

REALITY CHECK

For engineers, returning to school to pursue a doctorate comes at a cost.

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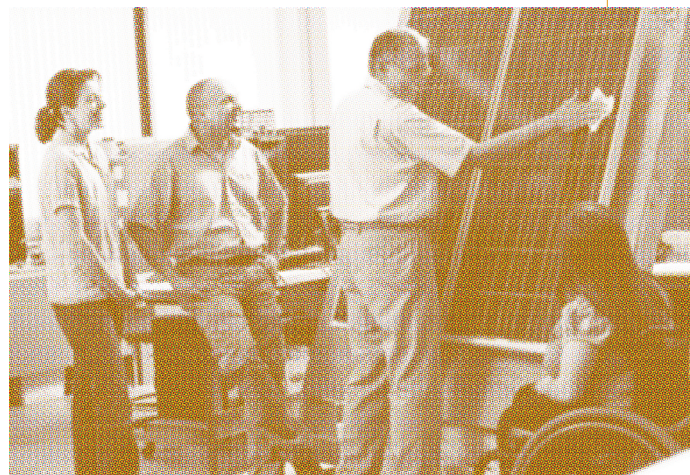
Engineering professionals who return for advanced study after significant time in the workforce are an often overlooked group that can provide diverse perspectives and experiences within engineering programs. In our study, we focused on those who returned for an engineering Ph.D. and potential factors that could shape their decisions to pursue and persist in doctoral study. We examined how returners' perspectives compared with those of direct-pathway students who pursue an engineering doctorate shortly after completing their undergraduate degree.

Returners begin their doctoral studies with exposure to real-world engineering problems and problem-solving approaches they can draw on. Studies of returning adult students in engineering and other disciplines also suggest these students may be highly motivated, goal-oriented, and well situated to apply their academic work more directly to other contexts. Further, the possibility of integrating experiences from professional and academic engineering contexts can be fertile ground for innovation.

However, little is currently known about engineering returners at the doctoral level. Why do they decide to pursue Ph.D.'s? What barriers might they face in completing their degrees? Do their experiences in their programs differ from their direct-pathway peers? To examine these questions, we drew on Eccles's expectancy-value theory, which posits that individuals' achievement-related choices (such as pursuing or remaining in doctoral studies) are motivated by beliefs that they will succeed in their pursuits of this choice, as well as the values they associate with it. Eccles identifies four primary types of values: personal interest/enjoyment, utility, fulfillment of identity-related goals or needs, and the relative cost of pursuing a particular choice. Recently, though, there have been calls to conceptualize cost as a distinct element of an individual's decision making.

Our team developed the Graduate Student Experiences and Motivations Survey (GSEMS), which includes questions on students' personal and academic characteristics; decision to pursue a Ph.D.; and the costs, values, and expectancy of success related to pursuing a Ph.D. Our sample comprised 476 domestic U.S. returning and direct-pathway engineering doctoral students. We explored factors related to students' expectancy of success prior to enrolling and at the time of the survey using ordinal logistic regressions. We then conducted exploratory factor analyses on scales of students' perceived values and costs. We used the resulting three value and three cost factors as our dependent outcomes in six regression analyses of the characteristics and experiences related to students' perceived values and costs associated with pursuing an engineering Ph.D., including their returner status. Our value scale factored in a way that was consistent with Eccles's original value types (aside from cost), while our cost scale analyses suggested three emergent dimensions: financial, academic, and work/life balance.

Our analyses suggest that while there were no significant differences in returners' and direct-pathway students' expectancy of success at the time of the survey, returners' retrospective assessment of their expectancy of success prior to enrolling was significantly lower. There were no significant differences between the two groups related to the perceived values associated with pursuing a Ph.D. Most notably, however, returners reported significantly higher perceived academic, financial, and work/life balance costs than did their direct-pathway peers.



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It is possible that lower pre-Ph.D. expectancy of success and higher perceived costs could negatively shape returners' decisions to enroll and persist in engineering doctoral programs. In light of this, we recommend that universities track returner status to better understand these students and target interventions to better support their success, potentially broadening the types of pathways available through advanced degree programs in engineering. We also suggest that universities consider the ways existing resources, such as targeted advising, funding opportunities, wellness programs, and childcare services, might be strategically leveraged to support returning students. Additionally, we invite universities to consider other programs, such as a returning student organization, that may be able to help ease returners' transition back into academia.

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