

DEVELOPING EFFECTIVE PRACTICES FOR SUPPORTING ENTERING DOCTORAL STUDENTS

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ABSTRACT

Successful transition into doctoral degree programs is critical to helping students tackle the challenges germane to this degree and completing their degrees in a timely manner. However, the specific challenges vary as graduate education depends on contextual factors such as discipline, department, institution, and local, national, and international educational environments. Accordingly, a variety of resources and strategies have been implemented to support students within the transition to doctoral degrees. However, little research has emerged regarding what works in specific contexts and why. This workshop provides a starting point for developing this understanding by promoting conversations on practices currently used at both the individual advisor level and the department, college, university, etc. (hereafter referred to as institutional level) to support students in transitioning into doctoral degree programs.

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1 MOTIVATION AND LEARNING OUTCOMES

1.1 Motivation

Doctoral education remains critical to scientific advancement across all domains, including engineering, as outcomes include people prepared to engage in research and the research products themselves (e.g., European University Association 2022; National Academies of Science Engineering and Medicine 2018). However, the doctoral journey is not always easy and requires attention as to how we support students in skill development and degree completion (e.g., European University Association, 2022; National Academies of Science Engineering and Medicine, 2018, National Science Foundation 2023). Successful transition into doctoral degree programs is critical to helping students tackle the challenges germane to this degree and completing their degrees in a timely manner. However, the specific challenges vary as graduate education depends on contextual factors such as discipline, department, institution, and local, national, and international educational environments. Accordingly, a variety of resources and strategies have been implemented to support students within the transition to doctoral degrees. However, minimal research has emerged regarding what works in what contexts and why. This workshop provides a starting point for developing this understanding by promoting conversations on practices currently used at both the individual advisor level and the department, college, university, etc. (hereafter referred to as institutional level) to support students in transitioning into doctoral degree programs. While organizations such as the Council of Graduate Schools in the United States and European University Association in Europe discuss graduate education across all disciplines there is less focus specifically on engineering.

1.2 Learning Outcomes

As a result of this workshop, participants will be able to:

- describe resource/support needs for different student populations transitioning into doctoral programs;
- articulate ways that individuals and institutions can support students transitioning into doctoral programs; and
- identify approaches to support students transitioning into doctoral programs already being used by others that may be salient to their own context.

2 BACKGROUND, RATIONAL, AND RELEVANCE

Helping students successfully complete doctoral degrees in a timely manner requires supporting students in getting off to a good start. This includes helping students understand the doctoral degree process and expectations. However, this seemingly simple idea is complicated by the fact that doctoral programs and doctoral student experiences are variable and depend on contextual factors such as discipline, department, institution, and local, national, and international educational environments (e.g., Becher & Trowler, 1989; Biglan, 1973; European University Association, 2022; Ferrer de Valero 2001; Gardner 2009, 2010; Golde 2005). Differences in doctoral experiences are also found based on student characteristics such as background and demographics (National Academies of Science Engineering and Medicine 2018). For example, studies on graduate education in the United States have shown that doctoral engineering degree completion rates are lower and degree completion takes longer for historically marginalized students (National

Science Foundation 2023). These differences mean that there is not a one-size-fits-all approach to developing resources and supports for doctoral students, consequently different approaches may be needed in different contexts and/or for students with different background characteristics.

Accordingly, a variety of support programs and resources have emerged that focus on this transition period. For example, Tufts University in the United States has a news article promoting the importance of getting off to a good start and sharing campus resources: <https://asegrad.tufts.edu/news-events/news/transitioning-your-graduate-program-importance-time-management-and-self-care-graduate-students>. Similarly, the University of Saskatchewan has a resources website: <https://cgps.usask.ca/onboarding/transition/transitioning-to-grad-school.php>. An Australian University has a program called Transition In which is embedded in their curriculum (White 2023). Columbia University has a Bridge to the Ph.D. in STEM Program (<https://bridgetophd.facultydiversity.columbia.edu/>) that is a support program outside of the curriculum. Recognizing the important role of the advisor in the doctoral journal, programs such as the Center for Improvement in Mentored Experiences in Research (CIMER, <https://cimerproject.org/>) focus on improving individual mentoring.

Because transition is recognized as critical, programs have also emerged to incentivize universities to create and provide transition support. For example, the Bridge to the Doctorate competitive funding opportunity provided by the National Institutes of Health in the United States encourages development of support programs for students. As another example, our research team has created a train-the-trainer program to help engineering colleges run a program that prepares historically marginalized doctoral students for the transition to the PhD. Our particular program [name de-identified for review] consists of workshops are intended to be held just before students start their graduate programs and into that first Fall semester. This workshop structure was designed and grounded in research on doctoral student development and has been tested across multiple institutional contexts for replicability.

Even with a structure designed to support students, and to motivate institutions to do so, what effective and appropriate support should look like remains a moving target. The graduate education landscape is constantly changing and there is a need to continually examine which students the support programs are serving, how the students are being served, and whether it is effective. To that end, this workshop provides an opportunity for researchers, educators administrators and graduate students to engage in an international sharing of practices regarding helping engineering students transition into doctoral programs. By collaborating across geographical, institutional, and disciplinary boundaries, we hope to challenge participants to think creatively and perhaps challenge perceived constraints by sharing ideas that work for students from different backgrounds and in a variety of contexts.

3 WORKSHOP DESIGN

Because graduate education is not a one-size-fits-all endeavour, this workshop has been designed to engage participants in rich, interactive discussion on effective means for helping graduate students transition into doctoral degrees in engineering. The timing and content of this 60-minute workshop are as follows:

5 min	Welcome and Overview: Introduction to the workshop and establishing a shared definition for supporting students transitioning into graduate school.
10 min	National Contexts: Input from audience members to identify national/regional contexts and demographic considerations relative to degree requirements for graduate education.
5 min	Intervention Results: Brief description of our intervention structure, outcomes to date, and challenges emergent from changing political climates in the United States.
15 min	Small Group Discussion and Sharing of Ideas and Practices: • In your research group/lab, how do you help students transition into doctoral work? Why do you take this approach? • What programs/resources exist in your department, college, university, etc. to help students transition into doctoral work? • What current contextual factors, if any, are influencing your approach? • What supports/resources do you wish existed for your students?
15 min	Reporting out from Small Groups Discussion and Sharing • Create a collective list of individual and institutional resources and practices; • Identify shared and unique contextual factors influencing on-boarding practices; • Generate a list of support needs/opportunities.
10 min	Next Steps: Opportunity for networking across institutions and contexts to learn more about specific ideas or practices.

4 RESULTS OF THE WORKSHOP

Our workshop had a small but engaged group of participants from multiple universities. Country contexts included the Czech Republic, Sweden, Switzerland, and the United States. Participants represented various roles within higher education including administrative, faculty, and graduate student.

Collectively the group identified individual support systems for helping students transition into the PhD including lab/research group meetings, setting expectations and practical guidelines for degree success, and ensuring sufficient mentoring which is sometimes scaffolded by postdocs or peer graduate students. Department, college and/or university resources included voluntary or compulsory seminars or classes for students that introduce topics such as ethics, publishing, scientific writing, and effective ways to engage with others, departmental level mentoring programs, and a welcome center focussed on supporting international students.

A common context participants considered when developing support practices are the needs of international students and helping them navigate language barriers and developing understanding differences in administrative processes. A unique context discussed extensively is one where students are hired by the University as junior colleagues and faculty advisors engage in significant training and apprenticeship

before they advise such students. This sits in contrast to models where individual faculty or units fund/support students.

Regarding desired support systems for helping students transition to the PhD, participants agreed that more institutional support is needed. Specific ideas included centralized professional development, more time allocations for supervising graduate students, and offering a fellowship year so students can focus on their own needs and getting off to a solid start.

At the end of the session, we asked participants to indicate one thing they learned that they would continue to think about. Several participants indicated learning about other contexts and specifically advisor training and expectations and reasons students pursue degrees and/or drop out of degrees in different settings. Participants also recognized a need to set expectations for students and for faculty in advising processes as well as considering the tension of graduate students as students but also as University employees and how some contexts prioritize one over the other.

5 SIGNIFICANCE OF THE WORKSHOP

With constantly changing political landscapes around the world, this workshop will provide an important avenue for sharing of ideas for supporting students in the transition into engineering doctoral programs that cross local geographical, institutional, and disciplinary boundaries. We generated a collection of practical approaches that engineering education stakeholders (faculty, administrators, graduate students) can leverage and adapt for local use.

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