

Developing Inclusive Leadership Training for Undergraduate Engineering Teaching Assistants

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Abstract

This complete experience-based practice paper describes the ongoing development of diversity, equity, and inclusion (DEI) training for undergraduate engineering teaching assistants in a first-year, team project-based design course. At a large private university, undergraduate teaching assistants play a key role in first-year student success and the mentorship of their cornerstone design project. As the first points of reference for students, they assist with content delivery, guide students through hands-on labs and projects, and deliver regular feedback on assignments. Effective teaching assistants are leaders, thus their training as educators is essential to our first-year students' success. To support this endeavor, peer-facilitated training on course content, technical skills, and best teaching practices is provided every semester to the undergraduate teaching assistant community. The training is grounded in global inclusion, diversity, belonging, equity, and access (GIDBEA) to foster a sense of belonging among the community of teaching assistants, students, and faculty. To this effort, we are piloting a series of workshops on inclusive leadership to be delivered every semester.

We seek to build our teaching assistants' sense of agency in the classroom by cultivating a positive self-concept, developing their understanding of sociopolitical environments, and providing resources for action. Co-created with faculty, teaching assistants, and DEI experts at the institution, the workshop series provides teaching assistants with the ability to recognize and confront bias among individuals and within teams, helps them develop an understanding of power, privilege, and oppression, and equips them with the tools to employ their knowledge professionally. The workshops feature individual reflection activities and small group discussions, culminating in a community-wide discussion on lessons learned and actionable items to build an inclusive community within our first-year program.

To understand the value of this training for the undergraduate teaching assistants, a survey was conducted of participants before and after participation in the workshops. The survey aims to capture the practicality of the training and the teaching assistants' assessment of the climate within the first-year engineering experience. In this paper, findings from the second year of piloting our workshops are described. In this second iteration of training, new teaching assistants participated in our foundational training in GIDBEA, and returning ones built on their introductory knowledge to learn about social justice and principles of inclusive leadership. The data shows that most of the teaching assistants found the workshop content and activities relevant to them as peer educators. Several teaching assistants shared inclusive leadership strategies that they planned to implement in the coming semester. The goal of this study is to inform plans for implementing solutions into training that address deficiencies identified through the survey and provide a set of inclusion best practices and learning objectives for inclusivity training for undergraduate teaching assistants.

Introduction

Undergraduate teaching assistants (UGTAs) play an important role in promoting student success. UGTAs promote student engagement, serve as peer mentors, and improve students' perception of a course [1]. In engineering education, involvement of UGTAs in first-year design courses has had positive outcomes, and the use of undergraduate teaching assistant programs continues to grow [2, 3]. Institutions thus continue to explore on effective strategies for UGTA training. Most UGTA training focuses on three realms: theory, pedagogy, and practice. How institutions deliver training varies widely, but often focuses on technical knowledge and skills to gain a holistic understanding of the course content [4-6]. Recently, educators have recognized the need to equip UGTAs in STEM with inclusive teaching training as well [7-12]. As UGTAs are often the first points of contact for students, they play a key role in fostering a sense of belonging in the classroom, which has been tied to improved student performance and retention. We thus set out to formalize inclusive teaching training for UGTAs by providing foundational knowledge of global inclusion, diversity, belonging, equity, and access (GIDBEA).

In this complete experience-based practice paper, we describe the continued development of a three-year, scaffolded inclusive leadership development program for UGTAs at a large private university. We adapt the Stern Cohort Leadership Program framework for inclusive leadership, defined as, "the practice of leadership that carefully includes the identities, experiences, knowledge, perspectives, and contributions of all community members" [13]. The framework aligns with the engineering inclusive leadership development model by Pollack *et al.*, where we focus on (1) an understanding of social positionality, (2) development of a GIDBEA lens, (3) the establishment of GIDBEA practices within our program and finally, (4) the realization of inclusive communication and collaboration [14-16]. We seek to empower our UGTAs to become inclusive peer mentors for first-year students. Co-created and co-facilitated by faculty, UGTAs, and GIDBEA experts at the institution, the program provides UGTAs with the ability to recognize and confront bias among individuals and within teams, helps them develop an understanding of power, privilege, and oppression, and equips them with the tools to employ their knowledge in their professional lives.

Project Approach

Setting and Timeline

This study is being conducted at a large private university with UGTAs of a first-year, project-based introductory design course. Between 300 to 350 first-year students enroll in the course each semester, and the university employs 100 UGTAs to support course instruction and administration. Typically, UGTAs are hired in their second year of university and retained until their graduation. Ahead of the Fall and Spring semesters, UGTAs complete training facilitated by returning TAs and faculty. Inclusive leadership training comprises about one fifth of the total training period ahead of each semester. The data discussed were collected before and after UGTA training ahead of the Fall 2022 semester.

Methods

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 [17, 18]. 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 [19].

We scaffold our training according to the years of experience that UGTAs have in our program (Figure 1). In the summer 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. Training ahead of the spring semester offers time for concept reinforcement and reflection on the fall. 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.



Figure 1. Scaffolded global inclusion, diversity, inclusion, belonging, equity, and access (GIDBEA) training for undergraduate training assistants.

To date, we have piloted Year 1 and Year 2 of the scaffolded schedule. Sessions have been co-facilitated by UGTAs, faculty, and the Office of Global Inclusion, Diversity, and Strategic Innovation (OGI). The workshops ran concurrently; newly hired TAs participated in Year 1 training, while returning UGTAs participated in Year 2 training.

Year 1 Training: The session was a five-hour long workshop for newly hired UGTAs. In the first two hours, 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 [20], which encourages, “the daily practice of intentional and unbiased word selection that acknowledges diversity, conveys respect to all people, and equitable opportunities.”

In the second two hours, we presented conflict styles and resolution. Adapted from Thomas and Kilmann’s Conflict Mode Instrument [21], the group was provided a framework to develop greater awareness of different approaches to conflict. Case studies were provided to allow for reflection on interactions between UGTAs, UGTAs and students, and UGTAs and faculty. The scenarios included the following:

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 UGTA who identifies as a woman and a new UGTA who identifies as a man. You notice that during class, students tend to ask the male-identified UGTA for help. When they do ask the woman-identified UGTA for help, they often ask the male-identified UGTA for a second opinion.

At the end of the semester, you are talking with a senior UGTA 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 asked 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, before a group debrief.

In the final hour, we provided time for guided reflection featuring additional inclusive language exercises, further resources for exploring conflict style, and prompts for self-reflection.

Year 2 Training: The session was a five-hour long workshop. In the first two hours, two UGTA facilitators delivered a training that focused on GIDBEA through a lens of race and racism. The content was adapted from Open Source Leadership Strategies, Inc., to introduce concepts of power, privilege, and justice to UGTAs [22]. In the session, participants were asked to reflect on their social positionality, draw connections to larger systemic issues, and identify strategies for applying an inclusive lens to the classroom space [23]. Concrete examples of Year 1 training topics, such as inclusive language, that focused on systemic race and racism were provided, such as avoiding outdated terms (such as oriental for Asian) and coded language (such as shady, sketchy, or ghetto).

The UGTAs were prompted to consider the following questions as they explored these concepts:

1. What are your earliest memories around feeling included or excluded within a space? How and by whom were these messages transmitted?
2. Where might I hold power and privilege and how can I work to distribute my power and privilege?
3. How might I be complicit in upholding ignorance or complicit in perpetuating racism?

UGTAs were given time to individually reflect before sharing in small, randomly assigned groups.

Giving our UGTAs the opportunity to reflect on their social positionalities served as a platform to discuss inclusive leadership and teaching [15, 16, 23]. For the remainder of the time, the UGTAs were asked to reflect and discuss several prompts, including:

4. In reviewing the principles of inclusive leadership, which principle would I identify as a strength and where I feel the most comfortable?

5. Are there specific times where I felt this was affirmed?
6. Which principle(s) would I identify as an area of growth?
7. What actions can I take to grow in this principle?

The day following the workshops, all UGTAs reconvened to share lessons learned and cocreate a list of community agreements and expectations as employees of the course.

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. Participation in both assessments was voluntary and open to all UGTAs who attended GIDBEA training. The pre-training assessment for new UGTAs was previously published and can be found in Appendix A. In Fall 2022, we modified the pre-survey questions for returning UGTAs to reflect on concepts they would like to review and assessed the impact that training has had on their behavior and overall climate of the program (Table 1).

Table 1. GIDBEA Pre-Training Survey for Returning UGTAs

Pre-Survey Questions	Response Options:
What concepts do you hope to review from Year One 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 familiar are with each of the following concepts (inclusive leadership, inclusive language, microaggressions, and conflict styles).	<ul style="list-style-type: none"> ● I have never heard of it. ● I have some idea of what it is, but it's not very clear. ● I have some idea of what it is, but I can't explain it. ● I can explain it.
Please indicate how relevant you have found each of the following concepts (inclusive leadership, inclusive language, conflict style and resolutions, and bias-related case reporting) to your role as a UGTA.	<ul style="list-style-type: none"> ● Very relevant ● Relevant ● Somewhat relevant ● Not relevant
Please state how strongly you agree or disagree with the following statements: <ul style="list-style-type: none"> ● I feel confident in my ability to be an inclusive leader. ● I do my best to use inclusive language in daily practice. ● I feel comfortable managing conflict. ● I know what steps to take to use the institutional bias reporting hotline. ● I feel comfortable using the institutional the institutional bias reporting hotline. ● I feel comfortable with the climate of our program. ● I feel a sense of belonging in our program. ● I feel supported by my colleagues in our program. 	<ul style="list-style-type: none"> ● Strongly agree ● Agree ● Neutral ● Disagree ● Strongly disagree

<ul style="list-style-type: none"> • When I am experiencing a conflict, I know who to reach out to for help. • When I am experiencing a conflict, I feel comfortable reaching out for help. • I feel that GIDBEA training has helped create an inclusive community within our program. 	
<p>Please share details on the impact that GIDBEA training has had on your professional development.</p> <p>What challenges have you had practicing inclusive leadership? How can we better support you (further training, resources, etc.)?</p> <p>Is there anything else you would like to share with us regarding the climate of our program?</p>	Open-ended

All UGTAs received a post-training survey (Table 2). The survey asked UGTAs to reflect on the impact training had on their understanding of GIDBEA, with questions specific to new TAs and returning TAs.

Table 2. GIDBEA Post-Training Survey

Post-Survey Questions	Response Options:
<p>For New TAs:</p> <ul style="list-style-type: none"> • I found the concepts presented during this training are useful to me. • I gained an understanding of inclusive language. • I gained an understanding of inclusive leadership. • I gained an understanding of implicit bias and microaggressions. • I gained an understanding of conflict styles and resolution. <p>For Returning TAs:</p> <ul style="list-style-type: none"> • I felt that first year IDBE training provided a good foundation for second year training. • I found the concepts presented during this training useful to me. • I feel comfortable acting on the concepts presented when interacting with students. • I feel comfortable acting on the concepts presented when interacting with fellow TAs. • I feel comfortable acting on the concepts presented when interacting with faculty. 	<ul style="list-style-type: none"> • I strongly disagree. • I disagree. • Neutral • I agree. • I strongly disagree.
<p>What concepts did you gain a better understanding of because of attending this training?</p>	<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"> • Please share at least one of your key takeaways from this training. 	Open-ended

<ul style="list-style-type: none"> ● What concepts remain unclear? What concepts would you like to see reiterated in future training? ● What methods/exercises did you find most effective? ● What new concepts would you like to learn in future IDBE trainings? ● Do you have any other feedback you would like to share with us? 	
<p>Please state how strongly you agree or disagree with the following statements:</p> <ul style="list-style-type: none"> ● I feel that GIDBEA training is relevant to our work. ● I feel that GIDBEA training was engaging and informative. ● I feel that the training was delivered effectively. ● I thought the length of the training was appropriate. ● I thought the amount of content of the training was appropriate. ● I would recommend this training to a friend. ● I would like to have more frequent training, involvement opportunities, and/or resources around GIDBEA. ● I plan to participate in other GIDBEA opportunities beyond what is required of me. 	<ul style="list-style-type: none"> ● Strongly agree ● Agree ● Neutral ● Disagree ● Strongly disagree

Results and Discussion

Impact of Year One Training on New UGTAs

86% of new UGTAs (representing 31 UGTAs total) responded to the pre-training survey. For most respondents (84%), Year One training was their first GIDBEA training experience. Despite having no formal training in GIDBEA, most respondents stated that they were at least somewhat familiar with the concepts of inclusive language, inclusive leadership, microaggressions, and conflict styles before the training (Figure 2). A small portion of respondents were unfamiliar or very unfamiliar with concepts of inclusive language (6%) and microaggressions (10%), while concepts of inclusive leadership (19%) and conflict-styles (32%) remained generally new to the cohort. The open-ended responses regarding expectations for the training aligned with this data; when asked, “What do you hope to gain from this training?”, UGTAs responded with the intention to promote belonging in a diverse classroom and workplace with their peers (Table 3).

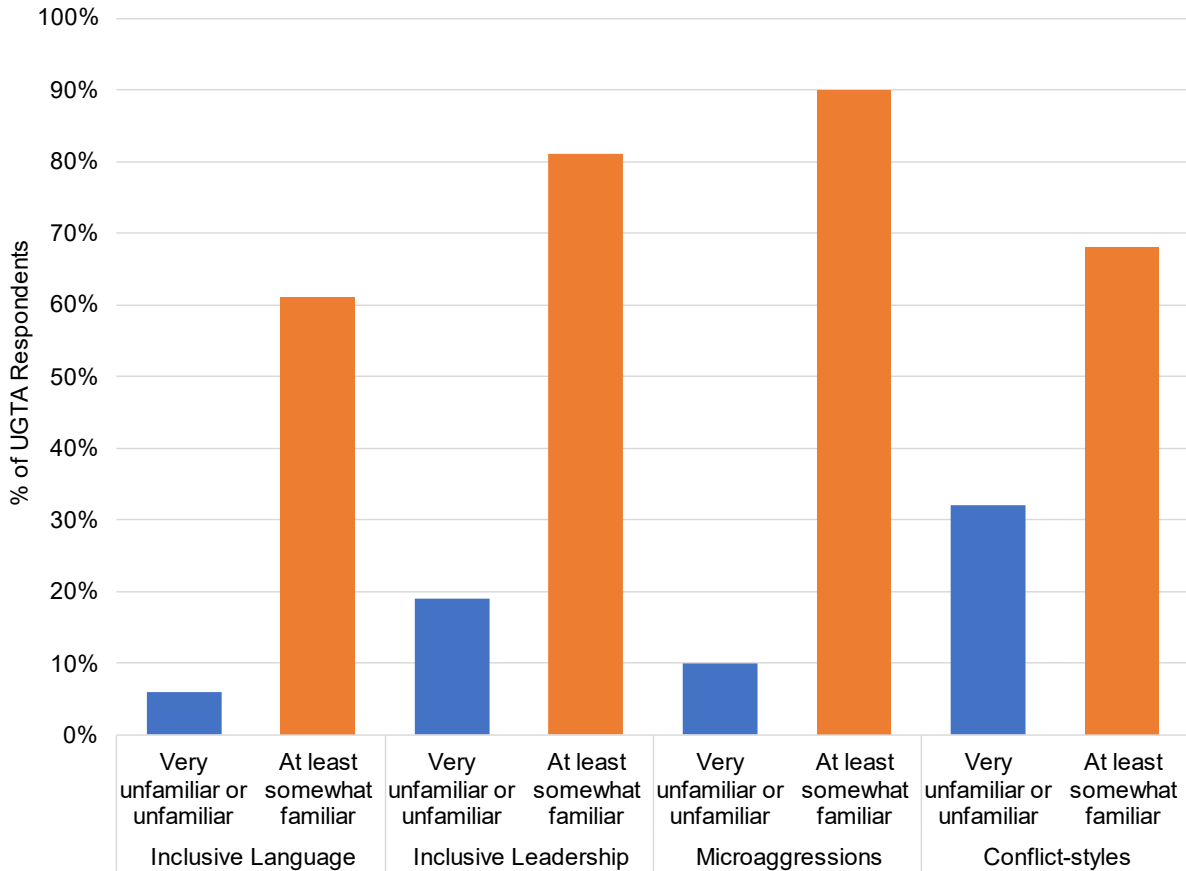


Figure 2. New UGTA familiarity with concepts of inclusive language, inclusive leadership, microaggressions, and conflict styles prior to first year training.

Table 3. Example Responses about Training Expectations from New UGTAs

Question	Example Responses
What do you hope to gain from this training?	Being able to include everyone without leaving anyone out unintentionally while also being able to provide the best work environment possible for all people to feel welcomed.
	I want to learn how to make everyone feel like they belong and how to deal with situations where this feeling is threatened.
	To have a better understanding of how to treat others in a way that makes them feel comfortable and included.
	I hope to learn how to make whatever classroom I'm in, a comfortable, safe place, for any and every type of person.
	I hope to gain knowledge that will allow me to create a community for students and fellow coworkers that is welcoming to all.

Post-survey training data revealed that 93% of respondents found training useful. The remaining 7% were neutral. Similarly, nearly 100% of respondents agreed or strongly agreed that they gained

an understanding of the concepts presented during the training. New UGTAs shared their key takeaways in response to an open-ended question (Table 4). Many of the new UGTAS marked the importance of understanding the impact of an action over its intent, reflecting on the role they play as educators and mentors in conflict resolution. As this was a key takeaway for the UGTAs, many of them also shared that they would like to see more focus on this content in the future.

Table 4. Example Responses about Training Takeaways from New UGTAs

Question	Please share at least one of your key takeaways from this training	What concepts remain unclear? What concepts would you like to see reiterated in future training?
Example Responses	It was really eye opening to learn about the importance of impact over intent, and the responsibilities that come with being a TA in regards to language to use and speaking with caution in case some language used is a micro aggression.	Conflict resolution isn't the most clear, only because there are countless possibilities for things that may happen.
	It's okay to have conflict, but knowing how to resolve it is also important. Also, being inclusive and reflecting on implicit bias is important because it lets you have a more welcoming environment in the class for the students, and the TAs and faculty as well.	I'd like to see more conflict styles and resolution, and I'd like to see more case scenario training. I really liked the open discussion GIDBEA things, like the exercises and the group talks.
	One of my key takeaways will be impact versus intent. Sometimes we have the right intent, but the execution ends up impacting more negatively than intended.	No concept really feels unclear, I just wish there was more examples of real life scenarios, so we can really get a feel for the more extreme examples and the more common, everyday examples.

Impact of Year Two Training on Returning UGTAs

95% of returning UGTAs (representing 37 UGTAs total) responded to the pre-training survey. The returning UGTAs participated in Year One Training in Fall 2022, as new UGTAs; given their experience, returning UGTAs were first asked with how relevant and familiar they felt the concepts presented in Year One Training were to their roles. All respondents found the concepts at least somewhat relevant to their roles and found the training helpful to them as UGTAs, students at the institution, and individuals. Most returning UGTAs stated that they could explain the concepts of inclusive language (97%), inclusive leadership (78%), microaggressions (72%), and conflict styles (56%). Several returning UGTAs expanded on their discomfort with conflict

styles in particular, writing that they would like to review, “what to do in situations where students/TAs experience harassment” and “more about how to deal with conflict and differences within colleagues and students in the classroom.” The UGTAs’ familiarity with these concepts corresponded with how comfortable they felt applying these concepts to their work (Table 5). While a majority of returning UGTAs still agreed or strongly agreed that they felt comfortable managing conflict, the percentage was significantly less than applying inclusive leadership and language to their work.

Table 5. Returning UGTA Comfort Applying Concepts to their Work

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I feel confident in my ability to be an inclusive leader.	0%	0%	5.4%	51.4%	43.2%
I do my best to use inclusive language in daily practice.	0%	2.7%	8.1%	35.1%	54.1%
I feel comfortable managing conflict.	0%	0%	27.0%	38.0%	35.0%

Feedback from the returning UGTAs emphasized the need to further support the UGTAs in conflict resolution strategies (Table 6). While UGTAs recognized the impact that they can have as peers and educators, the post-survey responses revealed that they would like more focus on strategies for addressing instances of exclusion and discrimination in the classroom. This aligned with the goals that new UGTAs set for future training, and we plan to address these issues in the future.

Table 6. Example Responses about Training Takeaways from Returning UGTAs

Question	Please share at least one of your key takeaways from this training	What concepts remain unclear? What concepts would you like to see reiterated in future training?
Example Responses	Individuals can be agents of change in a larger system.	What to do if a student harasses a TA
	Being an inclusive leader means a lot more than I initially thought it did	More about how to respond to other people when they mention something that isn’t inclusive.
	There are a lot of identities that come into play that affect the actions and reactions of individuals	How oppression plays a role into our jobs as TAs
	Everyone has different perspectives when it comes to GIDBEA situations and experience different levels of discrimination. The	I would like to expand on different forms of discrimination besides racism such as homophobia and classism.

	important thing is to keep an open mind and learn from others in order to grow and educate those around you.	
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In addition, two questions about returning UGTAs’ learning, we also asked them to evaluate the climate of the workplace environment in the course and the impact GIDBEA has had on it. Overall, returning UGTAs expressed comfort and a sense of belonging in the workplace, and that they were supported by their fellow UGTAs and the faculty of the course (Table 7). Still, a lower percent of UGTAs expressed being comfortable reaching out for help. 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 7. Returning UGTAs Evaluation of Course Climate

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I feel comfortable with the culture in the workplace.	2.70%	5.41%	8.11%	54.05%	29.73%
I feel a sense of belonging in the workplace.	0%	8.11%	13.51%	48.65%	29.73%
I feel supported by other UGTAs.	0%	0%	8.11%	43.24%	48.65%
I feel supported by the faculty.	0%	2.70%	13.51%	45.95%	37.84%
When I am experiencing a conflict, I know who to reach out to for help.	0%	5.41%	8.11%	62.16%	24.32%
When I am experiencing a conflict, I feel comfortable reaching out for help.	0%	0%	27.03%	43.24%	29.73%
I feel that GIDBEA training has helped create an inclusive community within the workplace.	0%	2.70%	5.41%	56.76%	35.14%

Conclusions

In this complete experience-based practice paper, we presented data from our Fall 2022 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, questions remained on how to implement the concepts, particularly conflict styles, in the classroom. TAs sought best practices and strategies for addressing conflict, and practice via case scenarios. In the future, we will consider ways to better incorporate these in the future.

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 refine Year One and Year Two training content and pilot Year Three 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.

Acknowledgement

We would like to acknowledge the participation and contributions of all UGTAs that support the course. We also acknowledge staff members of the institution Office of Global Inclusion, Diversity, and Strategic Innovation who have contributed to and co-facilitated training content.

Appendix A. Pre-Training Survey for New TAs

Table 8. GIDBEA Pre-Training Survey for New TAs

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 microaggressions? ● How familiar are you with the concept of conflict styles? 	<ul style="list-style-type: none"> ● Very Unfamiliar ● Unfamiliar ● Somewhat Familiar ● Familiar ● Very Unfamiliar
Have you taken any other GIDBEA-related training or attended any GIDBEA-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

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