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The Impact of an Inclusive Teaching Practices Workshop on Student Peer Teachers

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ABSTRACT

Interactions with peer mentors can support the success of undergraduate STEM

students; therefore, the training of near-peer teachers is key to ensure fruitful interactions. A Peer Teacher Inclusive Teaching Workshop was provided to graduate teaching assistants, undergraduate learning assistants, and undergraduate tutors. A pre- and post-assessment focused on participants' knowledge of and motivation to use inclusive teaching practices as well as the likelihood of asking for assistance with their use. A final assessment was given three to six months later to investigate the implementation of inclusive teaching practices. Results indicated that the workshop helped increase knowledge and motivation immediately following the workshop, but the effect was lost as time passed. Some, but not all, participants reported using inclusive teaching strategies.

Keywords: Inclusive teaching; near-peer; peer teacher; STEM; teaching training

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INTRODUCTION

The College of Science and Mathematics (COSM) at Georgia Southern University created and implemented a peer teacher workshop on inclusive teaching. The goal of the workshop was to increase the use of inclusive practices by peer teachers in their interactions with STEM undergraduate students thereby improving students' sense of belonging and persistence in STEM. The efficacy of the workshop on the peer teachers was assessed by measuring the extent to which peer teachers' confidence in the use of inclusive strategies, and their commitment and motivation for doing so changed because of their participation in the workshop.

Georgia Southern University is a regional, public university in the southeast that serves a student body characterized by substantial socioeconomic and racial variation including first-generation and Pell-eligible students. In introductory STEM disciplines, student retention and persistence rates are consistent with national trends, where underrepresented and first-generation students face disproportionately higher attrition rates. To help improve student retention and graduation, COSM has included peer teaching as a regular component of undergraduate STEM education. The college is one of the largest producers of student credit hours as it offers classes for degrees in biology, biochemistry, chemistry, geosciences, mathematics, physics, and sustainability science in

addition to providing general education courses for students of other majors. Within the college, peer teachers operate across both formal and informal instructional environments across all disciplines in the college. These roles comprise graduate teaching assistants and undergraduate learning assistants who assist with or lead formal laboratory and lecture sections, as well as undergraduate peer tutors who facilitate learning through a college-level and mathematics-departmental tutoring centers and out-of-class office hours.

While these peer educators were serving an important role in supporting undergraduate students, training initiatives within the college historically prioritized content mastery and standard instructional duties. Peer teachers received no systematic instruction in inclusive pedagogy, implicit bias, or strategies for managing classroom diversity. This absence left peer educators unprepared to create inclusive learning environments or support the student populations with traditionally lower success rates. To build a more supportive culture, COSM integrated inclusive pedagogy into peer educator training as part of a Howard Hughes Medical Institute (HHMI) Inclusive Excellence 3 (IE3) grant initiative. This initiative provided the resources to address these institutional issues by improving the sense of belonging and persistence within STEM disciplines and courses.

LITERATURE REVIEW

Today, higher education offers undergraduate students many types of interactions to boost their learning experience. In the classroom, these interactions can be categorized as student-to-faculty, student-to-student, or student-to-peer teachers (Booker & Campbell-Whatley, 2018; Colvin & Ashman, 2010; Hausmann et al., 2007). Within student-to-peer interactions, peer teachers, graduate assistants, and undergraduate teaching assistants are, in essence, near-peer mentors with whom students often identify due to similarities in academic experiences, socioeconomic backgrounds, and/or professional aspirations (Lockspeiser et al., 2008; Ost, 2010; Tenenbaum et al., 2014). Virtually all studies on near-peer mentorship report positive gains in student outcomes including performance (Ali et al., 2026; Brierley et al., 2022; Brobst et al., 2026; Dawson et al., 2014; Hidayat & Saad, 2025; Moamen et al., 2026). The ability to “see themselves” in a peer who had successfully completed the same class or academic program can be inspiring and fuel students’ self-efficacy.

Indeed, a positive peer teacher experience enhances students’ interest, motivation, and engagement with a subject matter. As such, student-to-peer teacher interactions can promote students’ sense of belonging, persistence, and academic and professional success. In higher education STEM disciplines, peer mentorship has been shown to support gains in groups that often experience higher attrition rates such as women, underrepresented races/ethnicities, low-income, first-

generation, and students in the first few years of college (Dekhane et al., 2024; Dennehy & Dasgupta, 2017; Drane et al., 2014; Liou-Mark et al., 2018; Raabe et al., 2019; Snyder et al., 2016; Wu et al., 2022). For example, an early intervention program that provided first-year female engineering majors with female peer mentors translated into improved retention, progression, and graduation outcomes as well as increased interest in graduate degree attainment and an increased interest in and acquisition of internship opportunities (Dennehy & Dasgupta, 2017; Wu et al., 2022). Swann et al. (2023) reported that a STEM peer coaching program helped undergraduate students gain greater clarity on their goals, improve their ability to self-advocate, and grow in their self-awareness and ability to make better plans for success. During the height of the COVID pandemic, peer teacher initiatives in virtual spaces created a sense of belonging and community that kept students engaged in computer science learning and self-efficacy (Dekhane et al., 2024).

Students benefit from interactions with a near-peer mentor, and notably and importantly, the peer mentors can also benefit from serving in this role. Being a peer mentor bolsters peer teachers' interpersonal skills, teaching and leadership abilities, knowledge base, and self-confidence (Avonts et al., 2023; Tenenbaum et al., 2014). A two-year longitudinal study found that in addition to the positive effects on medical peer teachers' confidence in their own clinical and teaching skills, the experience made them more "other" centered and helped to solidify their self-identities as professionals (Avonts et al., 2023). Similar outcomes were reported for an undergraduate STEM program at a minority-serving institution (Narayanan et al., 2023). Through a peer-led team learning experience in chemistry, biology, and statistics courses, student peer leaders who benefited reported gains in their communication skills, desire to persist, ability to solve problems on their own, and understanding of course material. These peer teachers also indicated that they grew in their passion for serving their peers. Another study on coaching-based training for underrepresented STEM mentors not only fostered a supportive environment for mentees but also yielded significant positive benefits in peer mentors, including improved emotional regulation in high-stress environments and increased confidence in their STEM abilities (Tuck et al., 2025).

Considering the impact that the peer teacher experience can have on student outcomes in higher education and the benefits gained by the peer teachers in these roles, initiatives that train and equip peer teachers to be successful are vital (Karia et al., 2020; Swann et al., 2023). Peer teachers are highly impactful members of an instructional team, and as such, providing peer mentors as well as faculty with inclusion-based pedagogical workshops is crucial for fostering and sustaining a robust inclusive teaching culture (Agresar et al., 2019; Everett & Oswald, 2018; Jaimes et al., 2024; Paredes et al., 2023). For example, one study found that better-trained peer teachers increased medical students' perception of learning, motivation, and positive environment (Karamaroudis et al., 2020), while another

provided empirical evidence for the effectiveness of a focused coaching training in preparing near-peer mentors (Tuck et al., 2025).

Inclusive pedagogy encompasses the full classroom experience including teaching methods, course material, assessment strategies, interpersonal interactions, and more (Booker & Campbell-Whatley, 2018). The conceptualization and operationalization of inclusive teaching vary according to characteristics such as individual interpretation and cultural and social context (Makoelle, 2014). However, the intentions behind inclusive practices seem to be consistent regardless of variables. Inclusive pedagogy aims for more self-aware instructors who establish learning environments that give recognition to students' diverse backgrounds and learning styles (Dewsbury & Brame, 2019; Draffan et al., 2017). Given the importance of inclusive teaching, professional development opportunities for those in instructional roles are fundamental to the wide-scale adoption and successful integration of this practice at an institution (Artero-Abellán & Agustín-Abellán, 2026; Sanchez-Diaz et al., 2025). While the positive impact of peer teaching and inclusive pedagogy on students is well-documented, little work has been done to highlight and assess inclusive teaching training for peer educators.

RESEARCH METHOD

Peer Teacher Inclusive Teaching Workshop

A Peer Teacher Inclusive Teaching Workshop was created as a part of a Howard Hughes Medical Institute (HHMI) Inclusive Excellence Three (IE3) grant. The workshop focused on training peer teachers within the College of Science and Mathematics (COSM) at Georgia Southern University. The college offers undergraduate courses in biology, biochemistry, chemistry, geosciences, mathematics, physics, and sustainability science to STEM majors and non-majors. In this study, a 'peer teacher' is defined as any undergraduate or graduate student who teaches other students in a formal classroom or lab setting or in an informal setting such as a tutoring center or out-of-class office hours. Here, peer teachers include COSM graduate student teaching assistants, undergraduate learning assistants, and undergraduate student peer tutors.

Inclusive teaching practices are most effectively acquired through formal, structured training opportunities (Sanchez-Diaz et al., 2025). During 2022-2023, COSM's peer teachers voluntarily participated in a one-time, 75-minute Peer Teacher Inclusive Teaching Workshop. The workshop was offered multiple times during the academic year to capture as many peer teachers as possible. The workshop was created and led by COSM faculty members who have experience and expertise in the use of inclusive teaching practices and a demonstrated commitment to inclusion. Immediately after the conclusion of the workshop, each

peer teacher participant was emailed a copy of the workshop presentation with hyperlinks to the resources cited.

Details of the workshop are included in Table 1. With the goal of promoting wide-scale adoption of easy-to-implement but highly impactful inclusive strategies, the workshop was developed using tools from across the concrete inclusive education practices spectrum (Dewsbury & Brame, 2019). The training was structured to (1) create a welcoming environment; (2) engage the peer teachers as active participants in their own learning with interspersed, reflective discussions; (3) formally introduce the concept of inclusive teaching and the benefits of practicing the approach; and (4) impart techniques that could be seamlessly and immediately implemented—reasonably achievable within the semester timeframe.

Table 1
Details of the 75-minute Peer Teacher Inclusive Teaching Workshop

Activity (approximate time allotted)	Information Source
Group Activity: Ice Breaker Identity Wheel Individual activity (5 minutes); Group share (5 minutes); Definition of Inclusive Teaching & Why Inclusive Teaching is Important (5 minutes)	(Center for Teaching and Learning, 2020)
Group Activity: Quiz over student demographics at the university (5 minutes)	(Center for Teaching and Learning, 2024)
5 Key Principles of Inclusive Excellence in Teaching (3 minutes) & Tips on Achieving The 5 Key Principles (10 minutes)	(Center for Teaching and Learning, 2024; Educators, 2024; Tanner, 2013)
Inclusive Language Definition (2 minutes) 5 Categories of Inclusive Language (2 minutes) Examples of how to use them when interacting with students (8 minutes)	(Educators, 2024)
Brief discussion on Implicit Biases (5 minutes) Group Activity: Encountering and responding to stereotyping and bias in your class (10 minutes)	(Goodman, 2011)
First Day of Class Checklist (10 minutes)	(Center for Teaching and Learning, 2024)
Wrap-up discussion (5 minutes)	

Relevant articles on inclusive pedagogy, such as the Universal Design for Learning (UDL), can be used as a guide to support trainings (Losberg & Zwozdiak-Myers, 2024; Rao et al., 2023). UDL is a widely recognized framework that uses multiple means to address the needs and learning preferences for all student populations (CAST, 2024). UDL has three guiding principles: engagement, representation, and action and expression. We may categorize activities in the Peer Teacher Inclusive Teaching Workshop under these principles. Engagement is meant to grow purposeful and motivated learners and foster a sense of belonging. The Ice Breaker Identity Wheel activity fosters community and gives motivation for the activities to come. The Implicit Bias group activity allows reflection and self-assessment, and the First Day of Class Checklist provides a tool to decrease anxiety about the peer-teaching activity and increase confidence. To produce knowledgeable and resourceful peer teachers in the representation pillar, the key principles of inclusive excellence in teaching are addressed along with the definitions and categories around inclusive language. These work toward the internalization of inclusive teaching by adding background and looking at the important features of these teaching practices. The principle of action and expression aims to produce strategic and goal-oriented learners. The training includes a variety of options for expression through the quiz on student demographics, discussions on principles, and role-playing examples of how to interact with students.

Data Collection and Analysis

Data collection through the Peer Teacher Inclusive Teaching Workshop and analysis aimed to determine immediate and long-term programmatic feedback, feasibility, and local impact on peer teachers. Three surveys were used for assessment; two surveys were identical, given before the start of the workshop (pre-survey) and immediately after the workshop (post-survey). The pre- and post-survey evaluated (1) knowledge of the use of diversity, equity, and inclusion (DEI) practices, (2) motivation to use DEI practices, and (3) likelihood of asking for assistance when engaging in DEI topics in the classroom (Table 2). The three question topics are hereby referred to as ‘knowledge,’ ‘motivation,’ and ‘assistance.’ The third assessment was a follow-up survey that was completed three to six months after the conclusion of the workshop. The follow-up survey contained the same questions as the prior surveys and additionally asked if strategies from the workshop had been implemented and, if so, which ones (Table 2). Many survey responses were on a Likert scale ranging from 1 meaning ‘very uninformed’, ‘very unmotivated’, or ‘very unlikely’ to 4 representing ‘very informed’, ‘very motivated’, or ‘very likely’ depending on the question topic (Table 2). Reliability was limited ($\alpha = 0.43$) but improved ($\alpha > 0.75$) when predicted to a larger number of questions ($n > 3$). Additionally, all surveys

collected demographic data of respondents including (1) Gender: Male, Female, Non-binary, or Other, and (2) Race: White/Caucasian, Black/African American, Asian, Hispanic, Native American, Multi-racial, Other, or I do not wish to share that information.

Numerical ratings were analyzed with descriptive statistics and were compared by gender and race for the pre-, post-, and follow-up surveys. A Wilcoxon rank sum analysis was conducted to determine if the workshop led to increased knowledge, motivation, and likelihood to seek assistance in providing inclusive teaching strategies. Significance was tested for $p \leq 0.05$. Specific to the follow-up survey, the number of respondents using inclusive teaching practices was converted to a percentage, and responses to open-ended questions were used for informal qualitative analysis.

Table 2
Assessment Survey Details

Pre- and Post-Survey Questions	Likert Scale Responses (1-4)
How knowledgeable are you about the use of diversity, equity, and inclusion practices in the classroom?	1-Very uninformed, 4-Very knowledgeable
How would you describe your motivation to use diversity, equity, and inclusion practices in your classroom and curriculum?	1-Very unmotivated, 4-Very motivated
How likely are you to ask for assistance or support when engaging with diversity, equity, and inclusivity topics in the curriculum?	1-Very unlikely, 4-Very likely
Follow-up Survey Questions	Likert Scale Responses (1-4), Multiple Choice, or Open-ended
Today, how knowledgeable are you about the use of diversity, equity, and inclusion practices in the classroom?	1-Very uninformed, 4-Very knowledgeable
Today, how would you describe your motivation to use diversity, equity, and inclusion practices in your classroom and curriculum?	1-Very unmotivated, 4-Very motivated
Today, how likely are you to ask for assistance or support when engaging with diversity, equity, and inclusivity topics in the curriculum?	1-Very unlikely, 4-Very likely
Have you implemented any of the strategies from the workshop into your teaching?	a) Yes, b) No, c) Not sure

Pre- and Post-Survey Questions	Likert Scale Responses (1-4)
If you answered "yes" to the previous question, list the inclusive teaching strategy (or strategies) that you are using.	Open-ended

RESULTS

Seventy-nine peer mentors participated in the Peer Teacher Inclusive Teaching Workshop. All peer mentor participants responded to the pre-survey (100% response rate), and 71 answered the post-survey (90% response rate) (Table 3). Participation in the follow-up survey dropped with only 17 peer mentors responding (22% response rate). Overall, the peer mentor respondents represented all genders including non-binary as well as all racial categories.

Table 3
Demographics of Peer Teacher Respondents by Survey

Demographic	Respondents in Pre-survey	Respondents in Post-survey	Respondents in Follow-up Survey
	% (n)	% (n)	% (n)
Gender			
Female	57.0% (45)	57.7% (41)	64.7% (11)
Male	40.5% (32)	39.4% (28)	29.4% (5)
Non-binary	2.5% (2)	2.8% (2)	5.9% (1)
Race			
White	34.2% (27)	43.7% (31)	47.1% (8)
Black	49.4% (39)	40.8% (29)	23.5% (4)
Asian	2.5% (2)	2.8% (2)	17.6% (3)
Hispanic	10.1% (8)	8.5% (6)	5.9% (1)
Native American	0% (0)	0% (0)	0% (0)

Multi-racial	3.8% (3)	4.2% (3)	0% (0)
Prefer not to say	0% (0)	0% (0)	5.9% (1)
<i>n</i>	79	71	17

Mean ratings on the three Likert scale questions were calculated, finding improvement from pre-survey to post-survey in all three question topics, as well as a smaller increase in the means on the knowledge question from the pre-survey to the follow-up survey (Table 4).

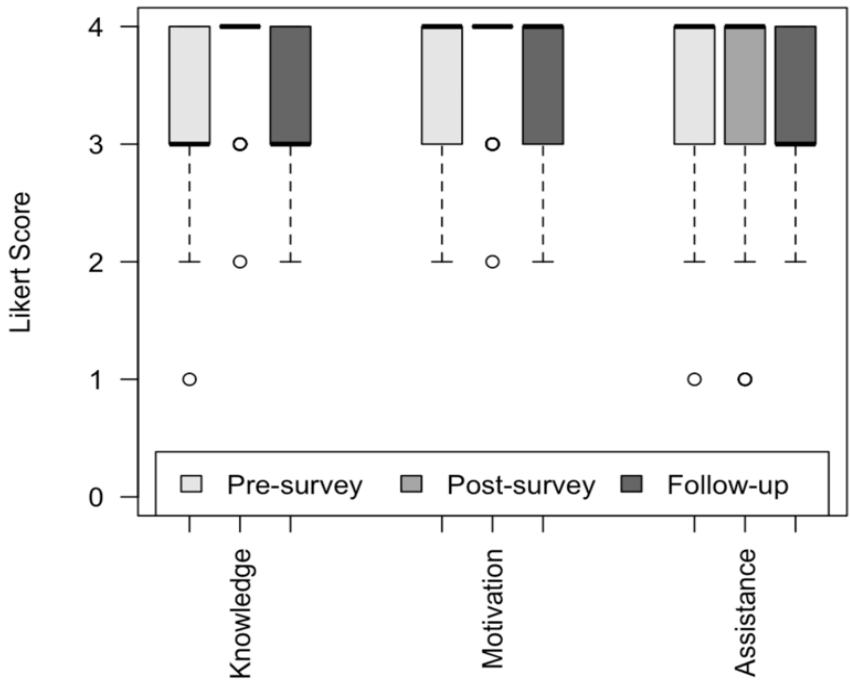
Table 4
Likert Scale Rating Results of the Three Surveys by Question Topic

Question Topic	Pre-survey			Post-survey			Follow-up survey		
	<u><i>x</i></u>	<i>s</i>	<i>n</i>	<u><i>x</i></u>	<i>s</i>	<i>n</i>	<u><i>x</i></u>	<i>s</i>	<i>n</i>
Knowledge	3.13	0.77	76	3.82	0.42	71	3.29	0.59	17
Motivation	3.71	0.48	79	3.84	0.40	70	3.65	0.61	17
Assistance	3.27	0.85	73	3.42	0.91	69	3.24	0.66	17

Data was typically skewed left, so a Wilcoxon signed rank test was used (Figure 1). Immediately after the workshop, there was a significant increase in knowledge ($p = 0.00000$) and motivation ($p = 0.025$) between the pre-survey and post-survey. No significant difference was found in the likelihood of asking for support ($p = 0.086$). However, ratings decreased over time with the follow-up survey responses; no significant increase was found from the pre-survey to the follow-up survey on any of the three questions ($p > 0.25$). Furthermore, if the assumptions are relaxed, and paired t-tests are used, significance is consistent in the same pairs.

Figure 1

Boxplots of Likert Ratings Assessing Knowledge, Motivation, or Assistance Across the Three Surveys



Note. The dark bars indicated the median, open circles are outliers, and dashed lines are the range of the first quartile.

Tests for differences between demographic groups were also performed. Using Kruskal-Wallis, no significant differences were found when respondents were grouped by gender or race with regard to the questions on knowledge, motivation, or assistance within each of the pre-survey, post-survey, and follow-up survey data sets ($p \geq 0.05$).

The final two questions of the follow-up survey asked peer teachers if they had implemented any teaching practices discussed during the workshop. Of the 17 respondents, seven said 'yes', one said 'no', and nine answered that they were 'not sure.' Topic recall is clearly an issue with respondents as a majority were unable to remember if they used the techniques or what the techniques were. Of those who answered the open-ended question, the methods they reported using included viewing students uniquely and valuing their differences, including

cultural differences in learning opportunities, encouraging participation, building rapport, and using inclusive language.

DISCUSSION & CONCLUSIONS

Peer teacher programs are known to have a positive impact both on the teacher and the student (Avonts et al., 2023; Dekhane et al., 2024; Drane et al., 2014; Liou-Mark et al., 2018; Lockspeiser et al., 2008; Ost, 2010; Raabe et al., 2019; Snyder et al., 2016; Tenenbaum et al., 2014; Wu et al., 2022). For full benefits to be gained from this high-impact practice, the peer teachers must first be trained to prepare for their roles (Karia et al., 2020; Swann et al., 2023). A peer teacher workshop uniquely focused on inclusive teaching was developed to meet this need. The participant results show that the Peer Teacher Inclusive Teaching Workshop was effective in increasing knowledge on this topic and motivation to use these practices immediately following the workshop. However, the surveyed participants regressed to pre-workshop levels of knowledge and motivation in the follow-up period, 3-6 months post-workshop.

The Peer Teacher Inclusive Teaching Workshop did encourage the peer teachers to use diversity, equity, and inclusion teaching strategies with 41% of respondents reporting they had done so during the follow-up period. While reported motivation decreased by the follow-up survey, some respondents were still using the strategies. In evaluating the open ended-responses, we see a variety of lower-level methods being used and described broadly. It is expected that these inexperienced peer teachers are likely to implement the more basic strategies first.

In summary, we can confidently conclude that at minimum the workshop brings awareness to inclusive teaching practices in peer teachers. However, a one-time workshop was not enough to ensure continued success. Similarly, a study that assessed outcomes of K-12 teachers who participated in a 20-hour, multi-module training program on inclusive practices found a drop off in participant self-efficacy three months after the program concluded (Rusconi et al., 2026). Our suggestions for improvement include the formation of a year-long, peer teacher community for each new cohort, led by an instructor knowledgeable in inclusive teaching practices. Meeting regularly, this group will be provided ‘refreshers’ on inclusive practices and a space to report individual results and discuss ways to improve implementation. The ultimate goal of inclusive teaching is for all students to gain a sense of belonging that supports their academic success. Future studies should not only investigate the effects of inclusive training on peer teachers, but also on the results of the students they teach.

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