to teach both other health professionals and their patients without the support they need in order to become effective medical teachers. Developing effective medical teachers is a complex task that can best be achieved by providing them with the understanding, knowledge, and tools they need to become effective medical educators. Most doctors would benefit greatly from direct instruction regarding how to become teachers.

Although a thorough knowledge of medicine is often considered all that is needed to become an excellent medical educator, and in most academic medical centers physicians are expected to effectively educate others in the practice of medicine just because they have been educated in the practice of medicine, earning a medical degree does not automatically make one an effective medical educator. The effectiveness of any teacher is determined by the effectiveness of student learning. It has been several decades since Katie Haycock found that neither courses completed nor degrees earned by teachers correlated directly with student learning ³. Developing a physician into a teacher is most definitely a complex task. Just because the word

doctor comes from the same Latin word for *teacher*, it does not automatically make every doctor an effective teacher⁴.

There are, indeed, a variety of factors that go into making an effective teacher in any educational setting. Some are related to the individual instructor while others relate more to the environment in which the learning takes place. Issues related to the learners also play a role. A few rare physicians come across these skills naturally, and a few develop these skills by earning advanced degrees in education, whereas most others require mentorship in order to develop the skills and dispositions common to effective teachers in any educational setting. While some medical educators easily embrace these attributes through trial and error, most need guidance and practice in order to become effective teachers.

It is hoped that by reading this book and discussing its content, doctors (and other healthcare professionals) will be better able to serve their patients because they will know how to effectively teach. They will know how to better teach future doctors, they will know how to better teach current colleagues, and most importantly they will know how to better educate their patients.

CHAPTER ONE

TEACHING/LEARNING

What is *learning*? In response to this question, many definitions have been provided. A dictionary-like definition might be gaining understanding or acquiring knowledge of a skill¹. In an academic setting, it could be defined as processing information to gain knowledge and meaning. My graduate students often defined it as gaining meaningful knowledge and using it purposefully over a lifetime. On a more basic level, it could be defined as the small stones that build the mountain of knowledge. A common definition is a process which results in change of behavior. For the remainder of this volume, however, I prefer defining learning as connecting new information with prior knowledge to create new knowledge.

What is *teaching*? As an undergraduate education student, I had it described to me by my mentor, George Walter, at Lawrence University as being a Master Organizer of Learning Activities. Through many years as a practicing educator, I have heard it defined by theorists as being the Guide on the Side rather than the Sage on the Stage. Again for the purposes of this book, I choose to define it as doing *anything* necessary to facilitate learning. I have always said that I would literally stand on my head if it would help my students learn, and I actually did that in order to demonstrate the concept of peristalsis to a bunch of fifth grade science students. I am no longer able to assume this position, so I will leave it up to the reader to imagine what that must have looked like and why a young teacher might stand on his head to demonstrate the concept of peristalsis to his students.

We know many things about learning. We know it is complex, requiring effort from both student and teacher. It is an ongoing process rather than a singular destination. It is multifaceted and multidimensional, not always fitting into concise black and white boxes. But most importantly, it is a beautiful, enjoyable activity for both student and teacher when it is effectively facilitated by an effective educator.

According to William Glasser ⁵, we learn:

10% of what we read
20% of what we hear
30% of what we see
50% of what we see and hear
70% of what we discuss with others
80% of what we experience personally
95% of what we teach someone else

Yet, how do many/most medical educators teach? Texts are assigned to be read. Lectures are prepared and delivered. PowerPoint after PowerPoint are shown. Why? Because it is easier, it takes less time, and it is thought to be more efficient.

But teaching is not always easy and cannot always be efficient! Teaching is not necessarily standing in front of room full of people and talking. Teaching takes both time and commitment. Effective teaching is like a bunch of rubber bands. If TEACHING is not stretched far enough, IT does not do its job. If IT is stretched too far, IT breaks. The IT, in this case, could be the teacher, the student, or the learning. The job of an effective teacher is to put oneself somewhere in between!

This is the art of teaching. Teaching is both an art and a science. It is a science because teachers can be taught some things; it is an art because teachers must find some things within themselves. With effort and with guidance, medical educators can get better in both areas.

Yes, teaching is extremely difficult. Just how difficult is teaching? Perhaps James H. Stronge said it best:

“Recognizing and understanding for a teacher is like getting into the driver’s seat of a 5-speed, stick-shift automobile. The ineffective teacher manages to get the car in gear, but cuts the engine off at every stop sign, The effective driver, like the effective teacher, abruptly and simultaneously handles multiple tasks and multiple meanings without losing sight of the goal of moving toward a specific destination.”⁶

Developing a physician into an effective teacher is most definitely a complex task, just as developing a safe driver is a complex task. If it were an easily achieved endeavor, Stronge went on to say that all schools (including medical schools) would have long ago placed effective teachers in all learning environments based simply on their credentials and learning experiences. But medical educators must remember becoming an effective teacher “requires as much attention and preparation as the percussion of a chest if it is to be fulfilled successfully”⁷.

The Four Stages of Teaching

Gerald Crow⁸, expanding upon the earlier work of Dennis Fox, has described four stages through which an effective teacher travels. Each of these stages is described by a series of verbs regarding the primary actions in which a teacher at this stage engages. In order to become effective and remain effective, a medical educator usually must pass through each stage and seek to become comfortable at Stage 4.

- **The Stage 1 Teacher**
Most teachers start out at this level, attempting to tell, transmit, give, convey, or transfer information directly to the student. A Stage 1 teacher tries to inform the student and provide repeated drills as would an athletic coach.
- **The Stage 2 Teacher**
As a teacher gains experience, more effort is placed on developing, shaping, and inspiring students. A Stage 2 teacher demonstrates, reinforces, and persuades students to learn by placing greater emphasis on motivation to produce a product.
- **The Stage 3 Teacher**
Teachers at this level begin the transition to the role of facilitator by leading, guiding, sharing, and suggesting. A Stage 3 teacher collaborates with students as they explore the content together and then works to validate student efforts.
- **The Stage 4 Teacher**
When teachers become mentors, they are better able to develop and cultivate more effective, self-directed learners. A Stage 4 teacher plants ideas, then encourages, nurtures, and challenges students to learn, enabling them to learn while the teacher guides the process from the sidelines and intervenes only when necessary.

Myths of Learning

The Association for Supervision and Curriculum Development ⁹ has advanced seven myths of learning, five of which are directly applicable to

medical education. In order to be most effective, it is important for medical educators to remain aware of what is myth and what is fact regarding each of the five statements.

- **Myth 1** – Some part of our anatomy must be in contact with a chair at all times in order to learn.
Fact – *Our ability to learn by experience diminishes in direct proportion to the amount of time we spend sitting.*
- **Myth 2** – The person who does the most listening does the most learning.
Fact – *The person doing the most talking or moving or writing is doing the most learning.*
- **Myth 3** – The best way to teach is to be a “sage on the stage” and give information in a well-planned lecture.
Fact – *We remember 20% of what we hear. If we want someone to “hear” something, we should lecture. If we want someone to “learn” it, we need to be the “guide on the side” and involve them.*
- **Myth 4** – Fun is marginal to learning.
Fact – *Not only do we learn best and remember more when we enjoy success at an appropriately challenging experience, we also will be more willing to seek out other challenging learning experiences.*
- **Myth 5** – The only person who should be the “sage on the stage” is the expert in the field.
Fact – *We are all in the process of becoming experts in something. The more of our knowledge we share with others, the more we learn.*

Active Learning

To be effective, a teacher must understand the learning process and how students learn. Central to this understanding is the realization that in a learning situation those who actively do the most learn the most. If teachers are *doing things*, they will be doing the learning; if students are *doing things*, they will be doing the learning. After all, learning is

definitely not a spectator sport. It is, therefore, essential for teachers to actively involve students in the learning activities whenever possible.

Authentic Learning

Authentic learning is learning that is as close to the actual skill to be learned as possible. One can begin to learn about shooting a free throw by reading a book written about basketball techniques, listening to a lecture presented by an outstanding basketball coach, and watching the NBA player with the highest percentage of made free throws. Until the aspiring basketball player stands at the free throw line and practices shooting the ball, however, learning cannot be said to be authentic. Likewise, an aspiring surgeon will not truly engage in authentic learning until that individual actually participates in operating room procedures. The reading, the listening, and the watching are all part of the learning process, but the learning will not be solidified until the activity, skill, or task is experienced personally.

Reflective Learning

Metacognition, or thinking about thinking, is very much a part of learning for both students and teachers. It is critical for all learners to reflect upon what has been learned or not learned after both learning failures and learning successes. Such reflection can lead to continued improvement. First introduced by John Dewey in 1933, the concept of reflective practice has gained significant interest in medical education because of its emphasis on encouraging learners to think critically and apply theoretical knowledge to clinical situations^{10, 11, 12}. For students, reflection has a positive impact on integration and understanding of basic concepts. For teachers, reflection allows both veteran and inexperienced teachers to prepare for their next instructional experiences with a better understanding of their strengths and their areas in need of improvement.

Covering vs. Uncovering

It is not the role of a teacher to COVER content. Rather, an effective teacher must learn to UNCOVER the content. Uncovering knowledge is far better than covering information. An effective medical educator ought to adhere to the educational philosophy known as *constructivism*, a philosophy that believes knowledge cannot simply be transmitted from teacher to learner, but that students must build their own knowledge with

guidance from the teacher. Hence the name CONSTRUCTivism. (This concept will be discussed in a future chapter.) Another of my undergraduate mentors at Lawrence University, Kenneth Sager, convinced me and my fellow prospective teachers that “Nobody can teach anybody”. A teacher can at most provide perceptions, personal insights, and information, but it is the learner who has to put all of these pieces together in order to build knowledge.

The Relationship of Teaching to Learning

Teaching and learning are intertwined. As James Mursell said decades ago, “Successful teaching is teaching that brings about effective learning”¹³. Teaching has only really occurred when learning has taken place. Simply delivering information is not teaching. This is no different in any academic discipline. The knowledge base of an excellent clinical teacher must be multi-dimensional, steeped in the principles of teaching and learning. “Good teaching is good teaching, regardless of the learning environment or the subject to be explored”¹⁴ and “learning medicine is not fundamentally different from learning anything else”¹⁵. Medical educators can only be judged to be effective if the medical students have learned, and medical educators will have a greater chance of positively impacting student learning if they remember how students best learn, how teachers develop, and the difference between myths and facts of learning. By understanding these concepts, effective educators assume the role of *facilitators*, guiding students through the journey of building their own knowledge by doing anything necessary to facilitate that learning.

CHAPTER TWO

INSTRUCTIONAL DESIGN/INSTRUCTIONAL OBJECTIVES

The design of effective instruction is a 5-step process

STEP #1 – The instructor must get to know the learner.

The instructor must get to know the learner, because knowing how the learner learns and what the learner already knows about the topic to be addressed is the foundation upon which effective instruction is built. Without taking this step, there will be no foundation upon which to judge student progress and learning. Teachers will also not have any idea of the best ways to facilitate learning for those students about which little is known.

STEP #2 – The teacher must allow the learner to get to know the teacher.

The second step is for the teacher to allow the learner to get to know the teacher in order to establish credibility. Establishing credibility and seeking to develop an open, trusting learning environment is essential before the learner can be expected to “buy in” to whatever learning activities are delivered or facilitated by the instructor. Without having a sense of trust in teachers, students will simply not feel sufficiently safe to take the chances needed in order to learn.

Teacher credibility leading to a trusting environment can be established in variety of ways, such as:

- Demonstrating (quiet) confidence
- Demonstrating competence
- Demonstrating positive attitudes
- Demonstrating positive body language
- Demonstrating enthusiasm
- Demonstrating respect toward students

- Demonstrating a willingness to help
- Demonstrating empathetic concern for students
- Making consistent eye contact with students
- Always listening actively
- Speaking WITH students rather than AT students
- Explaining in a nonthreatening style
- Being accessible and approachable
- Correcting students without belittling them
- Displaying honesty and integrity

STEP #3 – Fast forward to the end of learning activity.

In planning the actual curriculum for any course or program, one should always start at the end and work backward. In other words, the question to ask is what exactly does one want the learner to be able to DO when the learning experience has been completed? This process is sometimes known as *backward design*, and answering this key question enables the teacher to establish *instructional objectives*.

Objectives are not the same as *goals*. Goals are the general, overarching target(s) at which the lesson/course/program is aiming. Objectives are the specific and measureable things you want the students to be able to DO after the instruction has taken place. The objectives indicate the desired performance of the learner. Sometimes known as *competencies* or *outcomes*, objectives are, indeed, different than goals, and this difference is really more than a semantic difference. Regardless of which word is used (competency, outcome, objective), it is important to differentiate from an overall goal when planning for instruction, as a teacher should always know specifically WHAT is going to be taught and WHY it is going to be taught BEFORE instructional planning or implementation. Only when instructional destinations are understood, can a teacher select and arrange effective learning experiences for students.

Objectives are critical to instruction because teaching without instructional objectives is like taking a trip without a destination in mind, buying an airline ticket without knowing where one is going, building a factory without knowing what product the factory must be designed to produce, or beginning a surgical procedure without knowing where to make the initial incision. If a teacher does not know the destination, it is impossible to select the best path to get there. In the words of Robert Mager, “Without a

blueprint, the finest materials and most skillful artisans wouldn't be able to create the house of your dreams.”¹⁶

If you do not know where you are instructionally headed, you are very likely to end up somewhere else. Without clear objectives, it will be impossible to determine exactly what a particular lesson is supposed to accomplish. And without clear objectives, it will be impossible to accurately assess whether or not the desired learning has taken place. It is, therefore, critical to establish specific objectives in order to have a compass to guide the intended instruction.

Objectives should be *specific*. They should describe precisely what the learners are expected to DO when they arrive at their destination. Objectives should be *measurable*. They should describe a tangible outcome which can easily be *seen* or *heard*. In writing objectives, it is important to use *doing* words (i.e. action verbs), because they help describe what the learners will be able to DO by describing student behavior. Whatever words will best communicate the instructional intent of the teacher should be carefully chosen. To be effective in guiding instruction, objectives must be re-worded until they describe exactly what the teacher expects.

“Fuzzy” objectives are of little value to the teacher or to the learner. Without well-communicated instructional objectives, a teacher cannot create tools to measure when students are sufficiently competent to move on, and students do not know when they are sufficiently competent to stop practicing. Furthermore, clear objectives will also enable a teacher to select the instructional procedures which will best help to facilitate the desired student learning.

Words to avoid in crafting objectives include:

- Know
- Believe
- Think
- Like
- Feel
- Enjoy
- Understand
- Comprehend
- Appreciate

These words should be avoided simply because they cannot be seen, heard, or accurately measured.

Better words to use within objectives are:

- Label
- Recite
- List
- Sort
- State
- Write
- Complete
- Identify
- Outline
- Predict
- Construct

Words such as these should be used because they will allow the student learning to be seen, heard, and accurately measured.

Objectives should always begin with a phrase like “the student/learner will be able to”, in order to assure that the objectives are *instructional* objectives (for the student) rather than just *speaking* objectives (for the teacher). As such, they should describe the learner’s performance, rather than the instructor’s performance.

Examples of effective objectives are:

The student will be able to label the parts of the heart!

The student will be able to list at least three benefits of this antibiotic!

The student will be able to predict the likely results of the treatment!

How many objectives are needed? That depends on both the length and the complexity of the instructional activity. An effective teacher will need as many objectives as it takes to describe ALL instructional results that are thought to be important.

Only after all relevant objectives have been crafted, should a teacher return to the task of implementing instruction by deciding how the knowledge

gaps for each learner will be crossed. Questions to be asked (and answered) at this point are:

- How will the teaching of the teacher match the learning needs of the learner?
- What specific teaching approaches will be used?
- What materials/resources might help the learner reach the intended objectives?
- How will the teacher HOOK the learners into the learning experiences by having them want to reach the objectives?

Although it is usually best to share the learning objectives with the students before the actual instruction begins, as it communicates to students that the focus is on them, the teacher may choose to allow students to discover some of the objectives during the course of instruction. This approach is known as *discovery learning* and can lead to “aha moments” or “teachable moments” throughout the course of instruction. Leading students to the discovery of these moments can be a benefit to student motivation and can assist the teacher in the development of self-directed learners.

STEP #4 – The fourth step is planning for assessment.

A teacher must know HOW it will be known if the learning objectives have been met and if the intended learning has taken place. Assessment will be addressed more fully in the next chapter, but for now let it be known that the bottom line is for students to learn what the teacher wants them to learn. Effective, accurate assessment allows the teacher to gather evidence as to whether or not students have met the objectives. It is important to plan for this assessment BEFORE implementation of the learning activities.

Will the teacher then be “teaching to the test”? The short answer is yes, but in this case it is acceptable, as long as the “test” is designed to measure the objectives.

STEP #5 – The fifth (and hopefully final) step is remediation.

If the assessment shows that the students have learned what was intended for them to learn, then it is time to move on to the next learning experience. But if assessment indicates that the students have not met the learning objectives, an effective teacher will undertake steps to facilitate the learning of what has not been learned. Remediation is not simply re-

testing. Rather it is delivering the information in an alternative fashion before re-assessing in an alternative fashion.

In summary, always start with the END in mind. Instructional Design requires effective teachers to determine where they want to go, then to establish the means of getting there, and finally to find out whether or not the students have arrived at the desired destination. Without a clear objective(s), it is impossible to determine exactly what a particular lesson is supposed to accomplish. Without a clear objective(s), it is impossible to accurately assess whether the desired learning has taken place. Failing to plan is planning to fail!

Is this complicated? Yes, initially. Is it time consuming? Perhaps, but sometimes one has to go slow to go fast. Can teachers learn how to do it more efficiently with practice? Definitely. Why is such a complicated process essential to effective instruction? It all makes it far easier to help teachers facilitate student achievement of learning (i.e. to do the job of an effective teacher)!

Always be sure that planning for student SUCCESS is your bottom line if you desire to become and remain an effective teacher, and using this 5-step process is the best way to design effective instruction that allows students to succeed.

CHAPTER THREE

ASSESSMENT VS. EVALUATION

Assessment is different than *evaluation*. Assessment is an ongoing process of determining what a student can DO at a given time, and it is also an ongoing process of helping to determine how effectively the teacher has been in facilitating the intended learning of the students. It is a process of collecting data for the purpose of making decisions about individuals or groups. It is not always an exact science, but rather it is a process that allows teachers to make their best guess given the data they are able to collect. It is a comprehensive determination of a situation. Assessment should be based on objective criteria.

Evaluation is simply one individual assigning value to the work of another. In evaluating the work of a student, teachers compare the work or performance of the student to their own expectations of what students should be able to produce at a given point in time. Evaluation, then, is based on the subjective judgement of teachers.

We cannot effectively assess in a vacuum, thus it is important to get to know the learner before beginning the assessment process. We must know how the learner learns and what the learner has already learned.

Effective teachers must know specifically what they want the learner to learn, so it is important to clarify the learning objectives before they design and implement assessment. They can then allow themselves to be closely guided by these objectives as they facilitate the learning of students. The objectives can also then be clearly communicated to the students, because students will learn more and achieve more when they have a clear, specific knowledge of what they are expected to learn (except, of course, when the implementation of something called discovery learning is desired).

Many years ago, Douglas Reeves said, “ASSESSMENT should be viewed as a physical rather than an autopsy.”¹⁷ This statement is still true. Assessment should not only be used to inform what has already happened, but also what can happen in the future. Thus it can help teachers

continually learn how much and how well students are learning by continuing to measure student progress in relation to the established objectives throughout the course of planned learning activities and can lead to midcourse instructional adjustments when needed for better student learning. Assessment is, indeed, a tool that can guide effective instruction and inform effective educational practice throughout the student's educational journey, not only when the destination has supposedly been reached.

To be valid, assessment should be varied and done over time; it should be a photo album rather than a snapshot. Students should not be forced to play guessing games with teachers regarding assessment. Teachers should clearly communicate to students what they will be expected to learn and how their learning will be assessed.

Types of Assessment

There are three types of assessment:

PRE-Assessment
FORMATIVE-Assessment
SUMMATIVE-Assessment

Pre-assessment determines the readiness for instruction, as effective teachers should first of all determine if students might already know what they intend to teach; it is important to be sure there is a need for the instruction. *Formative assessment* provides periodic checkpoints leading to periodic feedback. *Summative assessment* matches objectives with completed learning experiences in order to assure that learning has taken place and to allow time for remediation if it has not.

The order of administration for the three types of assessment is:

- 1) PRE-Assessment
- 2) FORMATIVE Assessment
- 3) SUMMATIVE Assessment

However, the order of design for the three types of assessment should be:

- 1) SUMMATIVE Assessment
- 2) PRE-Assessment
- 3) FORMATIVE Assessment

Assessments should ideally be planned before the instruction begins. In this way, the teacher will have targets at which to aim throughout the instructional process. Pre-assessment helps guide the teacher in the initial phases of instructional planning, as it is conducted before the delivery of information takes place. Formative assessment has the greatest potential impact on student learning, because it gives students the opportunity to modify their behavior before the learning activity has been completed; it establishes checkpoints for both students and teachers. Summative assessment should not always be considered to be summative, as it provides direction for the teacher to take if the desired learning has not taken place, indicating remediation may be needed.

What Makes for Good Assessment?

Assessment need not be complicated, but effective assessment should always focus on what students are actually able to DO. Even though measurement of what students are able to do is not always easy, measurement of what is important should be the focus of assessment, not just what is easy to measure. Assessment activities should be ongoing, rather than something that is saved for the end of a unit or course on “test day”. All aspects of assessment should be kept visible to the student so that students are better able to hit the intended learning targets (i.e. meet the objectives). Assessment should try to reveal misunderstandings in order to illuminate areas calling for remediation on the part of both students and teachers. It should advance learning, rather than just documenting learning, and should be considered to be part of instruction, not something outside of instruction.

Key Questions to Ask

Several questions should be remembered whenever attempting to design effective assessment of student learning. First of all, teachers should determine what essential skills and content they are trying to assess. In other words, what are the instructional objectives? Then they should consider how the assessment allows students to demonstrate mastery of the desired skills and content. And finally, teachers should ask themselves:

- How do we know the assessment assesses what we want we really want it to assess?
- Would alternative means of assessment allow students to reveal their mastery more effectively?

- Are all the objectives accounted for?

Authentic Assessment

The Latin root of assessment is *assidere* (“to sit by”) ¹, and it should be considered to be a coaching tool designed for teachers to sit beside students in order to facilitate learning together. The bottom line is that students learn what their teachers want them to learn, so assessment should be continual and an essential part of every learning effort; it is the continuous monitoring of student learning. There are too many variables imbedded in educational situations to always make “proof” possible; educational assessment should be designed simply to collect indicators which may be useful for decision making. It does not always need to be based on standardized tests, but it should always focus on what students will encounter in their later lives. Assessment is most accurate when it is *authentic*. To be authentic, it should be as close as possible to how the learning will actually be applied outside of the classroom. It need not be complicated, but rather should be composed of meaningful, worthwhile performance tasks which will work together to indicate whether the learning has transferred. In order to effectively assess student learning, effective teachers need a variety of techniques, all working together to provide a forum to allow students to demonstrate what they have learned. These techniques should do more than just measure a student’s ability to read, write, and take tests!

Some, or all, of the following activities can be useful in building an assessment plan and in allowing medical educators to diagnose a learner’s needs, assist in both instruction and remediation, and help provide effective learner-centered feedback to medical students.

○ Tests

If teachers plan to use tests as part of assessment, they should consider starting the writing of these tests before delivering the content and adding additional test items as material is uncovered in class. In this way they are teaching to the test, and this is okay as long as the tests are designed with the objectives in mind and are integrated into classroom teaching. Tests should not be the culminating event, as they are in many cases, but rather the results should be used by teachers to adjust instruction as necessary. Test items can take a variety of acceptable forms (multiple choice, matching, fill in the blank, diagrams/drawings,

analogies, or essay). True/false questions should be used sparingly and only with care, as they tend to engage students in guessing games with the teacher. In all cases, however, the questions should be straightforward in order to avoid confusion. In preparing test items, teachers should always avoid trying to trick students; no guessing games are allowed. Although it is acceptable to use creativity in preparing tests, prompts should always be clear, not allowing the creativity to hide the purpose of the test item.

Multiple-choice questions are commonly used in medical education because of their relative ease in scoring, especially when dealing with large numbers of students. They are, however, the most difficult type of test question to write effectively. When preparing multiple-choice test items, always consider the following guidelines:

- ✓ Present just one clear concept/problem in the stem of the test item.
- ✓ Make all distractors plausible.
- ✓ Vary the position of the correct choice.
- ✓ Avoid similar wording in the stem and the correct choice.
- ✓ Avoid phrasing the correct choice in more technical terms than the distractors.
- ✓ Keep the correct answer and the distractors similar in length.
- ✓ Avoid using absolute terms (i.e. always, never) in the incorrect choices.
- ✓ Keep the stem, the correct choice, and the distractors grammatically consistent.
- ✓ Avoid writing distractors that contain clues allowing students to answer the question correctly without knowing the content.
- ✓ Use “none of the above” with care, and avoid using “all of the above” as a choice.

Regardless of the type of test items used, confusing expressions should be avoided. Subsequent items should not be dependent upon having gotten previous item correct. The first few items should be relatively easy so as to help build the confidence of the test takers. An effort should be made to create a test of an

appropriate length for the testing time period. When analyzing the results of any test, consideration should be given not only to student performance but also to teacher performance.

- **Rubrics**

A rubric is more than a checklist. A checklist is a snapshot; a rubric is closer to a photo album. It is a tool created to specify the elements of performance that matter most by advancing a specific set of printed guidelines, correlated with scores on a continuum, to distinguish performances of different qualities. It establishes the specific conditions of performance that must be met in order to be successful. The best rubrics clearly describe what students should be able to DO at each place on the continuum. They can be beneficial to both student and teacher by clarifying in advance what behaviors or actions indicate the intended learning has taken place. Thus, a rubric can become not only a scoring tool, but an element of instruction. To be effective, a rubric should focus learning and provide clarity for both students and teachers, and should be shared with the students before the learning experience. It allows both students and teachers to see what is meant by quality work so that students will be better able to produce the desired product and teachers will be better able to assess that product. A rubric should be quick and easy to use, as lengthy, complex rubrics will do nothing but gather dust. (See Appendix A for an example.)

- **Portfolios**

A portfolio can be either hard copy or electronic, but either way it is an organized, purposeful collection/showcase of student achievement. It is an examination of work over time, allowing students and teachers to reflect on progress, thereby helping to tell the story of the student's learning. In creating a portfolio, students are asked to take charge of their own learning by demonstrating their own growth and/or mastery toward the learning objectives, and providing evidence of student reflection on their own growth; it is something done by the student and not to the student. Teachers, however, may also choose to select some examples of student work for inclusion in the portfolio.