The physiology teacher, a facilitator of learning at all levels

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IT IS TRUE that concern has been expressed about the inadequate training and teaching techniques that exist in today's graduate schools. The usual way in which students learn their teaching techniques is by observation of their own teachers.

The academic physiologist in the university setting has three jobs: teaching, research, and service. As a teacher, the physiologist covers many levels of education: undergraduate, graduate, and medical. Each of these carries special kinds of problems and also special kinds of rewards.

If we examine the teacher as a facilitator of learning, we discover that the physiology professor then has several roles. One of these is to be the planner and developer of the curricula being offered at each level of physiology. In this role the teacher selects objectives and picks out the best learning resources, that is, chooses textbooks, handbooks, computerized exercises, and films. Sometimes a teacher also writes whole new scenarios, summaries, and case histories to help explicate the physiology under discussion. The teacher must also develop evaluation instruments and testing modes, not simply multiple-choice objective exams. In this role the teacher serves as a facilitator of learning at all levels, then they will be able to help undergraduates by the most appropriate choice of textbooks and handbooks; to develop case histories, scenarios, and summaries; and to show students how physiology got to where it is, developing in the students a healthy concept of skepticism. This can be expanded when the students are graduate students and the teacher acts as an advisor and is still facilitating the students' learning.

graduate student; graduate advisor

If we adopt the concept that a teacher in physiology is primarily a facilitator of learning, then the same sorts of operations are in action in three different occasions: 1) in a first-year undergraduate physiology course taught to students fresh from high school with very little science background, 2) in advanced undergraduate courses in physiology (which are usually viewed as requirements for one of the professional paramedical programs, i.e., nursing, physical therapy, occupational therapy, or medical technology), or 3) training graduate students to do research. The same actions are carried out. The teacher has to be the planner and the developer. Learning resources are chosen. The teacher is not dominating but rather is facilitating.

Certainly the teacher at any level is going to indicate to the students that what they find in the textbooks is not necessarily the absolute truth but rather is the present viewpoint and our best estimate of what approximates the truth about ourselves and our environment. In other words, we try to encourage in the students the concept that they take the textbook with "cum gran salis" (a grain of salt). This is necessary to develop a healthy type of skepticism; even in a first-year undergraduate student, healthy skepticism is necessary to have an appropriate viewpoint of science. Otherwise students will go out into the world believing science always has the answer, and then, when it fails, they abandon it. This has been part of the problem in the past. Too many teachers have indicated by their assertive attitude a sense of possessing absolute truth and by their dominance in the classroom that they were passing on the torch of absolute knowledge to the students. This is not what we really should be doing.

When we view physiology teachers in the graduate advisor role in which they supervise the development of a graduate student's research, we find that facilitation is the most appropriate. While the student is conducting independent research the teacher certainly aids in the planning and development and takes a leadership role in the beginning to show the student how to do these important steps. The teacher facilitates the student's ability to pick out objectives and refine those objectives and to choose the most appropriate resources. The teacher of physiology is a senior partner to the graduate student. The teacher is trying to bring the student along
to become a full partner by the time that student graduates and is ready to assume the role as an academic physiologist.

In the past, students have run into many kinds of advisors. The authoritarian advisor abounds. This kind runs the entire laboratory, and the students do exactly what that advisor tells them to because they are working under that advisor’s grant and the work must be accomplished in the shortest time possible. Many academic physiologists have had that sort of trainer. They then go on to train that way, because we do what our mentors did. Opposing that view is the kind of advisor who allows the students, at least at the doctoral level, to pick out their own problems. The advisor finds some moderate level of support for those students and finds supply money. Aside from overseeing and checking on them periodically (a couple of times a semester), the advisor lets them work on their own at the doctoral level. The master’s level is quite different. This type of advisor usually has a closer hand with the student. However, the problem still is unique; it may be a part of what’s going on in the laboratory or not, depending on what the student and the advisor have decided. This type of advisor usually produces a much more liberal kind of scientist, one who is more apt to change projects occasionally and look at other aspects and perhaps grow into a little broader-type scientist.

The strategies for teaching first year undergraduate student, medical students, and graduate students is basically the same, one of facilitation. There is not that much difference between the teacher and the advisor if one is a facilitator.