

Remarks on a philosophy of teaching

Asking an experienced teacher about his teaching philosophy is like asking a fish about his swimming philosophy -- it had better be second nature! I suppose that underlying anyone's philosophy about teaching is the premise that the teacher is an instrument for the preservation, continuation, and enlargement of mankind's cultural and intellectual heritage. The commonplace putting of pen to paper (or keystrokes to screen) is an astounding act, full of implication and without which teaching of anything but rudiments would be impossible. Reading and writing are perhaps the two most important cornerstones of the teacher's art, though there are many others. The teacher comes to his task, then, with an impressive implicit basis for understanding and communication between pupil and teacher.

At every level, the teacher must teach orderly reasoning and independent thought, as well as transmit knowledge or transfer a skill. The teacher should arouse curiosity and stretch minds. The teacher must inspire, generate enthusiasm, inculcate good work habits. He should set an example for his students of responsible conduct as a teacher, as a mentor and friend in their joint endeavour, and as a member of society. On these last points, I should emphasize that it is important that the teacher appear as a whole human being to his students, not as a lecturing and grading machine. Letting the student in on your interests and concerns outside the classroom supports your role and facilitates your work of educating that student.

A science teacher in a university, particularly a physics teacher, has a wonderful job. Physics underlies almost all science and engineering. It therefore carries great prestige. All the physics teacher must do is convey the wonder, the beauty, the elegance, the simplicity of physics. Someone said knowledge is power. Knowledge of the laws of nature is the key to the physical world, to its partial control, to its development for just and civilized purposes. Physics is the investigation and systematization of the most fundamental laws of nature. A physics teacher's philosophy must be to convey the importance and excitement of that quest. As one of my colleagues says, "It is Glorious Physics!"

The philosophy or approach depends on the level. To the freshman seminar, the stress should be on the wonder, the beauty, the excitement, with an effort made to develop logical thought and teach how a physicist approaches physical phenomena. "How does a physicist?" was the evidently overly arch title of one such seminar, but it conveyed (at least to me) what I wanted to do.

For the student intent on a serious study of physics (read any science), the philosophy must be to develop each student's skills in approaching the subject -- logical reasoning, the necessary mathematics -- and also transmit a certain body of relevant facts, all the while showing the logical, interlocking order of the subject, together with its beauty, power, etc. Very early the idea of the need for a qualitative understanding of any phenomena as a necessary precursor to a quantitative description must be conveyed. Order of magnitude estimation is crucial. The blind use of formulas is the bane of many a student and engineer. Always the excitement and wonder of a subject that spans from the heart of matter to the most distant galaxy should be there.

Graduate teaching, in both its formal classroom and informal research senses, is all of the above and more. Here the students are committed; the excitement and wonder is understood and accepted. The task in the classroom is enlarging the student's reservoir of techniques and advanced knowledge in order to give him or her more power as a physicist. Independent reasoning and the ability to look at a problem from a fresh angle are important aspects to stress. The graduate teacher, in the classroom material and in guiding research later, should present examples of how to make connections, exploit analogies, utilize past experiences in analyzing fresh ones (that is "physical intuition!"), identify the essential aspects of a problem and the inessential ones, too, make sensible approximations -- in short, be a physicist! At the graduate level, the mentor role and the "whole human being" aspect take on special importance.

A short philosophy of teaching might be love your subject and convey that love; all else is secondary. |

  
J.D. Jackson