Problem-based Learning

Commentary: Gender, Teaching Reform, Promotion, and Tenure

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An education policy forum by distinguished scientist-educators in Science [1] revealed their frustration that science education is not changing in response to what we know about learning [2, 3]. There seems to be a lack of interest by or incentive for most research-active educators and others to embrace active-learning approaches in their teaching. As one who adopted a problem-based learning (PBL) approach to teaching after many years of lecturing, I share this frustration and have taken an interest in identifying characteristics of those who explore active-learning methods.

For over a decade, I have been part of a team that has offered multiday workshops on PBL. Starting in 1994, these workshops initially targeted faculty and instructional staff at my university but soon also attracted significant numbers of national and international participants [4]. Early on I noted the gender bias in our scientist team of two men and five women, a sample too small to be significant. However, that bias has revealed itself repeatedly in the gender makeup of the 20–70 participants in the many workshops we have conducted. Typically, as many women as men register from a population that is predominantly male. Since 1997, 50.8% of the 632 participants have been women [5]. The percentages broken down by groups show that 50.4% of the 347 campus participants and 57.7% of the 194 visiting domestic participants were women. However, only 37% of the 91 international participants were women.

It is perhaps significant that of the members of the original team, the two men were tenured full professors with waning research careers whereas only one of the five women, all of whom taught introductory science courses, had a tenure track position and was tenured. In other words, promotion and tenure were not prominent issues for the initial PBL adopters who became the workshop leaders. Although I do not know these career issues for most of those who have attended our PBL workshops, casual observation suggests that the pattern exists there as well. Namely, the participants have teaching as a primary responsibility, and a significant proportion is not tenure track faculty or is already tenured. Also related, I find it difficult to persuade research funded faculty to attend these workshops.

These anecdotal observations tie in with a National Science Foundation-sponsored study at the University of Colorado that aims to determine the fate of women who earn science Ph.D.s, stay in academe, but do not become tenure track faculty [6]. There and presumably elsewhere, many women with comparable academic credentials have followed alternative career paths from men. Interviews reveal an active avoidance of a tenure track faculty career because of the high level of competition and the challenges of raising a family. Yet many of these women play key roles in undergraduate education and education outreach. They enjoy working in a collaborative environment. Thus, non-tenure track faculty are more likely to be women, and they seem to be more likely to be in a position and motivated to try innovative teaching methods. However, control of the curriculum resides with tenure track faculty. Does this signal that the current research-scientist-as-educator model is an illusion and that the academic career structure, timing, and climate need adjustment?

Although university promotion and tenure documents typically claim equal weight for teaching and research accomplishments, reality differs. An assistant professor in the sciences takes an enormous risk if he (or sometimes she) stakes his promotion and tenure on teaching accomplishments and educational research. Letters from external research evaluators have a preemptive influence on voting colleagues. In an environment where we measure success in research funding and where institutional income based on teaching comes from tuition that is not directly coupled to individual faculty performance, the greater importance of research than teaching in the reward structure is transparent.

I remember a chemistry education conference in which I and other tenured faculty strongly advised assistant professors to wait until they got tenure based on their research before coming out as a person wishing to try innovative teaching methods or do disciplinary education research. This issue became a persistent conversation topic for the rest of the conference. Our pragmatic advice based on experience was vigorously attacked by the untenured faculty who saw it correctly as hypocrisy. It perpetuated the status quo. “How are things ever going to change if you guys who have influence will not encourage those of us who do not?” they asked.

Clearly there are barriers to change. I suspect there are many tenure track faculty who enjoy teaching and would be quite receptive to modifying how they teach but per-
ceive such efforts as time wasters leading to professional suicide. Others do not accept or consider the evidence and cynically equate “active learning” by students to “passive teaching” by faculty. And some do not see any problem or leave it for someone else. Without the attention of the mostly male faculty in these groups, transforming undergraduate science education will continue to cause frustration for those interested in maximizing student learning.

REFERENCES