MULTIPLYING THE BENEFITS OF RESEARCH TRAINING

Many doctoral students in physiology will eventually be appointed to university faculty positions. Most of them will find that teaching is included among their responsibilities, yet their graduate training will not have prepared them for teaching. This deficiency in doctoral programs can be remedied by taking advantage of the remarkable similarities between the activities of expert researchers and master teachers. Both apply their intellect in an informed, disciplined, creative manner to planning and evaluating their work—that is, they are scholarly in their approach. Both have developed the skills and attitudes necessary to be effective, whether in the research laboratory or classroom.

Expert researchers acquire and maintain the depth and breadth of knowledge required to formulate significant research questions. The questions in turn determine the choice of research strategies, for example, the experimental techniques, composition of control and experimental groups, and statistical methods to be used. Effectiveness in the laboratory requires careful attention to the needed skills, in cell culture or animal surgery, for example, and cultivation of such attitudes as curiosity and intellectual honesty. Analysis and interpretation of the results form the basis for further experimentation, creating the familiar repeating cycle of planning + experimentation + evaluation of data → planning that constitutes hypothetico-deductive research.

Expert physiology teachers carry out a surprisingly similar cycle of activities. They acquire and maintain the depth and breadth of knowledge required to teach their subject. They formulate educational objectives and select teaching strategies that will optimize students’ ability to achieve the objectives. In the classroom, as in the research laboratory, well-developed skills and attitudes are essential. Depending on the educational strategies to be used, it might be necessary to be skillful at facilitating small group discussion, or demonstrating in the student lab, or lecturing to a large class. Attitudes of open-mindedness, caring, and enthusiasm are correlated with effectiveness in teaching. Critical evaluation of the results of teaching is essential for the continuous improvement of teaching and learning: What have students learned? What are their misconceptions? Are they developing a scholarly approach to the subject? Thus, exactly as in research, progress in teaching depends on a repeating cycle of planning → teaching → evaluation of learning → planning.

Given these remarkable parallels, why not double the benefits of the excellent training in experimental physiology that we give our graduate students? Why not make explicit the similarities between teaching and research, and require our students to take an equally scholarly approach to both? Why not give our future colleagues encouragement and assistance to develop the skills and attitudes necessary to be effective in all their future roles?

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