Setting goals for the classroom

In my last editorial (1), I raised a number of questions relevant to improving medical physiology curricula. As I continue my consulting activities, another question comes to the forefront, one that I find myself asking faculty with increasing frequency. This question is directly related to all classroom activities, and the response elicited indicates that it is a question that faculty seldom ask of themselves. The question is, “why are you teaching your course? What are your goals or objectives for your physiology course?” Responses range from the flippant, “I teach the course because my Chair says that I have to teach the course,” to the answer to a very different question dealing with student learning objectives, “Learning objectives for various areas in physiology have been published from time to time, and we use those objectives.” This question is critical, however, because its answer determines what will happen in the classroom. If the answer is “my goal is to present enough information so that students can address some specific learning objectives (e.g., define compliance, describe how impulses are transmitted at the neuromuscular junction),” then the classroom task is to hand out written information, give a lecture, or, perhaps, show a film or videotape. To achieve this goal requires no classroom interaction.

For many faculty, however, this is not the goal. When forced to address the question, many answer, “I want to help my students understand my area of physiology.” This objective may require an entirely different classroom environment. The task is no longer to simply present information. Now we must concern ourselves with how information is presented and how the students respond to the information. The material must be presented in a way that will give the students more than a verbal or graphic description. Gaining an understanding of a concept may require experiences other than just seeing or hearing information. With this objective, we must also decide what students must do to demonstrate that they understand, and this assessment must be incorporated in some way into the class. If it is not incorporated into classroom activities, we have no way of assessing our success in achieving the objective. In designing the class session, then, the overriding question is, “What classroom activities will best help me achieve my goals for this class?”

Perhaps a brief specific example will best illustrate the point. Consider a class session devoted to the elastic properties of the respiratory system under static conditions. Student learning objectives may include describing how elastic recoil of the lung and chest wall contribute to the negative intrapleural pressure at functional residual capacity and describing how the lung and chest wall interact to determine the elastic properties of the respiratory system.

As the instructor, my objectives for the class are somewhat different. They include helping the students realize that the concepts used to describe the elastic properties of the respiratory system apply to all elastic structures, helping the students gain an appreciation for what is meant by elastic recoil, and helping the students discover how intrapleural pressure reflects the interaction between the elastic properties of the lung and chest wall.

Information with which students can approach their learning objectives is available in any textbook on respiratory physiology. Presenting the same information in the same manner as the textbook (i.e., in an expository lecture), however, will not achieve my objectives. To achieve these objectives requires active student participation.

One approach to achieving my objectives is to have each student work with a familiar model and relate characteristics of the model to the respiratory system. This can be accomplished by giving each student a balloon at the beginning of the session, having the students perform some experiments through which they can explore the concepts of recoil and compliance, and, finally, working problems focused on lung and chest wall interaction that require using the knowledge gained from the experience with the balloon.

Addressing educational goals not only influences what happens in the classroom, it also dictates how ancillary materials are prepared. Consider, for example, protocols for student laboratories. Most traditional laboratory protocols have the same format. A series of steps are described for performing the experiment and gathering the data followed by a series of questions requiring interpretation of the data. Students often approach such experiments in a “cookbook” manner, performing the necessary steps without much thought as to how the system in question is responding. If one of the educational goals of the laboratory is to have the students think about the system, then the laboratory fails because the protocol is not designed to encourage the thought process. Instead, the protocol should provide information and encourage students (e.g., by asking specific questions) to predict what will happen at each step of the experiment. After the step is completed, the protocol should again encourage the students to do some analysis by reviewing the prediction, assessing whether it was correct, and reevaluating the rationale for the prediction if necessary.

Class handouts should also be consistent with stated educational goals. If one goal is to have students integrate information at several levels, then presenting “lecture notes” in a linear outline format will not help the student...
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perform the integration as well as a set of concept diagrams that show interrelationships at several levels.

Defining objectives and designing activities to achieve those objectives is not a foreign process to us. It is a process that governs all our scientific efforts. When formulating research projects, we define specific aims. We pose hypotheses and design experiments that, we believe, will provide the best opportunity to achieve those specific aims. Engaging in scientific activities that do not address specific objectives is generally considered unthinkable. Yet going into the classroom to “teach” without specific objectives is a common occurrence. It is time that we apply the process that is the cornerstone of our work as scientists to our efforts in the classroom.

REFERENCES


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