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## **AC 2011-1524: TENURE AND EDUCATION: FOCUSING ON RESEARCH AT THE EXPENSE OF PRACTICE**

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## **Tenure and Education: Focusing on Research at the Expense of Practice**

### **Abstract**

Hiring practices for academia have traditionally focused on doctorate level candidates, but allowed for masters level work with equivalent practical experience, especially for teaching institutions. Current trends in hiring seem to be increasing the need for a doctorate in order to teach, primarily as teaching institutions begin to apply research-level criteria to their hiring policies.

It appears that few institutions are willing to ask whether this trend is good, and are quick to use age-old arguments to justify the escalation. The question should be posed if this is a prudent course of action, especially in a time when engineering graduates in the United States are on the decline, when pursuit of advanced degrees is declining, and competition from foreign sources is increasing. Should we be limiting the pool of teachers, and focusing on research minded individuals at a time when practicing engineers and construction companies are asking for more practical, business-minded employees.

The engineering industry needs two types of engineers: theoreticians who focus on research and investigating and advancing new ideas, and practitioners who implement new design criteria and bring products to market. This paper poses the question that possibly the academic industry should refocus on balanced hiring practices, to ensure that students are getting both theoretical and practical knowledge, and that they are ready to choose advanced instruction and a theoretical track, or to “hit the ground running” if they choose to become practicing engineers.

### **Paper**

While surely the pursuit of an advanced degree is admirable, and the majority educators, as well as parents, would promote their students or children in their efforts to further educate themselves, should this level of education be a requirement for one to become an engineering educator.

Pure teaching institutions are minority players in the education game. They pale in comparison with research-focused institutions which comprise the bulk of the higher education facilities, both in student numbers and budget. The role of research in the educator’s career at a teaching institution is much diminished, and rightly so. Indeed in response to this paper’s abstract, comments were made to address the role of faculty to secure research dollars to provide employment to students. Seemingly the focus on research, which many faculty will admit privately is daunting, is center stage in the academic arena. Do parents of prospective students truly understand the actual role of the faculty in their sons or daughters institution? How many of those self-same faculty survived classes only due to the efforts of dedicated teaching assistants? Did the parents know exactly who would be teaching their children?

Many higher education institutions focus on the caliber of the faculty to attract undergraduate students, however, rarely are these faculty members actively engaged in the majority of the undergraduate classes. More often their time is consumed by research activities to provide an income source for the university, or to provide research opportunities for graduate level students

who need thesis level work to publish and succeed. Indeed if the criteria for hiring tenure-track educators is doctorate level credentials, then why are the majority of the faculty contact hours focused on upper level students?

In engineering the practice of the discipline provides as much knowledge, and maybe more within a focused area of study, than the same time within academia. In fact, students who have no desire for an advanced degree, or wish to forego it for developing a career, enter into a real-time, fast paced business environment, often with only theoretical knowledge and skills. Practicing engineers, even those without a doctorate, provide critical information propelling students past the theory and into reality. This practical mindset and business acumen is instrumental in giving students an advantage in the job market.

The engineering world, and civil engineering in particular, has been working to integrate theory and practice in teaching by making licensure a requirement for faculty members. This focus on practice seems lost in the hiring criteria for academic positions. While it is true that job descriptions often include both doctorate degree and licensure as requirements, the reality is that candidates without doctorate degrees are viewed as lesser qualified. This makes it apparent that the focus is not on practice, but on research. Furthermore, the decision-making individuals who evaluate and recommend candidates for hiring, including faculty members and administrators, are often from other departments where the doctorate degree is paramount to their discipline. In larger universities the reality is they are seeking researchers who may teach occasionally, or rarely. It is disturbing that this trend towards research is seeping into the teaching universities, and hiring criteria appear to be ramping up to include more research requirements. It had the appearance of the “keeping up with the Joneses” mentality, without any concern of the appropriateness of the action.

Indeed often adjunct professors are hired to fill gaps in curricula, in part because their experiences are an invaluable resource for teaching new engineers. So if these self-same professionals are so valued for their knowledge, why would they be inadequate for a tenure-track position?

The real question should be why are all faculty mandated to conform to a uniform set of criteria? There are faculty members who revel in research, and if given the choice would not teach. There are also faculty members who only desire to educate, without goals of publishing. An organized, integrated approach would seemingly take the maximum advantage of both personalities and allow each to use their strengths in the educational system. Why cannot a system develop where faculty with research aspirations are balanced by those who have passion for teaching, without trying to get “a little bit of everything” from each person? In this way both sets of individuals have the ability to expand their potential to greater heights within their own area of passion.

In fact the power structure of most of academia is held by those who have doctorates, and believe that this is the single criteria for exclusion. This is in part due to the diversity of criteria across the various technical and non-technical fields. It also has roots in the executive directives of the 1960's to develop a research powerhouse within the United States to compete with cold war rivals. Additionally, media surveys which purport to rank universities to provide parents with data to evaluate programs may be contribute to this trend. Surveys often ask for sheer numbers

of doctorates in the faculty pool, without assessing whether the degree actually adds anything to the teaching of classes, except for a possible infrequent tie to ones dissertation. Maybe it is time to re-evaluate the goals. I find it hard to believe that all of the practicing, licensed engineers with Master's degree educations have nothing to offer the students of today.

When looking at the typical course load for an undergraduate student, there are many classes which surely do not require a doctorate level degree to teach. Any competent engineer has the technical prowess to understand the concepts in statics or strengths of materials. You would be hard pressed to convince me that a doctorate is necessary to teach statics. Indeed it would be more beneficial for a technically adequate individual with a little course preparation training to conduct these basic classes than a Nobel laureate in engineering.

I have personally watched doctorate level educators make rookie level mistakes when it comes to practical engineering decisions. Much of this relates to lack of business acumen, rather than lack of competence.

You can easily interpret this paper as a condemnation of doctorate degrees in general, however it is more a call for equity in the recognition that practicing engineers have as much useful knowledge gained from technical work conducted in a business environment. Surely this has some parity with knowledge gained from a depth of study within a narrowly focused theoretical world. And quietly many would agree that the "paper mill" mentality of the current academic environment gives rise to more "fluff" papers than we would care to admit. In fact, maybe this paper is one of them.

Repeatedly I have fielded questions from construction and engineering personnel asking why we do not prepare student more for "actual" work. My response to this is that the majority of the educators are research oriented, who have minimal or no background in practice, and even less so in business. As a result the theoretical side of engineering dominates, and the business side of the equation is marginalized. In reality the majority of the graduates will become both practicing engineers, and eventually businessmen and women. Why diminish the importance of business acumen other than it is not the educators area of expertise?

### **Postscript**

This paper was never intended to be a rigorous, data mining experiment. The contents are more of a reflection on the comments received over an eight year period from industry personnel observing deficiencies in engineering graduates as a whole. Having arrived in academia after practicing for many years, the author encountered the same issues prior to academia in hiring for his own department. Once one gains entrance into the hiring and tenure process for academia, it is obvious there is a disconnect between goals of academia and industry. Academia seemingly focuses on producing more academics, and industry desires to have proficient practicing engineers. The direction of the hiring and tenure practices seems to serve to widen this gap. The "bigger is better" mentality, is not always prudent, but is unfortunately easier, and more readily accepted.