JOURNAL OF CHEMICAL EDUCATION
Cite This: J. Chem. Educ. 2018, 95, 1083−1085
Editorial
pubs.acs.org/jchemeduc

The Mantra of Graduate Education Reform: Why the Prayers Aren't Answered

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Supporting Information

ABSTRACT: The regular drumbeat (a mantra) of similar recommendations to advance graduate education by a constant stream of national studies over the past two decades has failed to prompt action. We propose several reasons why the studies have not gained traction, including the fact that the target recipients of the studies—students, faculty, and administrators—have not been asked whether they agree with the studies' recommendations. A survey we recently conducted of the beneficiaries of the recent national study of graduate education by the American Chemical Society reveals sharp differences in opinion regarding the study's three dozen recommendations that can be attributed to the pains and values of the various demographic groups that are impacted by the proposed changes. To develop a consensus path forward to reform graduate education, the survey results clearly speak to the need for further conversations that include the entire community of stakeholders, not just those who write the reports.

KEYWORDS: *Graduate Education/Research, Professional Development, Curriculum, Standards National/State*

A plethora of national studies of graduate education over the past two decades have yielded similar recommendations for reform but very little action. Beginning with the seminal 1995 National Academy of Sciences study *Reshaping the Graduate Education of Scientists and Engineers*,[1] two fundamental truths have been recognized and echoed in most of the dozens of subsequent studies, including a study by the American Chemical Society published nearly two decades later (*Advancing Graduate Education in the Chemical Sciences*).[2] First, most STEM Ph.D. recipients do not pursue careers in academics,[3] indicating that a broader range of instructional options is required. Second, it takes too much time to complete a Ph.D., and a concerted effort is needed to reduce the time to degree (TTD).[4]

WHY THE STUDIES HAVE NOT GAINED TRACTION

Many reasons could explain why the numerous studies have not resulted in substantive advances in the way we train graduate students. Unresolved natural tensions exist between some of the recommendations, for example, how nonacademic career development is to be achieved while reducing the TTD. Also, paths forward to implement the recommendations have not been provided; sustained efforts have not followed the studies; no go-to place exists to share best practices; and the unique challenges and traditions of individual disciplines and institutions are not often recognized. Although all of these reasons deserve consideration, here we focus on perhaps the most important reason for why these studies have not produced action: the entire community of stakeholders in the graduate education reform movement has not generally been consulted and engaged during or after the studies to learn whether they agree with the recommendations.

The target audience for the aforementioned studies included the presumptive graduate education "gatekeepers": faculty, administrators, and other policymakers. Graduate students and postdoctoral fellows were generally viewed as the recipients of policy, not as collaborators during the process of policy development. In response, we recently asked[5] the *entire* community of stakeholders of chemistry doctoral education—undergraduates who plan to go to graduate school, graduate students in various stages of their studies, recent graduates and postdoctoral fellows, faculty, and administrators—to indicate their level of support for the conclusions and the accompanying recommendations of the ACS study. The more than 1200 respondents to the survey reveal that some ACS study recommendations are universally popular, such as teaching additional professional skills to graduate students, which was given a high priority by three-quarters of the respondents, regardless of demographic group affiliation. Others were less popular, such as adding a requirement for at least two research proposals as hurdles to graduation, a recommendation that became even more unpopular with students as they progressed in their studies. Of particular interest, however, are the controversial recommendations, as disagreement could foretell conflict and therefore barriers to reform. For example, the recommendation to shorten the average time to Ph.D. degree from the current 6−7 years in chemistry to less than 5 years was strongly supported by

Published: July 10, 2018

DOI: 10.1021/acs.jchemed.8b00354
J. Chem. Educ. 2018, 95, 1083−1085

students, recent graduates, and administrators, with more than half considering the issue a high priority. In contrast, two-thirds of the faculty disagreed with the recommendation or gave it a low priority (Figure 1).

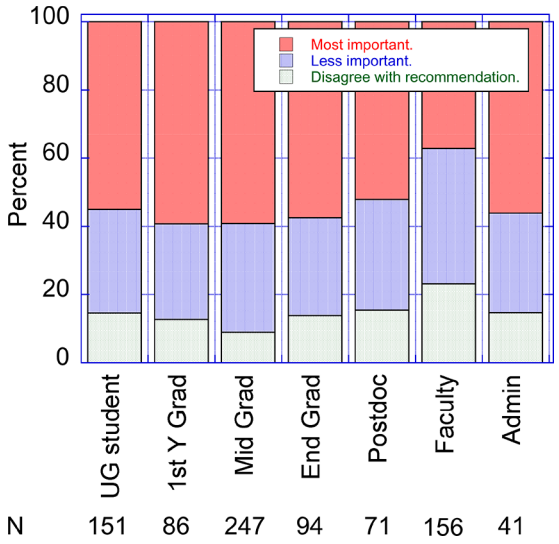

Figure 1. Responses to the recommendation that the current time to degree (TTD) of 6−7 years should be shortened to less than 5 years. Except for the faculty, all demographic groups agree that shortening the TTD should be a high priority. More than half of all students, recent graduates, and administrators believe that the recommendation should be a high priority, whereas two-thirds of faculty believe that it should be a low priority (40%) or do not agree with the recommendation (23%).

DIVISIVE ISSUES

While it is attractive to focus on addressing issues that have broad support, we cannot ignore divisive issues that threaten the underpinnings of reform. Importantly, no demographic group should be singled out as obstructionists, such as the faculty in the case of the recommendation to shorten the average time to the Ph.D. degree. Indeed, survey results disaggregated by demographic group of doctoral education stakeholders reveal something obvious yet telling. Specifically, stakeholders view reform from their own perspectives, their lenses filtered by their own pains and needs. Faculty face considerable pressure to deliver ever more to their undergraduate students, institutions, and funding agencies. Thus, asking them to deliver doctoral-level education in less time adds to their pain. Asking faculty to graduate doctoral students at the end of their fifth (instead of sixth or seventh) year, at a time when students are perhaps most productive in the research laboratory, may be interpreted by faculty as a request to reduce overall research productivity.

Imagine, however, that the recommendation to shorten the average time to the Ph.D. degree was rephrased, whereby earlier graduation will be achieved by requiring students to work more hours a week to reach the same research productivity in 5 years as they previously did in 6 or 7 years. Such an approach to shorten the average time to Ph.D. degree would shift the pain to students. Given that most students already work long hours in the laboratory,[6] they would likely find the proposition absurd.

TTD is not the only divisive issue. One-third of male graduate students disagree with the recommendation that greater emphasis should be placed on empowering underrepresented groups, whereas more than half of the female graduate students believe the recommendation should be a high priority (with less than 10% disagreeing with the recommendation). Moreover, while there is significant opposition from all demographic groups to the recommendation that chemistry departments in the United States should build up their fraction of domestic graduate students, 27% of U.S. residents disagree whereas 60% of non-U.S. residents disagree. Importantly, the pains and needs of graduate students evolve as they progress through their studies. For example, undergraduates who intend to go to graduate school and first-year graduate students offer the most support among student groups for the recommendation that there should be more active diagnosis and remediation of deficiencies in the preparation of first-year students; however, that support wanes as students progress through their studies. It is noteworthy that faculty offer more support for the latter recommendation than any other demographic group.

CONCLUSION

The stark reality is that reform is unlikely unless the pains and needs of each stakeholder group are recognized and addressed.[7] We suggest, however, that this reality can be confronted effectively only in doctoral programs that allow and even invite candid conversation about the pains and needs of every stakeholder group—including, and especially, students. However, herein lies a fundamental challenge: graduate students and early-career faculty are not forthcoming when asked to critically evaluate graduate education. They fear (in some cases, rightfully) retribution from senior faculty that hold their futures in the balance. New faculty, who recently experienced the pain and needs of students, must emulate their tenured colleagues to secure their place in the academy. As they do so, they unwittingly stunt the ability of the academy to adapt to the changing needs of our society.

In contrast, each doctoral student generation continues to evolve with our society, widening the gap between the pain and needs of graduate students and those of their faculty mentors. The chit-chat in the hallway among faculty mentors is true—students are not the same as they used to be. However, this is not the case for the (sometimes pejorative) reasons that are often cited. Students today do not lack the work ethic exhibited during the last century. They are not lazy. Indeed, having grown up with the Internet and evolving technology, the current generation of doctoral students (and early-career faculty) possess skills previous generations never imagined. Multitasking is ingrained in their DNA. They are ready to engage with the inter-, multi-, cross-disciplinary/cultural world that is our future. To ready the academy for that future, it is time to respond to the mantra with candid conversation.[8] However, until students and early-career faculty are empowered to safely express themselves, the honest dialogue academia so desperately needs will not take place, and the necessary reform of graduate education will not occur.

ASSOCIATED CONTENT

Supporting Information

The Supporting Information is available on the ACS Publications website at DOI: 10.1021/acs.jchemed.8b00354.

DOI: 10.1021/acs.jchemed.8b00354
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List of representative national studies on the future of graduate education since 1995; five (paraphrased) conclusions in the 2012 ACS study "Advancing Graduate Education in the Chemical Sciences"; paraphrased recommendations of the 2012 ACS study organized by common themes (with relevant literature cited) (PDF, DOCX)

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Notes

Views expressed in this editorial are those of the authors and not necessarily the views of the ACS.

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Michelle A. Maher is a professor and program coordinator of higher education administration programs in the School of Education at the University of Missouri—Kansas City. Her current research explores doctoral student research and disciplinary writing skill development and higher education access and equity issues.

ACKNOWLEDGMENTS

The survey data described in this editorial may be viewed at http://chemistry.graduate.education (accessed June 2018). The survey was funded by the National Science Foundation (NSF NRT-IGE 1633008).

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DOI: 10.1021/acs.jchemed.8b00354
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