

Creation of a Workshop Series on Inclusive Teaching and Design Practices for Engineering Undergraduate Teaching Assistants

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Abstract

This complete evidence-based practice paper describes a workshop series on inclusive teaching and design practices for undergraduate engineering teaching assistants of a cornerstone design course taught at a large private university. Undergraduate teaching assistants are integral to student success in the course. As the first points of contact for students, they assist with content delivery, guide students through hands-on labs and projects, and deliver feedback on assignments. Effective undergraduate teaching assistants are peer leaders and mentors to first-year students; through these workshops, we seek to ground their leadership and mentorship approaches in principles of global inclusion, diversity, belonging, equity, and access (GIDBEA).

In this work, we outline the workshop curriculum. Scaffolded into three parts, the workshop is designed to provide the teaching assistants with the ability to recognize and confront bias among individuals and within teams, help them develop an understanding of power, privilege, and oppression, and equip them with the tools to employ their knowledge as engineers through discussions of inclusive design. Co-created and co-facilitated by faculty, teaching assistants, and diversity, equity, and inclusion experts at the institution, the workshops feature short lectures by the facilitators, 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 program. 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.

To understand the value that this training provides the teaching assistants, a survey was conducted of participants before and after participation in the workshops. 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. In this paper, findings from the third year of piloting our workshops are described. The data shows that all teaching assistants overall found that the workshop content and activities were relevant to them as peer educators. Several teaching assistants shared inclusive leadership strategies that they planned to implement in the coming semester.

Introduction

In first-year design courses, undergraduate teaching assistants (UGTAs) have had positive outcomes on student learning, and the use of undergraduate teaching assistant programs continues to grow [1-5]. 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.

Recently, educators have recognized the need to equip UGTAs in STEM with training in how to approach their jobs as inclusive peer educators [6-11]. We thus set out to formalize inclusive teaching training for UGTAs in our program by providing foundational knowledge of global inclusion, diversity, belonging, equity, and access (GIDBEA).

Through this work, 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]. In this complete experience-based practice paper, we describe the creation of a three-year, scaffolded inclusive leadership development program for UGTAs at a large private university. This paper concludes a series of three papers detailing this work [13, 14].

Project Approach

Setting and Timeline

This study was conducted at a large private university with UGTAs of a first-year, project-based introductory design course. Approximately 350 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 2023 semester.

Methods

We view our UGTA body as a community of practice [15, 16]. Co-created and co-facilitated by faculty, UGTAs, and GIDBEA experts at the institution, the workshop series 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.

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 dynamics and privilege; and in the third year, workplace advocacy and design frameworks that center principles introduced in the first and second years. Training sessions that take place ahead of the spring semester offer time for concept reinforcement and reflection on experiences in the fall. Sessions are co-facilitated by UGTAs, faculty, and the university's Office of Global Inclusion, Diversity, and Strategic Innovation (OGI).

Curricula for Year 1, Year 2, and Year 3 were piloted ahead of fall 2021, fall 2022, and fall 2023 semesters. Each session runs simultaneously, with all three cohorts of UGTAs meeting as a large body at the end of training to share key takeaways.



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

We adapted the curriculum using 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” [17]. The framework aligns with the engineering inclusive leadership development model presented by Pollock *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 [18-20].

Details of Year 1 and Year 2 Training can be found in our previous work [13, 14]. Year 3 Training was a five-hour workshop designed for UGTAs in their final year of the program. In the first three hours of the workshop, the UGTAs applied principles of GIDBEA introduced in Year 1 and 2 to engineering design. Frameworks centering GIDBEA, namely inclusive design, universal design, and design justice were introduced, challenging students to consider how technical and emergent biases arise in their work as engineers and educators [21]. UGTAs were placed into small groups of approximately UGTAs to discuss the following questions:

- How do you define the practice of design?
- Think about who is designing for whom. How and why does this matter?
- What are examples of bias and exclusions in engineering design?

With an introduction to these design frameworks, UGTAs then analyzed engineering projects that applied the above frameworks using asset-based community development and participatory design. This discussion then led to a reflection on the ways UGTAs might apply these frameworks and lessons learned in their own professional development. UGTAs were asked to consider:

- Reflect on the last three years of workshops. What does diversity mean to you?
- How do you utilize your background to promote inclusion?
- What are qualities you look for in a company work culture and values? What are qualities and values you cannot overlook?
- Analyze the “Our Values” pages of a company you are interested in. How do these values align with your own?

Assessment

In a pre-training assessment, UGTAs were asked about their expectations of the session, reflecting on past workshops, and familiarity with institutional resources available to students (Table 1). In a post-survey, UGTAs responded to questions regarding the usefulness of the training to their roles as UGTAs, and their expected comfort applying these concepts in their interactions in the course (Table 2). Participation in both assessments was voluntary and open to all UGTAs who attended GIDBEA training.

Table 1. GIDBEA Pre-Training Survey for Year 3 UGTAs

Pre-Survey Questions	Response Options:
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
<p>What have you gained from this workshop series thus so far?</p> <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

Table 2. GIDBEA Post-Training Survey for Year 3 UGTAs

Post-Survey Questions	Response Options:
<p>Please indicate how strongly you agree with the following statements:</p> <ul style="list-style-type: none"> ● I felt that previous years' training provided a good foundation for this training. 	<ul style="list-style-type: none"> ● I strongly disagree. ● I disagree. ● Neutral ● I agree. ● I strongly agree.

<ul style="list-style-type: none"> • 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 UGTAs. • I feel comfortable acting on the concepts presented when interacting with faculty. 	
<p>Please share at least one of your key takeaways from this training.</p> <p>What concepts remain unclear? What concepts would you like to see reiterated in future training?</p> <p>What methods/exercises did you find most effective?</p> <p>What new concepts would you like to learn in future IDBE trainings?</p> <p>Do you have any other feedback you would like to share with us?</p>	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 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

60% of third-year UGTAs (representing 18 third-year UGTAs total) responded to the pre-training survey. Most respondents (83%) indicated that the concepts presented over the course of the workshop series were relevant to their roles, and that they felt familiar enough to explain the concepts presented during the sessions. A small number (30%) stated that they also attended additional GIDBEA trainings to supplement the workshops provided.

When asked what they had gained from their GIDBEA trainings thus far, respondents shared the importance of using inclusive language and practicing self-awareness about their interactions

with others (Table 3). This was consistent with responses received from Year 1 and Year 2 training [13, 14], as UGTAs have stated that inclusive language felt like a tangible skill to practice.

Table 3. Example Training Reflections from UGTAs

Question	Example Responses
What have you gained from this workshop series thus so far?	I have gained the understanding of why it is important to use inclusive language because at the end of the day you never know who you are dealing with and what they might feel by other types of slang/words.
	Gained a general sense of empathy and ability to interact with people in a more just manner
	I've learned to be a lot more deliberate and more mindful of the language that I use. I've improved at resolving conflicts involving people with different conflict resolution styles, opinions, and values.

While acknowledging the benefits of training, UGTAs also stated that they encountered challenges implementing principles of inclusive leadership into their work. In response to the question, “What challenges have you had practicing inclusive leadership? How can we better support you (further training, resources, etc.)?” several UGTAs shared that they found it difficult to address situations that they found conflicted with the principles presented in training. Given the still overall positive response UGTAs had to training, we acknowledge that this is an area of improvement for the workshop series, reiterating for students that developing leadership skills requires ongoing practice.

Table 4. Example Responses about Challenges Faced by UGTAs

Question	Example Responses
What challenges have you had practicing inclusive leadership? How can we better support you (further training, resources, etc.)?	Approaching other TAs when they do or say things that are not in line with an GIDBEA mindset
	When others are not following certain GIDBEA ethics it can be challenging to confront them.
	I often find myself using language that isnt that inclusive due to force of habit.

Post-survey training data revealed that 93% of respondents found training relevant to their work, engaging, and informative. Similarly, nearly 100% of respondents agreed or strongly agreed that they gained an understanding of the concepts presented during the training. Respondents shared their key takeaways in response to an open-ended question (Table 5). Many of the UGTAs noted that discussing GIDBEA in context of their professional development was a highlight of the training. While UGTAs responded positively to the introduction to design frameworks, they felt that discussions related to the workplace felt more actionable and relevant to their experience as undergraduate students. In future trainings, several UGTAs expressed that they would like

facilitators to focus more on these topics, particularly on self-advocacy in the workplace for respondents from marginalized backgrounds and working internationally.

Table 5. 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	GIDBEA is and always will be relevant in industry and research regardless of the field of study	I'd like more training on how to advocate for and talk about yourself in environments where there is a lack of support for your identity
	Research into companies you are interested in working in and seeing if their missions/values align with your personal moral compass	Company culture internationally since IDBE is not very prevalent internationally. How do we tackle this issue
	Courage to promote inclusivity in the workplace	How to operate under power dynamics and how to speak up

Conclusions

This paper concludes the creation of the workshop series designed for UGTAs in a first-year design course [13, 14]. We presented data from piloting our Fall 2023 training. UGTAs felt that foundational concepts of GIDBEA, tools for inclusive language, and navigating conflict were relevant to their work, and while they felt the training benefited them, questions remained on how to apply concepts in their roles as UGTAs and professionally as engineers. In the future, we will consider ways to focus the training to focus on steps for implementing these concepts in the workplace.

As this work continues, we plan to refine the content of our training and adapt the curriculum created for our UGTAs in other academic departments at our institution. 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. We also intend to adapt our training modules for students in our course, to introduce and incorporate GIDBEA principles into our curriculum.

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 and the Office of Inclusive Excellence for their support of our team.

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