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Scaling Inclusive Teaching:

A National STEM Teaching Initiative Centering Identity, Power and Privilege

By Susanna Calkins, Anna Conway, Tazin Daniels, Regina F. Frey, Donald L. Gillian-Daniel, Bennett Goldberg, Robin McC. Greenler, Lucas B. Hill , Sarah Chobot Hokanson, Vanessa Johnson-Ojeda, Tershia Pinder-Grover, Sara Armstrong, Diamond Buchanan, Diane Coddling, Schnaude Dorizan, Noah Green, Ivan A. Hernandez, Lisa Himelman, Tim Immelman, Omari W. Keeles, Haley Lewis, SuYeong (Sophie) Shin, Veronica Womack, Sara E. Woods, and Alessandra M. York

In Short

- We developed a free online course that centers learning about identity, power, positionality, and privilege to support inclusive teaching for STEM faculty and future faculty.
- Instructors across all institution types, including community college and 2-year, regional and comprehensive, and public and private research universities, utilized and valued a free asynchronous online course with an optional local learning community facilitated by project-trained facilitation teams.
- Participants were highly engaged in the online course content, rated the content positively, and demonstrated increases in awareness, confidence, and intent to apply inclusive teaching strategies.
- Outcomes demonstrate that the key features of the course (My Inclusivity Framework, Learning Community and Affinity Group discussions, and Embodied Case Studies) were viewed as unique teaching development opportunities that created valuable learning for our participants.

The ISTP [Inclusive STEM Teaching Project] learning community encouraged me to confront my own biases and consider how my identity and the identity of my students influence learning in the classroom. I also had the chance to practice concrete strategies for creating an inclusive learning environment. I loved sharing the experience with my peers and look forward to sharing this program with others on campus.

—Jennifer Kraft Leavy, PhD
(she/her/hers), Assistant Dean for Faculty
Mentoring, College of Sciences, Georgia
Institute of Technology; Learning Community
Facilitator

Calls for more inclusive learning environments, particularly in STEM courses, continue to reverberate in higher education (Handelsman et al., 2022). Marginalized students leave STEM majors—and STEM careers—at significantly higher rates than majority students (Rieggle-Crumb et al., 2019; Thiry, 2019), leading to a persistent lack of representation across STEM fields (National Center for Science and Engineering Statistics, 2023). As Handelsman et al. (2022) noted, many students are “discouraged and often alienated by the climate and teaching methods commonly found in STEM classrooms” (p. 1057). Compounding the problem is that STEM instructors, who largely hold majority identities, generally receive little professional development in pedagogy and instruction, and even less in inclusive teaching (Addy et al., 2021). Our challenge: Can we build educator awareness and capacity around inclusive teaching practices to help address this persistent intransigence in advancing diversity in STEM higher education more broadly? As millions of students annually take introductory STEM courses, addressing this challenge at a national scale is essential.

ADDRESSING THIS CHALLENGE

In 2018, members of a seven-university collaborative launched the ISTP, a National Science

Foundation–sponsored national initiative designed to advance ability and awareness to cultivate inclusive STEM learning environments. In fall 2021, after several years of development, we released an asynchronous 6-week free online course in inclusive teaching, with optional in-person or associated local learning communities (LCs), that led to individualized and contextualized learning for thousands of STEM faculty nationally. The ISTP amplifies the concepts of identity, power, privilege, and positionality prior to focusing on evidence-based teaching and learning strategies. Our ISTP seeks to shift educator mindsets and abilities at a national scale, through embodied case studies, optional LCs with trained facilitators, and facilitated, virtual, affinity-based discussion groups. While there are many local, high-engagement diversity, equity, and inclusion (DEI) programs (O’Leary, 2020), there are few national-scale DEI programs.

Our goal is to uplift the experiences of people who are marginalized within STEM and engage our participants in meaningful self-reflection related to DEI. This approach challenges our learners to consider what kind of mindset they need in order to create transformational learning environments that promote inclusion and equity. Six learning objectives raise awareness and build instructor capacity to engage in inclusive practices. Participants will:

- examine DEI in higher education, especially around identity, power, privilege, and positionality;
- reflect on their own and their students’ identities and experiences and the impact those identities have on their teaching practice and on their students’ belonging and learning;
- question their assumptions about instruction and what those assumptions might mean for their practice and student learning;
- identify and implement learner-centered structures and strategies that remove common barriers to learning in STEM courses;
- apply principles of evidence-based inclusive teaching to their course design and learning environments; and
- use their student learning data to inform pedagogical and curricular choices.

The ISTP course centers equity and inclusion, “doing no harm,” and ongoing self-reflection across six linked modules (see [Figure 1](#)), each adhering to principles of backward design (Wiggins & McTighe, 2005). To meet the needs of educators working in a range of institutional types, we worked directly with community college faculty and developed national community college partnerships for dissemination and adoption of ISTP.

OUR APPROACH

Our team, comprising STEM faculty and university administrators experienced with teaching inclusively, as well as experts in Learning and Teaching Centers from a variety of predominantly White institutions, designed ISTP with the intention to reduce the potential for harm to our participants, especially those with marginalized identities. This aspirational “do no harm” core value strives to ensure that our learners feel safe from verbal, psychological, and other forms of harm while engaging with content that focuses on their identities, backgrounds, and experiences, as well as those of their students. We acknowledged the limitations associated with our own identities, positionality, biases, and assumptions as we developed course content, strategies, and policies. We recognized—and explained to our participants—that they might experience “productive discomfort” as they increase their understanding of course content, themselves, and the world around them, through critical and ongoing self-reflection. This productive discomfort can promote a deeper level of learning (Bezrukova et al., 2016; Taylor & Baker, 2019).

KEY FEATURES

The key features of ISTP are informed by core values (see [Figure 2](#)). These features include

(a) embodied case studies (scenarios providing a common experience for learners and supporting their active reflection and discussion where appropriate); (b) the My Inclusivity Framework, offering a space for learners to reflect on their inclusive-teaching journey after each module; (c) moderated discussion boards, allowing participants to asynchronously reflect, respond to each other, and share their experience of each module; (d) local LCs, led by facilitators trained in “do no harm” to promote deeper course involvement; and (e) facilitated affinity groups, allowing participants to choose a community based on their racial identities, gender identities, and/or sexual orientations, to foster a sense of community and shared vulnerability that engaged both non-majority and majority participants. These features collectively support our core values and address the need for flexible pedagogical professional development at a national scale.

Embodied Case Studies

Embodied case studies, written and performed by the University of Michigan’s CRLT [Center for Research on Learning and Teaching] Players (an applied theater program), highlight marginalizing classroom practices and their damaging impacts, focusing on the experiences of people who are often marginalized in STEM higher education. Embodied case studies are similar to written case studies in that they allow viewers to analyze authentic teaching and learning scenarios (Armstrong & Braunschneider, 2016; Kaplan et al., 2006). However, the embodiment of the characters in recorded performances allows the observer to consider visible identities, notice the texture of displayed or restrained affect (e.g., body language, vocal tone), and reflect on perspectives held by the viewer and/or character. Intentional framing prepares viewers for charged content, allowing learners to make choices about how/when they will engage. The framing also signals to learners what they should attend to,

FIGURE 1. ISTP MODULES

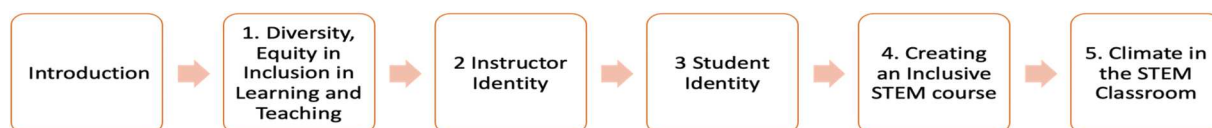
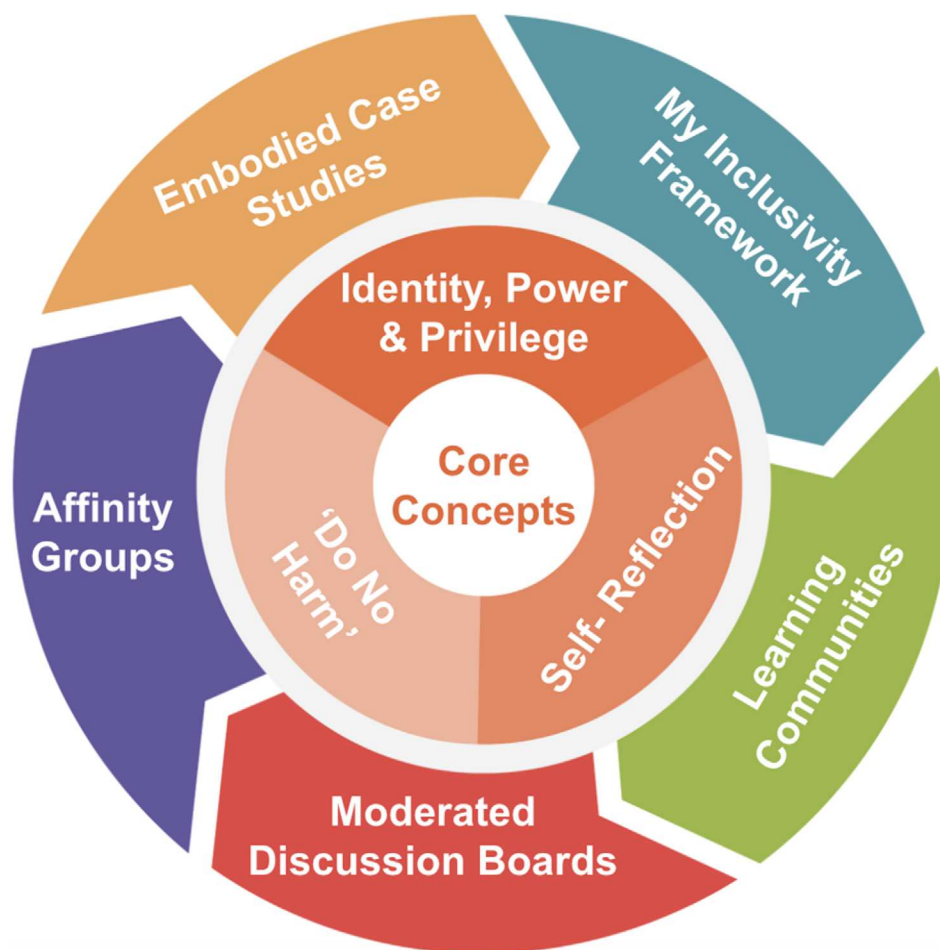


FIGURE 2. KEY FEATURES AND VALUES OF THE ISTP




particularly if they do not have firsthand experience with the harms being considered. Each case study was framed by an introduction and followed by a reflective prompt.

My Inclusivity Framework

Following each module, participants responded to two prompts, which they uploaded into the course site: self-reflection of module content and an application of ideas to practice. These reflections were designed to promote individual meaning-making, development, and growth (Brookfield, 2017). All the prompts were collectively referred to as My Inclusivity Framework (MIF), encouraging a metacognitive approach for participants to reflect on their own learning about inclusive teaching and generate pedagogical and curricular changes.

Moderated Discussion Boards

Participants were invited to engage with additional prompts about the content, asking them to share their thoughts, questions, and experiences, and to engage with others, after reviewing our posted discussion-board guidelines. Project team members moderated all discussion boards to ensure a “do no harm” standard. Moderators provided feedback and resources and were prepared to handle disruptive individuals, if necessary. In our guidelines, we highlight the distinction between free speech and academic freedom, where the latter draws a line in support of all learners. We indicate that, while we would not remove anyone from the group for presenting dissenting ideas, we would not tolerate inappropriate or abusive language, personal attacks, disrespectful conduct, or spam. Given the nature of our work in a free, open



The video case studies were very informative and helped me to reflect on my actions in the classroom and interactions with students. It helped me to draw parallels or differences to my experiences and consider where I can improve to promote more inclusivity in my course.

public forum, we once had to remove a participant due to persistent trolling behaviors.

Facilitated LCs

Learners could participate in a facilitator-led LC. LCs increase participant interest in student-centered teaching (Anderson & Finelli, 2014), encourage self-reflection of pedagogical skills (Nadelson et al., 2013), and promote community and agency among participants (Cherrington et al., 2018), including in online learning environments (Blum-Smith et al., 2021). The LCs typically met weekly, providing participants with opportunities to share their insights, questions, and experiences with one another within the context of their local environment. LC facilitators, often previous participants, underwent a 6-hour virtual training designed to provide an equitable learning experience that conforms to ISTP's core concept of "do no harm." Facilitators followed an ISTP-developed workbook containing reflective activities and scenarios associated with module content. Local LCs were run either simultaneously with the open online course, or as a local, independent course run, allowing for customized timing and content for their institution and participant needs. LC participants did not show significantly greater pre- and

postcourse survey gains, but preliminary qualitative results show LC participants found the experience valuable.

Affinity Groups

Affinity groups create space for conversations about sociocultural and identity-based experiences with others who share similar identities (Blitz & Kohl, 2012; Michael & Conger, 2009; Pour-Khorshid, 2018). Affinity-based conversations can lead to enhanced intergroup conversations (Tauriac et al., 2013) in LCs. Our facilitated affinity groups included intersectional racial and gender identities: Asian Pacific Islander Desi American; Black, Indigenous, and other persons of color (BIPOC) or BIPOC women/men (when facilitators were available); Latiné; Latin Women (when facilitators were available); lesbian, gay, bisexual, transgender, queer or questioning, intersex, asexual or ally, and other sexual and gender minorities community members; and White women/men.

We acknowledge that many more identities and intersectional identities would benefit from an affinity space and that any set of "labels" cannot fully capture the range of people and experiences present in this ISTP. Affinity-group facilitators share the sociocultural identities of

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the group's participants and guide discussion, maintaining safe environments for sharing experiences.

PARTICIPATION, ENGAGEMENT, AND REACH

Learner engagement and completion in ISTP have been strong. Since 2020, 11,240 participants have enrolled, with approximately 25 percent completing, defined as responding to more than half of the MIF questions. As is typical of such courses, about half never visit a single page following registration, but atypically, those who do so engage deeply in our course. Two-thirds of completers answer every question, with 93 percent answering 71 percent of the questions. Completion rates for those answering one question or visiting one page are 68 percent and 56 percent, respectively, rates five times higher than the average for free online courses (Jordan, 2015; Reich & Ruipérez-Valiente, 2019) and more than double the completion rate of courses associated with teaching (Goldberg et al., 2023) and professional development (Sun et al., 2023).

Preliminary analysis of completers' demographics from three of six course runs reveals that our audience predominantly identifies as a White, cisgender woman in a STEM faculty role, at a research or comprehensive university that is predominantly White serving. This overrepresentation of White women in our course is consistent with the overrepresentation of White women in education development overall (Gravett et al., 2023)

PRELIMINARY OUTCOMES

We report quantitative and qualitative evaluation findings from the third course iteration, consisting of 410 completers, to demonstrate key themes.

Holistic Course Findings

The precourse ($N = 627$) and postcourse ($N = 241$) surveys contained items related to learning objectives and participants' perceptions of course elements' effectiveness. Additionally, items with open-ended responses explored course impact and participants' experiences in ISTP. In the postcourse survey, respondents reported that videos were helpful for introducing concepts and ideas, content was informative, the course positively impacted them professionally and personally, and instructors effectively promoted learning. Comparing pre- to post-course awareness and confidence in inclusive teaching, respondents indicated significant positive gains.

Course-Components Evaluation

1. *Embodied case studies*: When asked which course aspect most impacted their learning, 38 percent of respondents ($n = 158$) mentioned the embodied case studies.

"The video case studies were very informative and helped me to reflect on my actions in the classroom and interactions with students. It helped me to draw parallels or differences to my experiences and consider where I can improve to promote more inclusivity in my course."

2. *My Inclusivity Framework*: Postcourse, participants identified areas where they had increased and were still gaining confidence. Five categories emerged: identity (instructor, student, and positionality), course structure (course design and implementation), course climate (creating and managing), concept knowledge (understanding and sharing), and planned implementation (knowledge synthesis and hesitations). Participants ($N = 153$) reported increased confidence in three top categories: course climate (31 percent), course structure (30 percent), and identity (17 percent).
3. *LCs*: We trained 396 facilitators from 123 different institutions. These facilitator teams have run 95 LCs containing 770 participants over five course iterations. LC survey respondents from the third iteration ($n = 127$) reported high agreement that participation enhanced their overall course experience, increased their learning of inclusive teaching practices, and strengthened their confidence to use those practices. Respondents also reported high agreement that LCs provided inclusive environments, creating a sense of community. LC facilitators ($n = 71$) reported increased confidence in facilitating DEI conversations, creating community, and leading conversations centered on identity.
4. *Affinity groups*: Respondents who had participated in affinity groups ($n = 77$) reported high agreement levels that participation increased their sense of community and shared vulnerability, created opportunities for marginalized individuals in STEM to connect with colleagues and potential mentors, and offset the burden of marginalized participants to “teach” others about their experiences. Affinity groups gave individuals from different social identity groups (both majority and minoritized) the space to share their knowledge and experiences in an environment more conducive to peer education and less potentially harmful and burdensome to marginalized participants.

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Overall, participants responded quite positively to the experience in the postcourse evaluation, especially in terms of the embodied case studies, which were frequently discussed as adding richness and depth to the course. LCs also supplemented participant course experiences and expanded engagement opportunities. However, respondents were more split in their assessment of discussion boards and affinity groups. For instance, discussion forums were often cited as being overwhelming given the number of course participants, making it hard for many participants to engage in meaningful dialog. Evaluation data also demonstrated concerns with affinity groups where participants indicated scheduling challenges and finding the right “fit” due to constrained options resulting from limited facilitator capacity. Participants in the White women group felt that the group was too large to engage meaningfully with peers; in contrast, BIPOC affinity groups reported very positive experiences and engagement. Thus, despite the overall strong course evaluation, data demonstrated areas to improve potentially participant–participant engagement through pedagogical, technological, and practical solutions.

KEY INSIGHTS AND LESSONS LEARNED

We learned several important lessons from this large-scale implementation and evaluation. First, our preliminary findings strongly suggest that the integration of our core components supported participants’ learning and development as educators. For example, participants indicated they now understood that critically reflecting on their own identities and backgrounds, and those of their students, was essential for building empathy and awareness of their students and factors that impact student learning and success. Offering multiple means of engagement was very powerful. The affinity groups and LCs provided essential opportunities for instructors to communicate their personal

experiences, including concerns, hopes, barriers, and strategies related to inclusive teaching in their own contexts. Not all of the approaches appealed to participants; for example, the embodied case studies and LCs were particularly well received, while the discussion boards were less so, but we wanted to model inclusion and multiple opportunities for engagement. And we measured positive gains in participant awareness and confidence nearly without distinction across identities, career stages, and institutional types, suggesting the multiple forms of engagement were powerful in terms of scale and fidelity to the project's goals.

Second, we learned that while we reached and changed the thinking of many people, we failed to reach a significant number of White and Asian men who hold majority identities in STEM faculty ranks. White women STEM faculty accounted for the majority of our participants, typical of self-selecting audiences in STEM-teaching professional development. Preliminary data from LCs suggest that financial and acknowledgment incentives, as well as snowball recruiting mechanisms that leverage those attending to invite colleagues directly to join, could increase participation of White and Asian men STEM faculty in future projects. The ongoing challenge of fostering participation in professional development among these groups in STEM higher education, including in learning and teaching and equity and inclusion professional development, transcends our own initiatives and is a far larger issue that the broader STEM community must address.

Last, while we encouraged participants to reflect on implementing practices into their courses (particularly through the My Inclusivity Framework) during our online course, we found that some did not have time to implement new practices. We do know, anecdotally, that a number of our LCs were structured to successfully support classroom implementation (see, e.g., Jaimes et al., 2024). Changes like offering sample course activities and handouts that instructors could easily adapt and put into practice and, in particular, more directed guidance from learning-community facilitators could support participants to sustain community while making


changes in their courses, which would enhance institutions' abilities to enact broad change in inclusive STEM education.

We are encouraged by our preliminary findings that our model of DEI faculty professional development has and will continue to support the increasing use of inclusive STEM teaching practices to improve learning for all students. We hope to add our findings to the communities' collective understanding of components that best advance STEM instructor awareness, confidence, and application of inclusive teaching strategies, as well as the barriers, reluctances, and other challenges that may persist and require additional attention. We encourage others in the DEI and faculty professional development spaces to explore models like ours that successfully scale to nationwide impact. The course will run for several more years as is, but we recognize that it will then need to be modified substantially, given the continual shifting landscape of DEI in STEM higher education. Meanwhile, over the next few years, the 4,000-plus course completers will be applying their new knowledge of inclusive teaching practices in classrooms across the country, advancing the success of thousands of students per year.

DISCLOSURE STATEMENT

The authors report there are no competing interests to declare.

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ORCID

Lucas B. Hill  <http://orcid.org/0000-0003-1995-5838>

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