

## **Self-Advocacy Professional Programming as a Framework to Support Non-Academic Outcomes of STEM PhD Graduate Education**

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Dr. Lilley's research interests in engineering education focus on professional development of engineering students at the undergraduate and graduate level. She is interested in studying the effects of the intersection of gender and race/ethnicity on the professional formation of engineers and how institutions of higher education can transform to support student's sense of belonging.

## **Self-Advocacy Professional Programming as a Framework to Support Liberatory Outcomes of STEM PhD Graduate Education**

Using the framework of servingness as conceptualized in research of Hispanic Serving Institutions (HSI), measures of student's success can be characterized using academic and non-academic outcomes (i.e. liberatory outcomes) [1]. Academic outcomes are commonly institutional quantitative measures such as GPA, time to graduation, retention, etc. However, within the framework of servingness of an institution, there are additional indicators, including identifying the experiences of students and their non-academic outcomes. Some examples of non-academic outcomes are academic self-concept, civic engagement, social agency, racial/ethnic identity salience, and leadership identity. In addition, the culture of the institution is also an important characteristic because it impacts the experiences of students and can be categorized as validating or racialized within the HSI servingness framework.

A self-advocacy professional development program has been developed that focuses on non-academic outcomes [2] of PhD graduate students in science, technology, engineering and math (STEM) programs at an Urban R1 HSI. Self-advocacy originates from the American Counseling Association (ACA) and the Learning Disabilities (LD) communities for effective counseling that promotes academic success and is based on a social justice framework [3]. The pillars of the self-advocacy program are centered on (i) Empowerment, (ii) Promoting self-awareness and (iii) Social Justice. Thus, the programming in the Graduate Education for Academically Talented Students (GREATS) is aligned to these three pillars. The current professional development program completed its third year and the fourth year is in progress. To date thirty-four students have participated in the program.

Within the context of the piloted graduate program and servingness, self-advocacy professional development programming is proposed as a new type of institutional support that promotes validating experiences for graduate students and supports non-academic outcomes such as increased sense of belonging and, within the context of STEM, their professionalization. As such, in this paper, the focus is on how PhD graduate students from historically minoritized communities perceive their sense of belonging within their research laboratories, their programs/departments and their professions. It is also discussed how teaching self-advocacy education impact how students navigate environments in higher education, such as in knowledge of policies and help seeking. Challenges in sustaining this type of programming will also be discussed and opportunities for expanding them more broadly within graduate programs at other HSIs and institutions interested in expanding their supports to include non-academic outcomes of students.

### **Programming**

Students are given opportunities to attend seminars, panel discussions and engage in group discussions within the themes of self-advocacy. For example, Dr. James Holly Jr. discussed the impact of engineering on Black communities during distinct historical periods in the US to engage in discussions of social justice and STEM. Workshops focus on health and well-being, including self-care. In the self-awareness/self-care them, helping PhD students overcome barriers to writing their dissertation was discussed by the graduate students and

dissertation writing was stated consistently as a source of anxiety for PhD students. Thus, a writing specialist was invited and hosted a seminar on dissertation writing as well as how to leverage resources to support thesis writing. Programming also focused on leadership development with panel discussions by STEM leaders to a book club discussion. In the third year, programming for professional skills was requested by the students. Dr. Subramanian Sankaranarayanan, a Group Leader for the Center for Nanoscale Materials at Argonne National Laboratory, gave a seminar on how to prepare for a postdoctoral job search and leveraging the postdoctoral experience to support professional aspirations. This topic was requested by the students to address their concerns about not knowing how to pursue or leverage a postdoctoral position as first generation and/or historically minoritized graduate students.

The students are invited to attend different modalities of seminars and workshops. For example, programs are offered virtually or in-person throughout the year. Events are held on various days, either at noon or early evening to make it as accessible to students to attend at least one event per semester. A Slack channel is also maintained for communication and outreach as well as to send out regular e-mail messages to remind students of events. The programming was thus aligned along the three main pillars of self-advocacy. In the fourth year, a fourth pillar on Other Professional Skills was added to include topics requested by students. The four components of the program as discussed above are shown in Table 1 below.

Table 1. GREATS Programming

Academic Year	Leadership	Wellness/Self-Awareness	Social Justice	Other Professional Skills
2020-2021	<a href="#"><u>Women in STEM discussion by Dr. Carmen Lilley</u></a>	<a href="#"><u>Solutions to the Top Ten Self-care Challenges by Carol Petersen, M.Ed.</u></a>	<a href="#"><u>Book Club Discussion: “Black, Brown, Bruised: How Racialized STEM Education Stifles Innovation” by Dr. Ebony Omotola McGee</u></a>  <a href="#"><u>Social Justice in STEM Panel Discussion</u></a>	
2021-2022	<a href="#"><u>Leadership in STEM by Prof. Denise Simmons &amp; Prof. Kyle Gipson</u></a>	<a href="#"><u>30 Day Health and Wellness Scavenger Hunt</u></a>	<a href="#"><u>GREATS Welcome Dinner and Conversation with Dr. James Holly Jr.</u></a>	

	<a href="#"><u>Dinner with Department Head Iris Rivero</u></a>  <a href="#"><u>Dean Karen Colley : 1st GREATS Seminar</u></a>  <a href="#"><u>Lynda Cabrales: 2nd GREATS Seminar</u></a>	<a href="#"><u>Conversation with Anita Ramirez</u></a>		
2022-2023	<a href="#"><u>The sport of science: Being competitive in STEM</u></a>  <a href="#"><u>Book Club Discussion: Lead from the Outside</u></a>	<a href="#"><u>Time management for the busy student workshop</u></a>  <a href="#"><u>Managing Time and Reducing Stress</u></a>  <a href="#"><u>Dissertation writing workshop with Lindsay Marshall</u></a>	<a href="#"><u>Spring 2023 GREATS kickoff with special guest Dr. Terrell R. Morton</u></a>	<a href="#"><u>Landing and maximizing your postdoctoral research experience. A presentation by Dr. Sankaranarayanan.</u></a>

Methods

The researchers adapted measures from the Prematriculation Inventory (PMI) that measure noncognitive assets that have been found to correlate to academic success for first year undergraduate students [4]. Noncognitive assets include skills, strategies, attitudes and behaviors of students that impact their academic success. Noncognitive factors can include academic behaviors, academic perseverance, academic mindsets, learning strategies, and social skills [5]. The PMI is administered at the University of Illinois Chicago to first year students prior to starting their first semester (prematriculation) and has been found to correlate to academic success of students [4]. Questions related to Time Management, Self-Efficacy, Sense of Belonging, Help Seeking and Managing Stress were adapted to survey the graduate students. In addition, mentoring by the academic supervisor is also important for PhD graduate students. In this case, measures in effective mentoring of faculty were adapted to ask about the mentoring by academic supervisors [6].

Results and Discussion

Herein, the results from the survey evaluation that took place in Spring 2023 and included some base comparisons to the Spring 2021 survey. The questions are intended to

measure how students navigate their experiences within their graduate programs and research laboratories, how self-advocacy is utilized, and the impact of social justice on a student’s perspective as academic professionals. The research questions were also expanded to include how advisors support student’s accumulation of social capital in the survey since students expressed that they felt supported by their advisors, but it was not clear how they were supported. The social capital probes were added after external feedback from the engineering education research community as a possible salient factor in the academic supports of graduate students from historically minoritized groups. Both the survey questions that were used to study emerging themes of self-advocacy in the graduate students and focus group questions, not included in this discussion, have been presented to the engineering education research community at conferences and one-on-one meetings to get feedback from the broader community on the themes of self-advocacy.

The survey respondents in 2023 (19 total) skew towards being first generation college students than respondents in 2021 (18 total). Eleven students responded to both surveys. In 2021, eleven students identified as female or cis-gender female, six identified as male, and one identified as non-binary. In 2023, twelve students identified as female, cisgender female, or woman; and seven identified as cisgender male or male. Students identified their race/ethnicity in various ways (see Table 2). Because these categories (like gender) are left blank for students to fill in, it is possible that students wrote different race/ethnicity responses each year.

Table 2. Race/ethnicity identity by survey response year

<b>Race/Ethnicity</b>	<b>2021</b>	<b>2023</b>
Latina/Latino/Hispanic or Latinx	7	5
Black or Black/AA	4	8
Black/White	1	1
Black and White/Creole	1	0
Guatemalan	1	1
Black/African	1	1
Nigerian American	1	0
Native American (Navajo)	1	1
Chicago	1	0
White/Polish/European	0	1
African Nigerian	0	1

In 2023, the rating scale on the sense of belonging measures from a 5-point scale to a 3-point scale was changed to align more closely with the prematriculation survey. Even with this change, trends between years seem to be consistent. Again, respondents indicated that they are not feeling a deep sense of belonging within the broader graduate student community but feel greater community within their research laboratories. In addition, it seems that research

supervisors are not consistently contributing to students' sense of belonging in their fields of study. However, sixteen of the seventeen respondents agreed that "my research supervisor supports me in developing professional networks." All seventeen agreed that "my research supervisor provides me the support I need to be a successful researcher in my field."

In 2021, respondents varied in their responses to the survey question on how overwhelmed they felt in navigating their department and in knowing who to go to for help. In 2023, responses indicate scholars no longer feel overwhelmed at the size of their graduate research program. Likewise, two-thirds of respondents know who to go to for help in their department. Variation continues in response to navigating one's department. However, most respondents know who to go to with questions about their academic progress.

Eighteen scholars responded to the open-ended question about which aspects of the program were supportive in 2021. All but two said something about having a community, knowing there are others like them, or connecting with a faculty mentor. In 2023, fifteen students responded to the open-ended question, and ten spoke of mentorship, networking with faculty, and/or guest lectures as a support. Eight students spoke about building community and networks. Seven highlighted the financial resources of the program such as paying for travel to conferences.

Finally, in the open-ended question, the students also spoke of how the program has helped them with building community and advocate for themselves. However, there are challenges as some members have also stated that they have had difficulty "breaking" into existing social groups. In addition, finding a time where all students can attend events is for all purposes impossible. Thus, it makes inclusion a challenge, in particular since there are two separate campuses where graduates students work in laboratories. Finally, some students also expressed difficulty in fully engage in the program and wanted more social time instead of formal programs. Thus, some new efforts are being made into including socialization with others in the program.

Some of the challenges in the program were in sustaining engagement by students due to their location over two campuses and their responsibilities and workloads of their graduate studies. Thus, finding a common time was not possible so creating access through varying days/times and modalities was necessary. In addition, there were also challenges due to the pandemic affecting in-person event planning and the strain many students felt at that time. In addition, more participants are needed to measure self-advocacy knowledge and skills of graduate students more broadly before they engage in this type of professional development. If a graduate program is considering developing self-advocacy programming, it is recommended that they collaborate with their institution's wellness or counseling centers and cultural centers. These centers typically have student academic support programs that align well or can be adapted to align to the pillars of self-advocacy. However, some institutional resources are needed to support external speakers for the program as well as a person be a program coordinator as well as provide mentoring and skills development of the graduate students in self-advocacy.

References

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