Undergraduate Education at NSF

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While a passion for scientific and technological innovation and the promise of a career with above-average job prospects may lead many undergraduate students to declare a major in a scientific field, fewer than half of them will actually complete their degree in one of these areas, according to a 2012 report by the National Center for Education Statistics.

There are several organizations committed to better understanding and addressing these gaps in STEM (science, technology, engineering, and math) education and retention, including the National Science Foundation (NSF). The NSF's Division of Undergraduate Education manages a host of programs in teaching and education research. During a symposium at the 25th APS Annual Convention, a group of reviewers for one of these programs, Transforming Undergraduate Education in STEM (TUES), comprised a panel of experts who gave tips and advice about securing NSF funding, with implications for psychological science .

Psychology lags behind other fields like biology and chemistry when it comes to the number of proposals seeking funding under the many NSF programs that will soon be condensed into the new Catalyzing Advances in Undergraduate STEM Education (CAUSE), a veritable one-stop-shop for programs in STEM education research, design, and implementation.

Securing funding from these programs starts with a compelling idea, usually found by identifying a hole in the current STEM education literature or practice, and coming up with an innovative way to study or address this gap. From there, proposers must develop strong methodologies with robust internal and external validity informed by pilot testing or other evidence, and they should outline concrete outcome measures. Panelists stressed that in the end, the best proposals are not only unique and transformative, but they are also interdisciplinary, adaptable for other institutions, and efficient in their budget and schedule.

Maureen Erber, associate professor of psychology at Northeastern Illinois University, included all these elements in her recently funded project implementing an expanded Peer-Led Team Learning (PLTL) model for engaging students in undergraduate psychology courses. Peer-led workshops and activities drive the teaching in this model, upending the traditional top-down educational paradigm to empower students to construct their own understanding of the material, while also developing their leadership skills. PLTL has previously been successful in engaging students in life science fields such as chemistry, providing Erber with solid evidence for her proposal. She specifically designed her model to adapt not only to other institutions, but also to other social science fields. She included clear metrics by which the success of the model can be measured, and provided a convincing argument for the transformative potential of PLTL in psychology courses.

The NSF is particularly eager to fund proposals in psychology like Erber's, ones that can recruit and retain students in STEM fields and also increase the scientific literacy of the citizenry as a whole.

Psychology is a uniquely positioned field in this respect because required introductory psychology courses serve as many students' only exposure to the fundamental scientific reasoning principles that are at the heart of all STEM-related pursuits.

With the potential for new education initiatives to influence the undergraduate population in such a profound way, and the NSF enthusiastic about funding such initiatives, psychologists have a tremendous opportunity to put their research or teaching initiatives into action through programs like those from the NSF.

References

STEM in Postsecondary Education: Entrance, Attrition, and Coursetaking Among 2003?04 Beginning Postsecondary Students. National Center for Education Statistics, 2012.