

PHILOSOPHY OF EDUCATIONAL OUTCOMES

The following four outcomes are not specific to any course, but rather they guide the major components of any course over which I am the assigned instructor. Another way to name these four ideals is to call them “meta-outcomes” because they inform the manner in which the course is structured and the manner in which the course is conducted.

“A person is better known by their questions than their answers.” –T. Merton

(A) PRIMARY OUTCOME: A successful course will initiate and cultivate the personal educational process of “question refinement” within each individual student.

Academic education is the developing and maturing of an individual through reading, writing, problem solving, experiential familiarity, and interpersonal relationship. The process of academic education is accomplished by forming better questions; a refinement through relational discourse by which some questions are answered, some are abandoned, and some are pierced and spawn a myriad of embryonic questions. “Refinement” assumes there is an initial question by the student, which should not be assumed by the instructor, for a question begins each student’s educational trajectory. The refinement process unfolds not only for the person’s inquisitive and reasoning abilities, but in fact, for the person as a whole.

The word best capturing my implementation of question refinement is “aspiring.” I am an aspiring adult, as are my students. I am an aspiring physicist, as are my students. I am an aspiring astronomer, as are my students. I incarnate this language in/out of the classroom explicitly because I want my students to understand that my process of development via questioning, i.e., my academic education, is on-going. By modeling the process of question refinement in my own scholarship and teaching, I embrace the title of aspiring teacher-scholar. We are all students in our own process of education, though some answers for the instructor are now lived.

“...Live the questions now. Perhaps you will then gradually, without noticing it, live along some distant day into the answer.” –R. M. M. Rilke

(B) INSTRUCTOR OUTCOME: A successful instructor will faithfully model the full spectrum of qualities exemplified by the guiding teacher.

The instructor serves as a model and as a guide for the students in the educational process. The title of guide best fits my role in the classroom for at least three reasons. First, the guide

must know the landscape of the subject at hand from well-worn experience. For example within peer instruction groups, a guiding teacher must be adept at resolving intellectual conflict and be aware of alternate routes of strategy when necessary. Second, quality guides appreciate and enjoy their territory. Teachers who are observant, inquisitive, and exuberant draw students into a deeper interest of the content area. One who models these qualities creates curiosity and appreciation within his/her students. Third, model guides are equipped to interact with *all* types of tourists and do not speak over the heads of their listeners, as if the terrain was only for the professional or the qualified. Guiding teachers must display patience and empathy, as well as the ability to “stand in the middle”—shouting directions to the trailblazers ahead, while also encouraging the stragglers behind.

“The essential thing . . . seems . . . to be a long obedience in the same direction: from out of that there always emerges and has always emerged in the long run, something which has made life worth living.” –F. Nietzsche

(C) PEDAGOGICAL OUTCOME: A successful course devotes the appropriate time, space, and energy for the development of questions to be asked and discussed.

The method of daily instruction begins with a question (or questions) that initiates the daily learning outcome(s). In courses with smaller enrollment, interactive questioning of the students begins to dredge up the background principles from the previous classes with appropriate silence for the students to weigh their response. Further questions in/decrease in difficulty depending the students’ responses. In courses with enrollments of >15, conceptual review or reading questions incorporate a personal response system (i.e., clickers). Students seem to have benefited greatly from the use of clickers, and I will not enter a large class again without them.

Timely and well-structured demonstration and/or video analogy (i.e., with pre-/post- questions and reflection) aid in the process of building on the initial discussion. Traditional problem solving still maintains a prestigious position within this framework, as does teacher-centered instruction, but this is more appropriately tempered with engaging non-rhetorical questions and therefore moments of (uncomfortable) silence. Across all courses taught, I also utilize web-based simulations and flash animations in both concept discovery and reinforcement settings. Animations of this type have shown through educational research to increase a student’s ability to better organize multiple dependencies on a particular physical concept. The classroom meeting closes with a moment or two of recollection, hopefully revisiting the focus question and the pertinent concepts, through which a new question might germinate.

Moreover, it is often what occurs *outside* the classroom hour that determines whether or not a student is educated according to the opening definition. Re-reading of notes, attempting problems, and perusing textbooks are assumed activities because they fertilize and concretize the course concepts and vocabulary. I question how prepared RC students are to enter the ‘long obedience’

and the amount of effort they put forth outside of scheduled classroom activities. Opportunities to discuss the material must be provided, which is why I encourage problem-solving in groups and maintain an “open-appointment” policy for office hours. Applied inquiry in the form of both directed and open-ended laboratories provides an atmosphere of modified failure through which experience is obtained. I have spent numerous hours developing new and challenging labs for RC students in both physics and astronomy courses (see individual course descriptions). Discipline, obedience, and experience are only obtained through the process of failing. The passionate implementation of these proven methods by the instructor creates a space where students may begin this long obedience to the lifelong process of education.

“A student from whom nothing is ever demanded which s/he cannot do, never does all that s/he can.” –J. S. Mill

(D) ASSESSMENT GOAL: A successful course augments traditional modes of assessment with those that highlight individual creativity and personal uniqueness.

While the methods of instruction outlined above are well-worn paths, every discussion of education must deal with the pragmatic realities of assessment and management. While Mill’s statement is often misused to invoke a law of natural selection regarding assessment, I am directed to seek each student’s personal threshold of “cannot do.” Individual research and collaborative projects incorporate inter-disciplinary topics while providing an opportunity for the stretching of creativity, writing skills, interpersonal team skills, and accountability. Due to my overall philosophy that education is a process of continuity and maturity, student responsibility and accountability factor heavily into course management. Typically, I maintain a grading rubric that includes self-discipline, responsibility, and collaborative participation as a small portion of the overall grade (e.g., <10%).

Though not grading each problem for complete accuracy, I give quizzes and collect homework weekly, which always reflects a cumulative and iterative approach. While an increased number of assessments offer the opportunity for grade-dropping, I do not offer forms of extra credit or replacement assignments. Over and above the appreciation and understanding of the physical world that our students gain, all of them will become independent citizens of society. The foundational assessment for any course is a student’s progression toward responsible creativity and accountable freedom.