



Work in Progress: Diversity & Equity Training for Undergraduate Engineering Teaching Assistants

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Introduction

Known for their competitive culture, engineering programs are often unsupportive learning environments for undergraduate students. Efforts to broaden participation in engineering have achieved modest progress as students, especially those from historically marginalized groups, lack structured support towards academic success [1]. First-year, team-based design courses present a unique opportunity to foster inclusion through active, collaborative learning experiences [2, 3].

Undergraduate teaching assistants (UGTAs) often play an important role in building community within first-year courses. UGTAs promote student engagement, serve as peer mentors, and improve students' perception of a course. Through their work, UGTAs build their own technical skills, practice effective communication, and gain leadership experience [4-6]. UGTAs often receive training on technical knowledge and skills to gain a holistic understanding of the course content [5]. However, more educators are now emphasizing the need for inclusive teaching training for UGTAs in STEM [7-12]. As UGTAs are often the first points of reference for students, their professional development is necessary to provide undergraduate students with an equitable learning experience. We set out to formalize inclusive teaching training for UGTAs by providing foundational knowledge of global inclusion, diversity, belonging, equity, and access (GIDBEA).

To this effort, we are piloting a three-year, scaffolded training plan to develop UGTAs' inclusive leadership skills. We seek to train UGTAs to recognize and confront bias among individuals and within teams, develop an understanding of power, privilege, and oppression, and provide them with tools to engage GIDBEA in their personal and professional practice. In this Work-In-Progress paper, we report findings from our preliminary run of first year UGTA training.

Project Approach

Theoretical Framework: We view our UGTA body as a community of practice, in which the community acts as a "living curriculum" that engages in a process of collective learning [13, 14]. Our goal is to empower UGTAs as inclusive peer educators. We seek to build their sense of agency in the classroom by cultivating a positive self-concept, developing their understanding of sociopolitical environments, and providing resources for action [15].

Setting and Timeline: The first-year engineering program at New York University Tandon School of Engineering is a one-semester design course. Approximately 100 UGTAs support the program through content delivery, grading, curriculum development, and administrative tasks. Typically, UGTAs are hired as second-years and are retained until their graduation.

We are currently piloting the following schedule for training (Table 1). In the fall semester of their first year, UGTAs learn foundational concepts related to GIDBEA; in the second year, power and privilege; and in the third year, strategies for engaging GIDBEA in their future careers. The spring semesters offer time for concept reinforcement and reflection on the fall semester. By scaffolding the training over the UGTAs' three-year tenure in the program, we seek

to sustain engagement as TAs put their knowledge to practice in interactions with peers, students, and faculty.

Table 1. GIDBEA Scaffolded Training Schedule

Year	Fall Semester	Spring Semester
1	Learning foundational concepts of GIDBEA	Reinforcement and mid-year reflection
2	Understanding how power and privilege perpetuate inequity	
3	Engaging GIDBEA as working professionals	

To date, we have piloted Year 1 of the scaffolded schedule. Sessions have been co-facilitated by UGTAs, faculty, and the New York University Office of Global Inclusion, Diversity, and Strategic Innovation (OGI).

First-Year UGTA Training: The GIDBEA session consisted of a two-hour long workshop. To create an atmosphere where UGTAs would feel respected and connected to one another, we emphasized community goal setting where all members would contribute to the formation of group objectives and work to realize them.

We introduced inclusive language and strategies for addressing conflict as tools for the UGTAs to use in their interactions with each other, students, and faculty. Inclusive language was introduced using a framework from The Diversity Movement [16], which encourages, “the daily practice of intentional and unbiased word selection that acknowledges diversity, conveys respect to all people, and equitable opportunities.” Adapted from Thomas and Kilmann’s Conflict Mode Instrument [17], the group was provided a framework to develop greater awareness of different approaches to conflict. Examples of conflict were provided by the general UGTA body to practice strategies for conflict management, which included the following scenarios:

A student stays behind at the end of class to speak with the professor. You overhear the professor ask where the student is from. The student responds with Yonkers, New York and the professor looks confused. The professor continues to ask, “but your parents aren’t from there, are they?”

You work a lab section with an experienced TA who identifies as a woman and a new TA who identifies as a man. You notice that during class, students tend to ask the male-identified TA for help. When they do ask the woman-identified TA for help, they often ask the male-identified TA for a second opinion.

At the end of the semester, you are talking with a fourth-year TA who is on your shift and is in the same major as you. You ask for advice on the classes you are about to take in the following semester. In response, they laugh and say, “you are so screwed, those classes made me want to kill myself!” They proceed to give discouraging remarks about your upcoming semester.

The UGTAs were prompted to consider these scenarios with the following prompts in mind:

1. How are you feeling after reading the case study?
2. What internal biases, preconceived notions, and/or barriers may be coming up for you when navigating this scenario?
3. What strategies might you use to approach this scenario and offer support to the affected party or parties involved?

Discussions first took place in small, randomly assigned groups, led by returning UGTAs. Faculty then facilitated a final debrief with the general UGTA body.

Assessment: In a pre-training assessment, UGTAs were asked about their expectations of the session, familiarity with the concepts of inclusive leadership, inclusive language, conflict styles, and institutional resources available to students (Table 2). For the scope of this paper, we focus on familiarity with the concepts presented. Participation in both assessments is voluntary and open to all UGTAs who attended GIDBEA training.

Table 2. GIDBEA Pre-Training Survey for New UGTAs

Pre-Survey Questions	Response Options:
<ul style="list-style-type: none"> • How familiar are you with the concept of inclusive leadership? • How familiar are you with the concept of inclusive language? • How familiar are you with the concept of conflict styles? 	<ul style="list-style-type: none"> • I have never heard of it. • I have heard of it, but I don't know what it is. • I have some idea of what it is, but it's not very clear. (If so, please tell us your definition.) • I know what it is and could explain what it is. (If so, please tell us your definition.)
Have you taken any other IDBEA-related training or attended any IDBEA-related events on or off campus?	<ul style="list-style-type: none"> • Yes. (If yes, please describe.) • No.
What do you hope to gain from this training?	Open-ended

In Fall 2021, we modified the pre-survey questions for returning UGTAs to reflect on concepts they would like to review and provide an assessment of the impact that training has had on their behavior and overall climate of the program (Table 3).

Table 3. GIDBEA Pre-Training Survey for Returning UGTAs

Pre-Survey Questions	Response Options:
What concepts do you hope to review from spring training?	Select all that apply: <ul style="list-style-type: none"> • Inclusive language • Inclusive leadership • Conflict-style • Bias-related case reporting • Concepts not listed (describe if selected)
Please indicate how relevant you have found each of the following concepts (inclusive leadership, inclusive language, conflict styles, and bias-related case reporting) to your role as a TA.	<ul style="list-style-type: none"> • Very relevant • Relevant • Somewhat relevant • Not relevant

Since spring training, have you taken any other IDBEA-related training or attended any IDBEA-related events on or off campus?	<ul style="list-style-type: none"> • Yes. (If yes, please describe.) • No.
If you would like, provide an example of how you used concepts from fall training to resolve a conflict.	Open-ended
<p>Please state how strongly you agree or disagree with the following statements:</p> <ul style="list-style-type: none"> • I feel that I can handle conflict well. • I do my best to use inclusive language in daily practice. • I feel comfortable to report instances of bias using the Bias Response Line. • I feel that IDBEA training has improved my ability to do my job as a TA. • I feel comfortable with the climate of EG. • I feel a sense of belonging in EG. • I feel supported by my colleagues in EG. • When I am experiencing a conflict, I know who to reach out to help. • When I am experiencing a conflict, I feel comfortable reaching out for help. 	<ul style="list-style-type: none"> • Strongly agree • Agree • Neutral • Disagree • Strongly disagree

All UGTAs received the same post-training survey (Table 4). The survey asked UGTAs to reflect on the impact training had on their understanding of GIDBEA.

Table 4. GIDBEA Post-Training Survey

Post-Survey Questions	Response Options:
<ul style="list-style-type: none"> • This session met my expectations. • I learned valuable strategies or concepts that I can use in the near-term to help build a more inclusive culture in our program. 	<ul style="list-style-type: none"> • I strongly disagree. • I disagree. • Neutral • I agree. • I strongly disagree.
What concepts did you gain a better understanding of because of attending this training?	<p>Select all that apply:</p> <ul style="list-style-type: none"> • Inclusive language • Inclusive leadership • Conflict-style • Bias-related case reporting • Concepts not listed (describe if selected)
<ul style="list-style-type: none"> • What did you find most valuable about training? • Name one strategy you will implement in the near-term that you learned about in this training. 	Open-ended

<ul style="list-style-type: none"> • How can we improve the facilitation or content delivery of this training to better support your learning? 	
<p>Please state how strongly you agree or disagree with the following statements:</p> <ul style="list-style-type: none"> • I feel that this training has improved my ability to do my job. • I enjoyed this training. • I would like to have more frequent training around IDBEA. • I plan to participate in other IDBEA training beyond what is required of me. 	<ul style="list-style-type: none"> • Strongly agree • Agree • Neutral • Disagree • Strongly disagree

Results and Discussion

Iteration 1 – Spring 2021: Of our body of 90 UGTAs, 52 completed the training pre-survey, and 62 completed the post-survey. Most respondents came to training having at least heard of inclusive leadership, inclusive language, and conflict styles. According to our pre-survey data, few could explain what the concepts were—confirming gaps in UGTA training that we sought to fill (Figure 1). When asked about their expectations for the training, UGTAs expressed an interest in gaining skills relevant to student-TA and TA-TA interactions, “a better understanding of how to be more respectful and inclusive of others,” and strategies for tackling sexism, racism, and mental health issues within the first-year program.

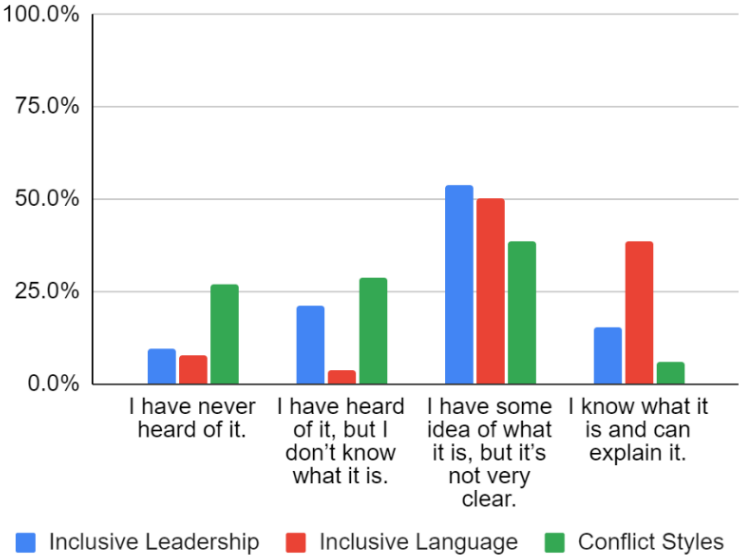


Figure 1. UGTAs’ Baseline Knowledge of Foundational IDBEA Concepts. Data was collected from the pre-survey administered ahead of Spring 2021 training.

The response to training was overall positive. According to the post-survey, 98% agreed or strongly agreed that they learned valuable strategies and concepts to implement at work. All

UGTAs responded that they gained an understanding of inclusive leadership, inclusive language, and/or conflict styles from the session. When asked what strategies they would implement in the near-term, UGTAs provided examples regarding the use of inclusive language within the workshop (e.g., asking for pronouns, using gender inclusive language) and reflections on conflict resolution strategies.

For future work, UGTAs expressed a need for a repository of resources and more time for case scenario discussion. In response to this feedback, we are developing an internal website for GIDBEA resources and have added related discussions to monthly UGTA general body meetings.

Iteration 2 – Fall 2021: The content of the workshops remained the same between Spring and Fall 2021 training. Of our body of 98 UGTAs, 90 participated in the GIDBEA pre-survey (46 new UGTAs and 44 returning UGTAs), and 14 completed the post-survey. As participation in the post-survey was too small to extract meaningful statistics, we instead present responses to open-ended questions that provide further insight from results first obtained in Spring 2021.

Compared to spring, a higher percentage of UGTAs were familiar with inclusive language and inclusive leadership (Figure 2). Based on definitions they provided, UGTAs’ understanding of inclusive language was built on using each other’s pronouns correctly. UGTAs wrote that inclusive leadership meant cultivating an environment where “everyone feels valued and heard,” and that “includes diverse identities and opinions, specifically including marginalized groups.” Conflict styles remained a less understood topic among new TAs prior to training, suggesting the usefulness of the workshop. Though our data set was small, post-survey results were once again positive. Again, UGTAs provided examples of inclusive language and reflections of conflicts styles when asked what strategies they planned to use following training.

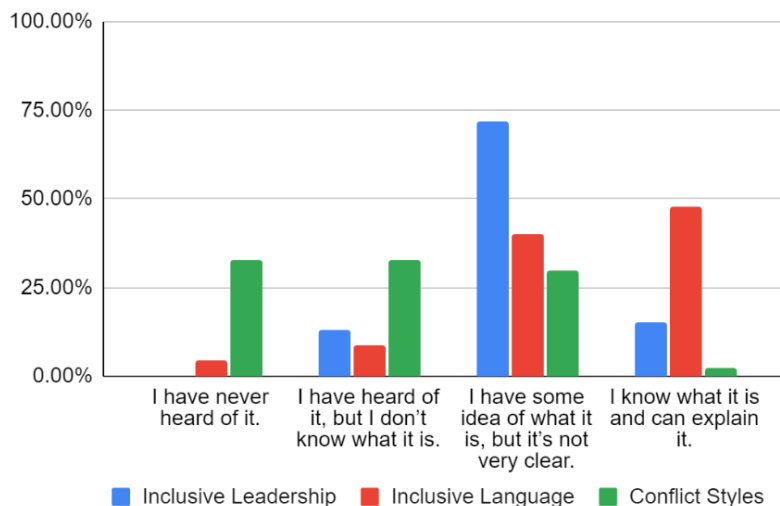


Figure 2. New UGTAs’ Baseline Knowledge of Foundational IDBEA Concepts. Data was collected from the pre-survey administered ahead of Fall 2021 training.

Returning UGTAs expressed a willingness to review the concepts presented, with all three concepts generally perceived as relevant or very relevant to their work (Figure 2).

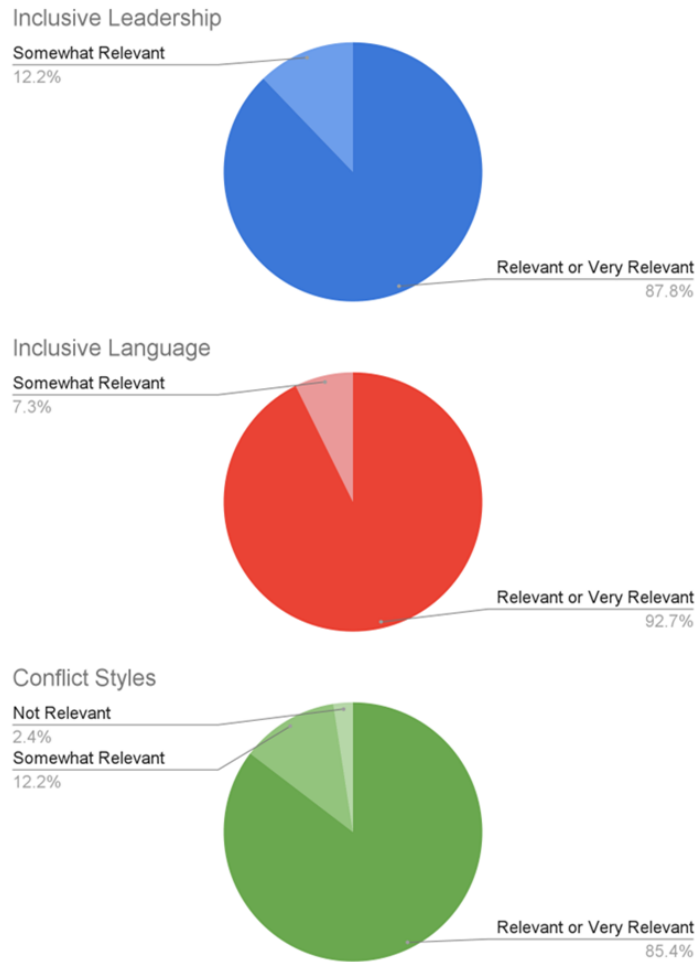


Figure 3. Returning UGTAs’ Impression of Foundational GIDBEA concepts. Data was collected from the pre-survey administered ahead of Fall 2021 training.

Several returning UGTAs shared how training had impacted their work. One respondent wrote that they were, “much more aware of [their] choice of words and how [they] approach different power dynamics within the program.” 23.9% of returning UGTAs even participated in an external GIDBEA training in between Spring and Fall 2021 training, covering topics including university policies on reporting and discrimination, microaggressions, as well as inclusive teaching. These results indicated to us the success of training and encouraged future topics to introduce once the scaffolded framework is formalized.

Returning UGTAs also shared an evaluation of their sense of the climate within the program (Table 5). Overall, many TAs reported feeling comfortable with the climate and felt a sense of belonging within the program. Fewer UGTAs expressed comfort reaching out for help, though they stated they knew who to reach out to when needed. In future iterations of training, we seek to better understand UGTAs’ hesitancy towards seeking help, and interventions we can provide to improve their likelihood to do so.

Table 5. UGTA Assessment of the Climate of the First-Year Engineering Program

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I feel comfortable with the climate of our program.	20%	53%	20%	5%	3%
I feel a sense of belonging in our program.	22.5%	60%	10%	8%	0%
I feel supported by my colleagues in our program.	43%	43%	13%	3%	0%
When I am experiencing a conflict, I know who to reach out to for help.	30%	43%	25%	3%	0%
When I am experiencing a conflict, I feel comfortable reaching out for help.	25%	33%	43%	0%	0%

Conclusions and Future Work

In this Work-In-Progress Paper, we presented preliminary data from our Fall and Spring 2021 training that was effectively well-received. UGTAs felt that foundational concepts of GIDBEA, tools for inclusive language, and navigating conflict were relevant to their work. Still, when faced with conflict, UGTAs revealed that they did not strongly feel comfortable seeking help. We thus seek to build on training to include possible intervention methods and mitigate reluctance.

We acknowledge that the data presented is aggregate, as we do not consider UGTA identities. Consequently for future work, we plan to analyze data more closely to correlate UGTAs' self-identification with the data presented here.

As this work continues, we plan to begin piloting the second and third tiers of our training. While tested in a first-year program setting, this training framework can be adapted to other programs employing UGTAs who seek to develop their community as inclusive leaders.

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