

## **Revising the Dissertation Institute: Contextual Factors Relevant to Transferability**

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## Abstract

Data show that underrepresented minority (URM) engineering students have lower rates of completion and higher rates of attrition in their doctoral studies than their majority peers. To address attrition and support students, we have developed a research-based intervention that we call the Dissertation Institute (DI). As part of a five-year NSF-funded project, we have developed and refined the DI as a one-week intensive writing and workshop experience for URM in the final phases of their engineering doctoral degrees. We have hosted two DIs to date (2017 and 2018) and we are preparing for our third DI in 2019. The goal of the DI is to offer practical and timely experiences for URM doctoral students to contribute to their degree success. At the same time, we have been researching the motivational factors that promote or detract from degree progress. This analysis looks across the data we have collected and analyzed to date to describe how the DI has evolved over time and in research-informed ways. This approach is in alignment with the final project research question: *What are the critical contextual differences between the annual DIs that are important to consider with regard to transferability of DI for future sustainability?* We believe that other institutions, programs, and advisors can use our findings in developing local workshops as our research broadly indicates that the first two offerings of the DI have positively impacted students' motivation to finish their dissertation. In critically examining the DI itself and documenting the changes over time, we find that: 1) lack of writing is a symptom of other challenges in pursuing the doctoral degree, and 2) a balance of writing time and professional development is needed to support students. Although heavily grounded in research data (e.g., comparative analysis of quantitative and qualitative data gathered in each of the prior Dis), herein we describe the evolving design of the DI and lessons learned to date.

## Introduction

Data show that underrepresented minority (URM) engineering students have lower rates of completion and higher rates of attrition in their doctoral studies than their majority peers [1]. Previous research has argued that this higher attrition rate is caused by motivational factors like students' isolation within the program [2], unclear requirements to degree completion [3], poor communication with the advisor [4, 5], and the challenge of writing the dissertation itself [6]. Although these motivational factors affect all students, we acknowledge that they have a bigger impact on URM students in engineering programs where underrepresentation has been a long-standing issue across all levels of study [6]

To address attrition and support students, we have engaged in a five-year NSF-funded study to develop, and continually improve, a research-based intervention for advanced URM doctoral students (i.e., those at proposal or dissertation phase) in engineering. The primary purpose of the project is to develop and offer a sustainable, practical, and a timely experience to help shorten participants' time-to-degree and increase degree completion rates for URM doctoral students in engineering. The intervention, the Dissertation Institute (DI), is held annually and is a one-week experience. The background and motivation for the project itself is described in greater detail elsewhere [7] but the primary focus is to get students who are stuck in the writing phases to be

able to move forward. Overall, the DI is composed of structured time for students to engage in writing, facilitated workshops on topics germane to the completion of the dissertation and focus groups for students to share their progress throughout the week. The goals of the five-year project are threefold: 1) to conduct research to understand the motivational factors that promote and detract from degree progress, and 2) to develop and offer the DI to provide underrepresented doctoral students in engineering with motivationally consistent, helpful strategies for avoiding pitfalls that prolong completion times, particularly those at the dissertation proposal preparation and dissertation completion phases, and 3) to identify a list of variables to which we should pay attention in designing transferable versions of the DI.

This paper focuses on the last goal, by analyzing across the data we have collected and analyzed to date we describe how the DI has evolved over time in research-informed ways. This approach is in alignment with the final project research question: *What are the critical contextual differences between the annual DIs that are important to consider with regard to transferability of DI for future sustainability?* We believe that other institutions, programs, and advisors can use our findings in developing local workshops as our research broadly indicates that the first two offerings of the DI have positively impacted students' motivation to finish their dissertation. The next step is to examine the DI itself and document the changes over time so that we can identify the factors critical to transferability. To accomplish this, we comparatively analyzed a series of surveys, interviews and focus groups gathered before, during, and after each of the first two DI. Our analysis reveals that: 1) lack of writing is a symptom of other challenges in pursuing the doctoral degree, 2) a balance of writing time and professional development is needed to support students, and 3) building community not only among participants but also between DI leaders and participants is important. Although heavily grounded in actual data, herein we describe the evolving design of the DI and lessons learned to date pulling on prior analyses of the data and our experiences hosting the DI.

### Overall Organization of the D.I.

The DI consists of 3 main types of activities: workshops, writing clusters and time to practice writing (Figure 1). The driving idea behind the overall organization is that participants will learn skills that will help them continue making progress when they return to their institutions (workshops), have time to practice these skills (practice writing time), and discuss how things are going (writing clusters).

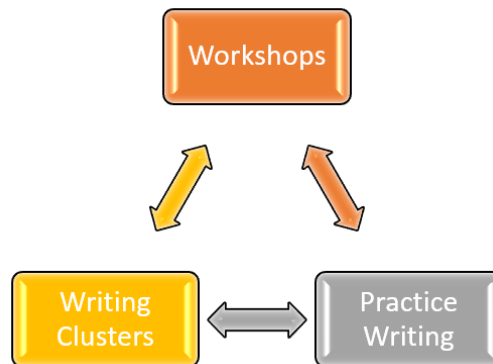


Figure 1. Dissertation Institute Main Activities

**Workshop Sessions:** Multiple 1 or 2-hour sessions lead by experts in dissertation topics to provide the participants with ideas, concepts, techniques and reflections about the writing habits and process, time management, communication with advisors, and overall topics germane to the completion of their dissertation.

**Practice Writing Sessions:** Significant amount of structured writing time distributed along the week to provide students with the opportunity to apply the workshop's lessons, practice their writing, and advance in their dissertation.

**Writing Clusters:** A daily hour-long focus group lead by a facilitator who is an experienced doctoral advisor. It consists of a semi-structured conversation with maximum eight students that meet to discuss and share personal progression during the practice writing sessions, and to reflect on the workshops' topics, personal motivations in the dissertation process, relationship with their advisor and other topics related to graduate school politics or challenges. These clusters are often accompanied by individualized coaching depending on participants' needs and group dynamics.

These main activities were informed by a design process grounded in research and theories about motivation [8, 9] and management education [10]. Additionally, as described in [7], we collected quantitative and qualitative data on URM doctoral engineering students and faculty who have advised URM engineering students prior to hosting the first DI. The analysis of these data and theories helped us to understand the needs for potential participants and their advisors, and enabled us to design the DI consistently with literature suggestions and best practices.

### **Research and Evaluation Activities Associated with the Dissertation Institute**

Our findings are supported by research and evaluation efforts. We have gathered survey data from 53 participants at the following time points: 1) pre-DI, at the start of the DI; 2) post-DI, at the end of the DI; and 3) post-post-DI, approximately six months after the DI. Although the sample sizes are small, we have completed some quantitative analysis. We have also gathered interview data during each DI from a total of 23 semi-structured interviews with participant volunteers during the DI and a total of 4 follow-up interviews conducted approximately six months after DI participation. Across the two DIs, we also engaged in multiple sessions with participants in 12 focus group sessions as participants discussed writing practices and habits.

We have analyzed much of these data using appropriate techniques and we have already shared findings relative to targeted research questions. For example, our research already shows that after attending the DI students had increased beliefs that academic writing is useful and that the benefits of writing outweigh the costs. The DI also contributed to positive success beliefs regarding academic writing; that is, participants considered academic writing to be a less difficult task and they had increased self-concept of being good at academic writing [11]. Moreover, data suggest that students increased their belief that they can be successful in communicating with their advisor, and their belief that they can complete their Ph.D. and be successful at conducting research [11]. Our analyses have also shown that over the course of the DI participant transition from thinking about the dissertation as a big task to a combination of smaller and more achievable tasks [12]. Finally, we have learned the ways through which minority student's underrepresentation in engineering affects their socialization into the discipline [13]. We will not

repeat the details of all of our analyses herein. Rather the results upon which we focus are a synthesis across these multiple data sources with citations to the relevant works.

As a research and implementation project, we also gathered evaluation data. In some cases, research and evaluation data are the same (and approved for research purposes through human subjects research approval by our institutions). Other data was gathered for evaluation purposes only (such observations during the week and feedback on workshop sessions) and is used only to inform team decisions. While we have taken care to report research data only, the author team hosts the DI and we interact extensively with participants and our decisions cannot help but also be informed by these experiences.

### **Lack of Writing is an Indicator of Other Challenges in Pursuing the Doctoral Degree**

As previously described, our intention with the original design of the DI had been to focus on developing and supporting writing skills and habits. Through the data collected and analyzed in the first years of the DI, we recognized that writing output is heavily connected and often a function of other doctoral experiences [12, 13]. Therefore, in the second year, we asked participants to self-identify challenges and we grouped students accordingly.

**Year 1:** In the first execution of the DI, we collected data from students assessing their progress in overcoming their obstacles every day. These conversations centered mostly around students' progress in writing the dissertation and their thoughts on the advice being provided in the workshops. Through our analysis we found a shift in the conversation from general questions about the writing process such as managing time to write and organizing your literature to more precise about how to structure a research story and developing your literature review ([12]). A second finding was that while students may not have expressed in the application that they experienced social isolation in their department, most of them were experiencing impostor syndrome [13]. We found this impostor syndrome was heightened by the heavy underrepresentation. However, students expressed that attending the DI, where they were able to meet people that 'looked like them' and had undergone the doctoral process and come out successful, helped adjust their beliefs about completing the Ph.D.

**Year 2:** As part of the continuous improvement, in the second year, students were asked to describe in the application the areas in which they believed they needed help through the DI. This question was also posed to advisors in the recommendation form they filled out to endorse their student's attendance at the DI. From these responses, we triangulated the main obstacles keeping students from making progress in their doctoral journey and identified four categories of obstacles: writing, motivation, time management, and social isolation. Note that the ordering is not intended to imply a degree of severity or sequential progression. The first obstacle category was the task of writing the dissertation. Students facing this obstacle were commonly in the very final stages and described experiencing 'writer's block' or inability in expressing their research results in writing. The second category was students who believed they lacked motivation. These students expressed a lack of self-efficacy in being able to commit to the work necessary to complete the degree. They described often procrastinating because they no longer wanted to conduct the research (or related activities), and in more advanced cases, inability to communicate clearly with the doctoral advisor. The third category was students that struggled in managing their time. These students described struggling with scheduling time for work relating degree

progress, balancing multiple responsibilities such as teaching or service, and planning their activities adequately for progress success. The fourth category was students that experienced social isolation within their program and/or their institution. These students expressed in their application struggling with specifically with being an ethnic and/or racial minority in a dominantly white space.

**Year 3:** As we plan for year three, we intend to continue having participants and advisors self-diagnose struggles as this approach has provided us with valuable information for tailoring the DI to incoming participants. Such information has allowed us to have a deeper understanding of the issues students face that may not be captured in the existing literature on doctoral education, particularly that relevant to minority students in engineering. As we did last year, we can support DI leaders in making sure the sessions are relevant and useful to the participants.

### **A Balance of Writing Time and Professional Development is Needed to Support Students**

Consistent with our findings above that writing is tangled with many challenges for URM doctoral students in engineering, we offer multiple workshops and they have changed slightly in content and time over the years as described in this section. As noted earlier, the week includes three main types of activities: workshops, writing clusters, and time to practice writing. Table 1 shows how the relative proportion of time between these activities has evolved. Note that we have increased the total length of the DI in order to offer the relevant workshops more time to do applications and more time to practice writing. The marginal increase in the total workshop time was due to an earlier start of programming on day one.

Table 1: Approximate Time Distributions for DI Activities

Activity	Year 1	Year 2	Year 3 (Plan)
Workshops	21	22.5	24
Writing Clusters	5	5	4
Time to Practice Writing	15.5	16	19.5

Workshops that have been largely the same for Years 1 and 2 and that will be for Year 3 are:

- **Making Writing Manageable:** This workshop offers a series of strategies to avoid writer's block or other struggles that people face before and during the actual process of writing. Examples of such techniques are free writing, separating production from editing, reducing the writing work to small units, and tracking progress to be accountable for the writing development.
- **Writing Mechanics:** This workshop deepens on the process of writing, from the elaboration of the outline and structure of the document to the revision and proofreading of the multiple drafts. Topics covered in this workshop reflect on that writing is mostly continuous revising or that texts that are easy to read are usually the result of hard

writing. Also, this workshop covered how to support claims and maintain the coherence and logic of the written document.

- **Healthy Writing habits:** This workshop focuses on the motivational aspects of the writing process. From managing the external conditions (e.g., space and time selected to write) to reflecting on the values, expectancies or other motivational factors involved in the personal writing process. The topics in this workshop included strategies to reflect and understand the personal writing process to strategies to take ownership of the writing process and apply those reflections into practice.
- **Time Management (and Procrastination):** The purpose of this workshop is to offer strategies to macro and micro manage time for the dissertation. The workshop offers techniques to take control of our own time and describes time as a resource. For example, considering the long-term timeline of degree completion, participants define daily activities and priorities that lead to progression in the dissertation, or, enumerating the activities and distractions that take time to work in the priorities, participants define strategies to reduce their negative influence on the advancement of their dissertation.
- **Demystifying the Ph.D. process:** The purpose of this workshop is to illustrate the participants with the typical steps of a dissertation process from the definition and description of the research problem to the dissertation submission. Topics covered in this session were the content and purpose of each chapter of a traditional style dissertation or proposal in addition to the behavior that departments are often expecting from doctoral students. This workshop included to debunk common myths, and discussed some of the unwritten rules about the process of completing a Ph.D.
- **Preparing for the Defense:** This workshop states the steps that doctoral students could follow to accelerate and facilitate the culmination of the dissertation. It describes the actions taken 4-6 months previous to the dissertation submission, the expected elements of a dissertation defense, and the further processes that lead to graduation. Topics covered included how to build a timeline for graduation including the time allotted for committee and advisor revisions, and practical guidelines for preparing and conducting the defense presentation.
- **Communicating with Your Advisor:** In this workshop, the facilitator presents the common misunderstandings in the communication with the advisor and suggest an additional explanation for the actual meaning of the messages given for many advisors and the expectations they have for their students. Topics covered included the acknowledgment that every department has a culture and unwritten rules (i.e., power relationships) and suggest ways for students to know such culture and foster relationship with their doctoral committee. For example, doctoral students are encouraged to communicate their expectations to their advisors because the nature of the advisor-advisee relationship makes that many decisions made by the advisor directly affect the fulfillment of the students' goals.

Workshops that changed from Year 1 to Year 2 that will stand for Year 3:



- **Career Options with a Ph.D.** The purpose of this workshop is to illustrate the different pathways that could be pursued after the doctorate. In Year 1, the session was facilitated by a one person who has had a career in academia. In the second year, the workshop was facilitated by two faculty, one with high experience in academy and administration and the other with high experience in industry. Topics included the common academic path for faculty (tenure, non-tenure track) and common skills that industry employers expect from graduates.
- **Special Topics.** In Years 1 and 2, we scheduled two sessions each year related to special topics that URM students face in a Ph.D. In Year 1 we had workshops on impostor syndrome and mindfulness. In Year 2, we had elements of mental health in graduate school, and microaggressions. Although they are not exclusive to the URM population, we selected topics that traditionally hinder the motivation to finish the doctorate. We will also have two topics in Year 3.

The Writing Cluster activity was largely the same for Years 1 and 2. As we work to incorporate more time for actual writing, we are planning one less writing cluster for Year 3. The main goal of the writing cluster is to allow students to talk about how things are going and process the daily activities in smaller groups. This also helps students form networks with fellow URM students so students can share and learn from each other. Through the writing cluster, students discuss, share and reflect on concerns and observations about the Ph.D. process, normative practices in academia, ways to overcome these barriers upon return to their home institution, as well as, personal progression in writing their dissertation during the week in the DI. Writing clusters have been previously shown to be a good way for minority students or traditionally underrepresented in academic spaces to process what they experience in academia every day and negotiate with peers how they make meaning of the doctoral process [14]. We were able to observe similar behavior across participants in our writing clusters. Writing clusters became the space where participants not only processed out loud and among peers the advice they received but also discussed barriers that could keep them from implementing these solutions when returning to their institutions. Because the students were sharing these barriers among like peers and facilitators, the conversation also provided a space where they could learn that they were not alone in their struggles and that the difficulty of pursuing a PhD is common, thus relieving students of impostor syndrome. As a consequence of being able to discuss their issues, we were able to observe students' questions transition from broader ones such as discussing the parts of the dissertation to specific ones about how to frame results among others. This finding demonstrated that students were able to engage with their writing and work past some of the issues underlying their doctoral pursuit. A deeper discussion of this analysis is under preparation and will be published elsewhere [16].

The DI includes a significant amount of structured writing time (Practice Writing) as part of the week to offer spaces and time for students to apply the lessons and practice their writing on their dissertation. We did not micromanage the students time, but we encouraged students to use that time efficiently to work on their dissertation rather than on other tasks. To encourage students to invest more writing time on their dissertation we apply four strategies: 1) we ask the prospecting participants to define which part of their dissertation they want to write during the week; 2) we

schedule writing clusters right before the writing time and prompt students to disclose their plans and goals for the writing session; 3) the writing clusters' facilitators asked students to reflect and share about their progression during the previous writing session; 4) we did not schedule anything after dinner so participants could use night as a writing time (except for a celebratory dinner at the end of the week); and 5) we suggest participants to try different scenarios, locations, dispositions and times to write. We prompted students to reflect on the effects of these different settings on their writing productivity and apply their conclusions into their writing practice after the DI.

## **Discussion**

As we prepare for the third DI, we have identified two critical factors to consider with regard to sustainability of the DI. First, there is a need to support writing while also addressing underlying challenges that contribute to difficulties in writing. Second, there is a need to balance the amount of workshop time and writing time to assure students can make sufficient progress.

Considering these findings, we recognize that they are in some ways at direct odds and this makes balance hard to find. While it may be important to address a variety of obstacles students face in order to also support writing, having too many workshops intended to help overcome such obstacles also takes away from writing time. This tension is aggravated when also considering the importance of having participants work through and talk through challenges together. These conflicts highlight the notion that the final degree stages are not simply "writing it up" as faculty and students alike often say. Writing the proposal and dissertation are part of the degree process and as such are tasks that need to be done. But writing is also identity-building and part of the socialization process towards being a professional [15]. Considering how to balance the experience we offer students through the DI will take additional research to understand which elements are most effective for whom and why.

We also recognize that student input is key to designing a relevant and useful experience. The multiple ways through which students allowed us to hear their opinions about their experience in the DI helped us understand where the literature and our assumptions about the issues faced in graduate education were disconnected from their reality (e.g., the influence of funding on their everyday activities [15]). Because the doctoral experience in engineering is understudied from the minority perspective, we must continue to conduct evaluation and research activities to assure the DI continues to be a fruitful experience that will lead students towards degree completion.

On the other hand, we have not designed the DI based on particular goals of specific institution's advisors, administrators or faculty. We aim to provide practical and timely experiences for URM doctoral students, in general, to contribute to their degree success. However, we have used faculty's input in the participants' application to the DI to target specific areas where students need improvement. We encourage and remind each student to determine what advices apply to their own department's requirements. For example, we suggest students to keep in mind deadlines, milestones or other elements that are needed to finish the dissertation, and encourage participants to create their plan according to their program or school guidelines. Institutions interested in developing their own workshops, could be more specific in the advices related to their particular guidelines and requirements for graduation.

Finally, we also recognize that changes have repercussions from a systems perspective. There are always unintended consequences of making changes. Literature on systems [16] [17] consistently points out that no change is made in isolation rather there are always dynamics at play. For example, through our efforts to provide a better and more helpful experience for participants, we have added total time to the DI. It is possible that this will be a deterrent for participants that are already struggling to be able to spend a week away from home. This is particularly important as we consider that URM often have additional family demands on time than majority peers [18], particularly those that are first generation college students [19]. Therefore, we have considered contingency plans such as offering childcare and accommodating participants travel needs whenever possible.

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