

# Teaching, Research, and Service

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This document addresses the interactions among instruction, research, and service. The accompanying document focuses primarily on administration. Please read this document be read after having read the document entitled “Administration.”

**Research and Teaching.** I have said at many times and in many places that I believe that research and teaching complement and supplement the professional life of the academician. In many respects, I will reflect upon my own career to make the point, but first, I turn to respect the passions of my colleagues whose primary mission is teaching. I know them to be life-long learners. Their scholarship is focused upon finding the best way to present material, and they tirelessly teach our students as much as possible. A faculty member’s contribution to teaching, research, and service occurs in differing proportions at different times in a careers. Faculty expect rewards for excellence in all of their professional endeavors.

I gave an example above in which my explanation to my freshmen calculus students caused me to reflect upon recently completed research papers. The operative dissection of that word is *re* — to do again, *search* — to look through in order to locate something. Researchers who teach have an Alaskan tundra of basic courses upon which we can search, collect nuggets of knowledge, and study more deeply. A well written paper with great ideas is more acceptable to a journal than a poorly written paper with great ideas. So the expository aspects of our research writings, at least, are enhanced by our ability to explain the elementary aspects of our fields to our students. My own research deals with abstraction. From what are the ideas being abstracted? Ultimately, arithmetic, algebra, geometry, and calculus. So my own research benefits because I teach. My teaching benefits because I do

research. I personally understand the terms in Pascal's triangle as pieces of a hyper-cubical solid. Because of this, I can show my students these ideas, and hopefully they will become excited about higher mathematics.

Mathematics can be a lonely enterprise. Each of my research colleagues and I within the department has roughly 200 to 300 colleagues who understand our own research at a rudimentary level. More specifically, roughly ten to twenty of those colleagues world-wide understand the intricacies. Yet, our overriding desire is to be able to talk about our work to others. Students help fulfill our need to communicate the beauty of our subject.

I believe that all of my research colleagues in the College share a passion for their subject. Intellectually passionate professors ignite their students' curiosities.

**Service.** The Dean is the servant to the faculty and the students. The Dean's office should aid the faculty in their research and teaching endeavors. Instructions from the office should be clear and concise. Faculty consensus is built when competing interests are focused on the common cause of a liberal arts education. The Dean depends on the good will of faculty who are willing to serve on committees, who wish to have a voice in the formulation of policy, and who work towards the common good of the College. When the water is rising, we all fill the sandbags.

**Technology.** Technological revolutions in academia and education are coming from unexpected quarters. In my own field, it is becoming increasingly common for scientists to post their works on a publicly accessible pre-print archive. Feedback from fellow scientists comes quickly, improvements can be made, and referees are often familiar with the work long before the time it has been submitted for publication. Some large-scale research projects are now being done via blogs. A group of researchers who share a common interest begin an on-line discussion on a specific topic, ask questions of each other, and manuscripts are being created organically. Priority fights (such as those that haunted Newton and Leibnitz) are increasingly infrequent since the blog records who said what when.

Wikipedia, search engines, and Wolfram-alpha are being called "the source of all knowledge." Like oracles of old, they rely on the inputs of users to maintain their veracity. The Academy has been helpful in driving these data sources to be of high quality. The institution has to find a way to recognize and to reward research blogging and wiki-writing.

While publication in refereed journals was the gold standard for acceptable levels of research in the past, the nature of such venues is changing

drastically. In particular, science journals in mathematics are adding costs while not adding quality to the final published product. The value that is added is that of refereeing while the work of referees and editors goes unpaid. Meanwhile, the institution has few methods to reward these activities.

The changes in research behaviors can translate into changes in classroom behavior. Some colleagues are forming class blogs. These come complete with discussion forums. It is not hard to imagine that a classroom discussion might extend into virtual space for an extra hour or two in the evening. These discussions can occur with a faculty member present or not. In some sense, they are an electronic study session. And as often happens during study sessions, not everyone is always paying attention.

Meanwhile, great care needs to be taken before traditional classrooms are replaced by virtual communities. People enamored with cyber-space romanticize about the intimacy that it can produce. Yet, real human communication occurs face-to-face, one-to-one, and one-to-many. There is, as of yet, no substitute for being present in a classroom, feeling free to ask questions, and having your instructor anticipate your question by the look on your face. The presumed interactivity that is obtained from a virtual forum is currently only as interactive as a high speed postal correspondence. Videos of in-class lectures are doubly dull because there is no dynamic and no interaction.

The content of the previous paragraph is opinion formulated via personal experience. Not only do I upload videos of my class work to youtube, I also watch those videos of my peers. Very few of these capture my attention. Many of my own collaborative research projects have been conducted over long distances and via e-mail. All of these projects, and there are many, were supplemented in crucial ways by means of face-to-face communications. Faculty travel to conferences to be in the physical presence of each other. Students expect to learn directly from their professors. This is not to say that other teaching paradigms will not develop because of the increasing sophistication and relatively low cost of technology. Rather we, as human beings, need personal contact to enrich our communications. Any new paradigms for teaching via cyber-space will have to balance our human needs.

## **Conclusion**

After I wrote my friend and collaborator, artist Tony Robbin, that I was considering applying for this job, he wrote back pointing out that my inter-

ests in the creative arts (primarily music and drawing) helped make me a balanced candidate for Dean. He wrote, “Consciousness evolves through human effort to which both the arts and the sciences contribute.” He went on to say that seemingly unrelated disciplines function together to promote the critical and creative thinking that is the essence of education. The committee has asked about the “ideal mix and interaction of classroom instruction, research or creative activities, and service.” Sometimes the mix is merely existential: good research can lead to good teaching. Sometimes the mix is explicit: research projects often become class projects. Sometimes the mix is inverted: questions that occur in a classroom context can lead to research projects. My answer to this question is closely related to Tony’s quote. Consciousness evolves through human effort. The arts, the sciences, the social sciences, teaching, research, and service all contribute to our evolution. The purposes of the academic endeavors are to increase the rate of conscious evolution and thereby improve the human condition.

It is reasonable for the committee to ask why I would like to take this job at this time. The budgetary situation for the University is grim, and sweeping educational reforms are being proposed. I am not opposed to change; in fact, I have usually embraced change. The focus on these changes so far has been focused on instruction and not research. In my own field, the research changes that have resulted from technology are already sweeping and apparent. So the institution needs to recognize and accept the changes that have already occurred and to learn from the research experience. My hope is that changes in instructional techniques will be well thought out and in consultation with a wise faculty. Meanwhile, I want to help preserve the liberal arts values that Arts and Sciences represents — the values that I learned as an undergraduate student in a state school.

Thank you for your time and consideration.