Getting Students Involved in Physics & Astronomy!

One of the most challenging aspects of teaching introductory science courses is that, because many students, expecting to be spoon-fed "the facts", fail to think critically and begin to lose interest. For too many, science looms like an imperturbable monument built by dowdy and eccentric geniuses. Instead of seeing the satisfaction of challenging one's own preconceptions to arrive at a deeper understanding, students are often numbed by the blizzard of laws, rules and facts. The social, collaborative nature of science is masked.

How can we present science as an evolving endeavor of human curiosity?

To compound the problem, instructors, after years of training in the field, can have trouble *empathizing*. Quite understandably, they may focus on the topics they perceive as 1) most interesting, or 2) daunting, be it from their own experiences years ago, or simply from last year's class. Unfortunately, *this* year's class is often unfazed by subjects the instructor belabors, and utterly daunted by others given short shrift. The end result is that students lose interest or get lost.

How can we achieve better "real-time, adaptive impedance matching" between instructors and students?

Competitive environments, particularly for undergraduates, may mean that until exam time, many have no measure of how well they know the material, or where they stand relative to their peers. Students, particularly those who find no role models around them or at the front of the class, may become intimidated. For them, this is their last science class.

How can we insure that every student has a personal contribution to the process ?

- Peer Instruction in astronomy.
- ConcepTests for astronomy.
- Going whole hog: the ClassTalk system
- Textbook Development for Physics classes.

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