WIP: Implementing the Rising Doctoral Institute, A Case Study in an R1 University of the US Northeast

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***Abstract*—The purpose of this Work-in-progress, research-to-practice paper is to illustrate the implementation of the Rising Doctoral Institute (RDI) at an R1 university in the Northeast of the US. The RDI is a research-based NSF-funded intervention directed at first-year doctoral students in engineering programs that aims to address common student struggles such as doctoral program management, fostering advising relationships, day-to-day management activities, navigating the culture of graduate school, and finding their place in the research community. The RDI curriculum was built leveraging research findings from a large dataset from a different intervention project aimed at later-stage graduate students. Throughout this process, we studied the experiences of roughly 125 underrepresented racial and ethnic minority (URM) doctoral students and identified five themes relating to the common struggles they face throughout their Ph.D.**

One of the objectives of the RDI project is to disseminate our intervention to approximately 25 institutions. Over the past two years, leaders from institutions that were part of our pilot dissemination were trained in our RDI curriculum and implemented a version of the RDI in their schools. This paper describes the implementation in one of those institutions that built and adapted two different versions of the RDI based on their students' needs and the logistical constraints of their institution.

Based on a thematic analysis of interviews conducted with the collaborating institutional leaders (CILs), our study showed three initial findings: 1) Both RDI models allow a supporting community to navigate the challenges in graduate school; 2) The biggest challenge for each local RDI model is logistical; and 3) The support offered to URM graduate students motivates CILs to continue implementing the local RDI.

I. INTRODUCTION

Extensive research has demonstrated that underrepresented racial and ethnic minority (URM) doctoral students encounter challenges that hinder their progress toward degree completion. Sowell and colleagues [1] expose challenges for URM students in three significant aspects of a Ph.D. journey: 1) advisor-advisee relationships, 2) understanding Ph.D. expectations, and 3) social interactions. Specific to engineering, it is common that URM doctoral students experience isolation, tokenism, exclusion, racial stereotyping, and lack of support [2-10]. Based on these research studies and considering the assets that URM students bring to the engineering field, it is imperative to recognize URM students' unique experiences and support their Ph.D. success at different program stages.

Research has demonstrated that URM graduate students in engineering take longer to complete their degree and have higher attrition rates when compared to non-URM students, critically URM doctoral students usually leave doctoral programs within the first two years [1]. To address this problem, we developed the Rising Doctoral Institute (RDI) which aims to provide a timely and preparatory experience for rising doctoral students in engineering to address issues related to transitioning into the Ph.D. encountered by underrepresented students. The RDI is also focused on transferring this research-based intervention to other institutions and allowing our institutional partners to adapt it considering their institutional contexts. We called these interventions a local RDI.

This paper illustrates insights into the implementation, challenges, and overall perception of two different local RDI models from those directly involved in their execution and support within an R1 university in the Northeast of the US. Specifically, we address the question: **How do institutional partners perceive the implementation of their local RDI?**

This work was funded by the National Science Foundation under grant No. 2029796, 2029784, 2029782, and 2029785. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

XXX-X-XXXX-XXXX-X/XX/$XX.00 ©20XX IEEE

DEFINITION OF TERMS

National RDI: The intervention developed by the research team from the NSF-funded project and implemented at a national level.

Local RDI: The RDI implemented in universities across the country by institutional partners tailored to their contexts and using the guidelines provided by the RDI.

Collaborating Institution Leader (CIL): Institutional collaborators at universities, who lead the implementation of the local RDIs.

II. CONTEXT

The RDI is an NSF-funded initiative to provide a timely and preparatory experience to help incoming doctoral engineering students in their transition to their doctorate. Our research team considers helping first-year doctoral students' transition would likely increase their success and graduation rates. The national RDI is a four-day program that offers support to prepare minoritized engineering graduate students to transition to their Ph.D. program and is conducted before students start their first semester. The RDI consists of a series of workshops based on five topic areas (See Table 1), and success groups to provide students with a support network from the beginning of their program. Details about the RDI workshops, the success groups, and theoretical underpinnings are reported elsewhere [11].

TABLE I
RDI TOPIC AREAS AND WORKSHOPS

Topic Areas	Key takeaways
Doctoral program management	• Students enter graduate school with misconceptions that can ultimately impact their persistence. • Having a clear understanding early on can help them make critical decisions conscientiously. • Funding types and management have been shown to impact the doctoral experience and time to degree. • In the case of minoritized students specifically, the investments made to attend doctoral education often extend beyond the financial.
Advising and interpersonal relationships in graduate School	• Learning how to handle disagreements has been shown to increase persistence. • The process of selecting an advisor is often complex. • Maintaining a positive advising relationship is a key factor for student retention. • Awareness of the broader departmental politics and environment can be key to the development of graduate students and their persistence. • Minoritized students in engineering have been found to struggle with this awareness.
Day to day strategies for graduate school success	• Shifting from a prescribed schedule and explicit assessment guidelines in the undergraduate to a hidden process at the doctoral level is often a barrier for students who lack self-management. • The writing process can often be a challenge for engineering doctoral students as they may not have developed these skills in their undergraduate.
	• Minoritized doctoral students often experience impostor syndrome and lack belongingness.
Being minoritized in graduate school	• Managing such and creating support systems such as peer groups and mentoring relationships can help students manage to be visibly different from the norm in academia and persist in the doctorate. • The continuity of these feelings can develop mental health issues and impact doctoral progress.
Life post Ph.D.	• Over 70% of engineering and other STEM doctorate holders have been shown to pursue careers outside of academia, such as industry and government.

To transfer this research-based intervention to other institutions we invited CILs to implement a local RDI. These CILs were selected because their institution showed a need for developing support for URM doctoral students, had experience in advising doctoral students, and they were willing to implement an RDI workshop on their campus. To support this process, the CILs participated in a training workshop offered by the RDI PI team, and a series of discussions to develop their local RDI.

In this paper, we present insights into the implementation of a local RDI at an R1 university located in the Northeast of the United States. The first iteration (from now on called **local RDI Model 1)** consisted of a three-day workshop series combined with an interactive lunch Q&A during the last day. The workshops were composed of open sessions with faculty and administrative staff from the University, and presentations and success groups with current graduate students from the institution. For this iteration, 10 URM Master's and Ph.D. students attended. The second iteration (from now on called **local RDI Model 2)** consisted of a running workshop series for the academic year 2023-2024 combined with an interactive lunch question and answer session. This model essentially integrates the workshop and success group components. These sessions are held periodically throughout the year and host URM students starting either their Master's or Ph.D. degrees. For this iteration, 12 students participated (Table 2 shows details of their demographics, Table 3 and 4 show the schedule at a glance for each iteration).

TABLE 2
RDI COHORT DEMOGRAPHICS

Demographic Information	RDI Cohort 1	RDI Cohort 2
Number of Participants	10	12
Race/Ethnicity		
• Hispanic or Latino/a	6	5
• Black or African American	3	5
• Other	1	2
Gender		
• Man	2	10
• Woman	8	2
Degree Track		
• PhD	8	11
• Master's	2	1

TABLE 3
RDI MODEL 1 SCHEDULE -WORKSHOPS

Time	Sunday Aug 15	Monday Aug 16	Tuesday Aug 17
Morning		• Finding Balance • Navigating Landscape • Funding	• Dean's Welcome • Good Start to Grad School • Student Panel
Lunch		• Office of Graduate Educational Equity Programs	Students' Groups (Multicultural Engineering Graduate Association, Graduate Women in Engineering)
Afternoon	• Welcome • Tips from the top • Success Groups	• Time Management • Advisor Relationships • Build Team/Network • Success Groups	• Mental Health Resources • Closing • Success Groups
Dinner	Keynote: Grad School Success		• Downtown Walking Tour (optional)

TABLE 4
RDI MODEL 2 SCHEDULE -WORKSHOPS

Time	**Workshops**
Aug 14, 5- 7:30 pm	RDI kickoff
Sep 19, 12-1 pm	Time management
Oct 6, 12-1:15 pm	Building your brand
Dec 13, 12-1:30 pm	Finding funding Navigating university landscape
Feb 26, 2:30 – 3:30 pm	Graduate student wellness
Mar 18, 2:30 – 3:30 pm	How to be a good mentee
Apr 5, 12 - 1:30 pm	Resilience as a young professional

III. METHODS

To provide a preliminary answer to our RQ How do institutional partners perceive the implementation of the local RDI? we conducted a thematic analysis [12] of interviews with CILs from a US Northeast R1 university after each of their local RDI implementations. The interview process involved two researchers from our team. Each researcher, independently, assigned initial codes to denote aspects pertinent to our research inquiry. Subsequently, a peer debriefing session was conducted to discern emergent themes from the initial analysis by combining or grouping codes that exhibit a common unifying characteristic [12]. The following section shows a description of the themes identified. Quotes supporting our findings have been adjusted for clarity.

IV. FINDINGS

Our analysis showed three initial findings: 1) Both RDI models allow a supporting community to navigate the challenges in graduate school; 2) The biggest challenge for each local RDI model is logistical; and 3) The support offered to URM graduate students motivates CILs to continue implementing the local RDI.

A. RDI models allow a supporting community to navigate the challenges in graduate school.

This theme reflects how both models from the local RDI provide URM participants with the opportunity to create a community with other peers and CILs. Additionally, participating in the local RDI allowed participants to be prepared for their journey and to have the opportunity and the confidence to ask questions and support. For example, the CILs indicated that local RDI model 1 provided more time for participants to interact and connect before the beginning of their program.

"The students are meeting each other, and probably connecting better early on (…) because they're forced to spend so much time together in those 2 to 3 days."

These interactions enhance the opportunities for URM graduate students to create a community from the beginning resulting in a support network to face the various challenges they likely encounter. In addition, the CILs recalled a highlight of this model is to provide students with prior knowledge, elicit questions and give them the confidence to ask for support. As stated by a CIL, local RDI model 1 prepares participants to ask questions at their program orientation.

"I think by doing that, we have given them maybe a little more confidence to ask questions. [because] you don't know what you don't know right when you're starting. And then, now that we've given them specific information [it made them realize that] they really don't know that, and they need to ask about it. So, I feel like [we are providing a] better preparation for the department orientation to get their questions answered."

CILs also shared insights about having workshops throughout the semester (local RDI model 2). They considered this model to give more opportunities for students to reconnect in different instances.

"Doing workshops disaggregated throughout the year allows them to have frequent touch points with each other…, I think that was helpful."

Connecting at different points throughout the semester also allows the students to recognize that others may be encountering similar challenges or can provide advice based on their experience. Additionally, it gave participants opportunities to bring up questions or concerns they were currently experiencing.

"[students were] more comfortable in navigating challenges that might come up with their PI or other lab members. They kind of know the tools already, but they come back to us to ask for more support and clarity."
"*We were able to have rich conversations because they've already experienced some kinds of challenges and we could jump in and give the tools in real-time*."

Additionally, having workshops throughout the semester (local RDI model 2) allowed students to share what they were learning from others outside the program, for example, CILs stated that two students asked if they could bring someone from their lab to the meetings.

CILs considered both local RDI models to allow the creation of a peer network, establishing a community between students and, importantly, establishing a community and a connection with the CILs and other stakeholders who are supporting the intervention at an institutional level.

"I think the biggest thing is that they need to establish some sort of community and connection, not necessarily just to each other, but to us who can be reliable supporting people. When a problem comes, they know who to go to. I think some students feel empowered to share their concerns and things with us."

Ultimately, the local RDI, no matter the model, provides students with a mentors' network beyond their program to support their success.

"That's a huge benefit to them along their journey, because they already know who their mentors and support systems can be beyond people in their lab"

Students highlighted how the RDI supported their first-year process: 1) The discussion about the advisor-advisee experience was very insightful for them to learn how they could manage this relationship. 2) They considered that the discussion about the general overview of expectations of graduate school would be particularly helpful to their success. and 3) The opportunities for networking with both new and older graduate students from different disciplines were a valuable experience.

B. The biggest challenge for each RDI model is logistical.

The CILs also shared the challenges they encountered for both models. On one hand, local RDI model 1 (three-day workshops before the semester) presents two big logistical challenges: 1) The RDI collided both with other activities the CILs do in their roles and with other events happening around campus: *" all of the plates were spinning and it was a bit over-consuming, overpowering (because) we're balancing so many other things"* 2) It was difficult for students who are relocating to the area at the start of the semester because housing leases often started around this date. Also, most students were still traveling to the College to participate in their respective orientations.

On the other hand, adopting local RDI model 2 (workshops throughout the semester) makes it difficult to find a date that fits all students' schedules, and ultimately not all students were available to participate in all activities: *"We're not requiring them to come to the monthly meetings. I mean, we're trying to find a time when most people will not have a conflict, but that's impossible. However, the students that do come, they want to come and chose to be there."*

C. The support offered to URM graduate students motivates CILs to continue implementing the local RDI.

Even though CILs recognized that implementing the local RDI comes with challenges, remarkably, they acknowledged supporting URM students on their campus is valuable for them and keeps them motivated to continue with these interventions.

"*We're trying to help students navigate their transition to graduate school and be successful. And I feel like we're doing that, and I think that's what kind of motivates me to keep going and wanting to do this for the students (...) we've had RDI participants who came to graduate school for a master's degree and decide to stay for a Ph.D." I feel like that is a testament to the fact that we did okay with this transition."*

"I'd like to think that the RDI is helping, at least in a small way, in creating the kind of environment that we want for our students here."

That the CILs are motivated to continue implementing the RDI is key to the success of the initiative, and it is an important condition for the diffusion and adoption of an innovation [13].

The CILs reported that various faculty and administrators from the institution are interested in continuing to support the local RDI. This commitment suggests that CILs served as a vehicle for change by creating awareness and informing others in their institution about the importance of the RDI and the support provided to students. This result is consistent with the literature on communities of practice that suggests that participation in learning communities [14], or groups of people, preferably from professional networks, who shared concerns or a passion for something can serve as a vehicle for change [15].

Literature associates it with gains in knowledge, practical competence, and diversity awareness of the participants [16], [17], and literature about change in academia associates it with the improvement of schools and the innovations needed for students' success [13].

V. NEXT STEPS

This preliminary analysis suggests that each local RDI model brings opportunities for URM students to create a community of peers and mentors and gain confidence to ask for support during their journey. Despite the challenges of implementing the local RDI, the CILs demonstrated their commitment to support URM graduate students and their willingness to implement an RDI workshop on their campus, aligning with the community of practice principles and our criteria to reach out to potential CILs. Remarkably, CILs considered the local RDI to positively impact the URM students who participated.

For the next steps, we plan to further explore the experiences of other CILs implementing the 2 local RDI models, so that we can understand how to provide guidance and information to consider for future CILs considering implementing local RDI in their institutions. For example, consideration about how the model selected may impact logistically their work and the challenges for students to attend. Additionally, we need to further explore the students' perceptions of the local RDI and how model 1 and model 2 may impact students.

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