



Training Effective Facilitators to Scale Equity-Focused Computer Science Professional Learning

Nicole D. Martin
Texas Advanced Computing
Center
The University of Texas at
Austin
Austin, Texas, USA
ndmartin@tacc.utexas.edu

Allen Antoine
Texas Advanced Computing
Center
The University of Texas at
Austin
Austin, Texas, USA
aantoine@tacc.utexas.edu

Andrea Wilson Vazquez
Texas Advanced Computing
Center
The University of Texas at
Austin
Austin, Texas, USA
awvazquez@tacc.utexas.edu

Cydney Black
Texas Advanced Computing
Center
The University of Texas at
Austin
Austin, Texas, USA
cblack@tacc.utexas.edu

ABSTRACT

Creating computer science (CS) classrooms in which all students – especially those historically excluded in CS – feel a sense of belonging is critical to equitably expanding CS education. Providing professional learning that prepares teachers to cultivate inclusive and culturally responsive environments at the scale needed to address inequities in CS education is a major challenge. This paper explores our experience scaling inclusive CS teaching through the development of a professional learning course for teachers and accompanying facilitator training. We describe key design decisions made over several iterations of the teacher-facing course and facilitator training. Our approach has aimed to balance the need for building community and safe spaces to converse about sensitive topics with the capacity to reach teachers at scale. We discuss findings from recent facilitator trainings and discuss best practices we have learned for scaling equity-based professional learning in CS.

CCS CONCEPTS

• Social and professional topics ~ Professional topics ~ Computing education ~ K-12 education • Social and professional topics ~ Professional topics ~ Computing education ~ Computing education programs ~ Computer science education • Social and professional topics ~ Professional topics ~ Computing education ~ Adult education

KEYWORDS

Professional development, Broadening participation in computing, Equity, K-12 teachers

ACM Reference format:

Nicole D. Martin, Allen Antoine, Andrea Wilson Vazquez, and Cydney Black. 2024. Training Effective Facilitators to Scale Equity-Focused Computer Science Professional Learning. In *Proceedings of 2024 RESPECT*

Annual Conference (RESPECT 2024), May 16-17, 2024, Atlanta, GA, USA. ACM, New York, NY, USA, 8 pages.
<https://doi.org/10.1145/3653666.3656108>

1 INTRODUCTION

Fostering a sense of belonging and identity in computer science (CS) classrooms for all students, especially for students who have been historically excluded in CS, is essential to equitably expanding CS education. Whether students feel a sense of belonging in CS has been shown to be a key factor in students' interest in taking courses or pursuing degrees in CS [1, 2, 3]. Teachers play an essential role in cultivating a sense of belonging and inclusion for students [4, 5], but many states and districts lack the resources to provide teachers with the preparation necessary to create these types of learning environments [6]. Further, the limited number of preservice teacher education programs in CS [7] underscores the need to upskill many in-service teachers in CS.

Preparing teachers to use inclusive teaching practices in their CS classrooms requires professional learning that is intentionally focused on such practices [8, 9]. As the CS education field identifies and implements effective models for professional learning centered on inclusive and culturally responsive CS teaching [9, 10], we must be mindful of how we can effectively scale these efforts. There is a pressing need to provide such equity-focused professional learning on a large scale so that all students have positive experiences in CS. However, providing such CS professional learning at the scale needed is a challenge [10]. Tensions between implementation fidelity and contextual adaptations are well documented in prior work on the scale-up of educational initiatives [11]. Scalable approaches to professional learning such as Massive Open Online Courses (MOOCs) can reach many teachers and offer courses with ensured fidelity, but these approaches are constrained in adapting to the local context and needs of teachers. Additionally, such approaches to large-scale professional learning may not be effective for creating space for educators to discuss sensitive topics like racism, bias, and privilege.

Prior work on addressing inequities and bias in schools, particularly around race/ethnicity, emphasizes the importance of engaging educators in *courageous conversations* [12]. *Courageous conversations* are characterized by educators having a passion for



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RESPECT 2024, May 16–17, 2024, Atlanta, GA, USA.

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ACM ISBN 979-8-4007-0626-4/24/05. <https://doi.org/10.1145/3653666.3656108>

and commitment to equity, practicing effective strategies for engaging students from diverse backgrounds, and persisting over time in the work of confronting inequity and bias. A significant challenge of engaging educators in *courageous conversations* at the scale needed to achieve equity in CS education is the tension between balancing the need for building community and safe spaces to converse about sensitive topics with capacity to reach thousands of teachers. Professional learning that provides opportunities for synchronous connection and interaction between CS teachers have been shown to effectively foster community [10] and will be essential to models of scalable inclusive CS professional learning.

This paper explores our approach to scaling inclusive CS teaching practices through the development of a hybrid professional learning course for teachers and a facilitator training that prepares facilitators to offer the professional learning course to teachers in their own states or districts. We summarize our journey through the various iterations of the course design and facilitator training, highlighting pivotal changes we made over time and their impacts on the learning experience. We then focus on how the most recent iteration of the facilitator training prepared participants to implement the professional learning course and supported their understanding of inclusive and culturally responsive CS instruction. Finally, we discuss best practices and key learnings for scaling equity-focused professional learning through a facilitator training model.

2 FACILITATOR TRAINING CONTEXT AND DESIGN

The evolution of the facilitator training for the *Scaling Inclusive Pedagogy* course developed by The University of Texas at Austin’s Texas Advanced Computing Center has been marked by iterative improvements and a growing commitment to equity, inclusion, and impactful teaching strategies. In this section, we summarize the context of the professional learning course and facilitator training and describe key changes made to the course design and facilitator training over three iterations. In prior work, we have described the first and second iterations of this work in more detail [13]. We focus here primarily on key changes made in the third iteration and the impact of those changes on facilitator training participants’ experiences.

2.1 Iteration One

In its initial iteration, launched in 2017, the professional learning course had a central focus on gender disparities in CS education. This version of the course was fully asynchronous, included six modules that participants could complete at their own pace, and was devoid of direct instructor or facilitator involvement. Low course completion rates (34%) and feedback from participants made it clear that the fully asynchronous model was not sufficient to support teachers in addressing their own biases and developing inclusive teaching practices. This model did not allow participants to practice and engage in *courageous conversations*. Although a fully asynchronous model was easy to implement from a course

management perspective, the desired outcomes for participants were not achieved.

2.2 Iteration Two

By 2020, the second iteration introduced substantial revisions to both the course content and its structure. The course still included six modules (one introduction module and five modules with core content), but we expanded the curriculum to include topics on equity, inclusion, and culturally responsive teaching practices. Race, cultural identities, intersectionality, and neurodiversity were introduced in this iteration to broaden the course beyond gender inequities in CS education.

The course structure was overhauled to utilize a cohort model, whereby teachers participate in the course as a group with a trained facilitator. A hybrid structure was also implemented that included asynchronous coursework and virtual synchronous discussions, fostering real-time engagement with the course facilitator and other participants. This decision was supported by prior research showing the value of leveraging online synchronous meetings in professional learning to foster belonging and community for CS teachers who often experience professional isolation [10].

A train-the-trainer model was implemented to train facilitators who then offered the course to teachers in their own states/districts. The facilitator training for this iteration consisted of three synchronous sessions and concentrated primarily on logistics of the Canvas learning management system. Facilitator trainees were asked to go through the course content between the synchronous sessions. Feedback from facilitator training participants via post-course surveys revealed a need for enhanced support in facilitating *courageous conversations* with their teachers. As trained facilitators implemented the course with their own teachers, it was clear that facilitators’ varying levels of experience and comfort in guiding challenging discussions resulted in divergent experiences for their teachers. Facilitators did not feel prepared to engage their teachers in *courageous conversations*, and some facilitators chose not to include any synchronous discussions in their version of the course.

2.3 Iteration Three

Based on our learnings from iteration two, the professional learning course content and facilitator training structure both underwent a transformative redesign in the fall of 2021, led by the second and third authors. In this section, we detail changes made in iteration three related to 1) teacher professional learning course content updates, 2) facilitator training content and structure updates, and 3) facilitator recruitment.

2.3.1 Teacher professional learning course content updates. We redesigned the curriculum to expand the equity focus and more deeply address issues of race, ethnicity, neurodiversity, and more in CS classrooms. While additions to the context made in iteration two were valuable, issues of racism, intersectionality, and bias were only addressed at a surface level and not woven throughout the course. The curriculum was rewritten and reorganized to

comprehensively address how a teacher can create an equitable and inclusive CS learning environment. The six modules from iteration two were transformed, guided by five critical questions that structured each week's instruction:

1. Who's in your classroom?
2. How do different students learn?
3. Why is inclusive teaching in CS important?
4. How can teachers make a significant impact?
5. How can teachers advocate for CS in their schools?

These modules utilized content and design elements from prior research on culturally responsive pedagogy in CS contexts [8], including centering equity, explicitly promoting diversity in CS, self-reflection, collaboration, and opportunities to deeply consider implementation of teaching strategies in context. Modules also incorporated innovative activities and current issues in computing. For instance, educators reviewed various culturally responsive teaching frameworks and engaged in sample lessons addressing topics like creating identity-safe classrooms and understanding algorithmic bias. Additionally, participants delved into discussions about implicit bias, explored their cultural identities, and examined the influence of algorithmic bias in educational contexts.

Another essential addition was the integration of online interactive case study simulations (called *Teacher Moments*) in which teachers can practice skills to advocate for a more equitable and inclusive CS classroom [14, 15]. Together with the MIT Teaching Systems Lab, we developed *Teacher Moment* activities for each week of the course that provided educators with immersive scenarios to practice real-time interactions with students and administrators, honing their teaching skills and practicing advocating for inclusive CS programs. For example, in one week's *Teacher Moment*, participants take on the role of a teacher and are presented with five different situations that occur with students in their fictional CS classroom (e.g., three Latina students are the only girls in class, and they regularly sit together, talking and distracting other students, and act bored or disengaged). Participants respond to a series of prompts about what they think might be causing the behavior presented in the *Teacher Moment* and how they could address the situation. For prompts about brainstorming ways to address a situation, participants are asked to respond in writing; whereas for prompts about what they would say to students or how they would implement a change in their classroom, participants are asked to respond verbally. The goal of these multiple response formats was to provide opportunities for participants to gather their thoughts and reflect as they responded in writing and then to practice verbally what they would actually say or do in their classroom.

2.3.2 Facilitator training content and structure updates. In addition to the course content redesign, the structure of the facilitator training was overhauled for iteration three. Instead of simply reviewing the materials included in the professional learning course, facilitator training participants were asked to fully engage in and complete the entire course as their teachers

would experience. The training lasted approximately seven weeks and consisted of seven weekly synchronous train-the-trainer sessions (held virtually for one to one and a half hours) and online asynchronous coursework between synchronous sessions. To qualify as certified facilitators, participants were required to complete 80% of the course. Synchronous session attendance was weighted to count for 20% of this total course completion score.

The synchronous train-the-trainer sessions were new to this iteration of the facilitator training. These sessions were facilitated by the course developers, the second and third authors, ensuring a firsthand grasp of the curriculum's intent and nuances and providing a forum for discussions and learning. Key features of these sessions included:

- Engaging in *Consider This* conversations with other participants at the beginning of each session. These were our version of intentional, facilitated *courageous conversations* about topics related to the week's course content. Training participants were able to both experience these conversations as a participant (like their teachers would) and discuss how they would facilitate the conversation. Participants were also encouraged to seek out their own examples of discussion topics they might bring to their future implementation of the course with teachers.
- Discussing the *Teacher Moment* for the week that participants completed as part of the asynchronous coursework. Participants were able to debrief with each other about the scenarios they experienced and consider how they might discuss these scenarios with teachers.
- Exploring a practical example of the course content in small groups to dig deeper into the lesson plan and facilitation strategies.

Notably, the train-the-trainer sessions involved the course developers modeling the kinds of discussions that participants would lead with their own teachers, particularly on sensitive topics related to equity and inclusion. Training participants were able to watch how the course developers facilitated the same types of conversations that they would be facilitating with their teachers in the future, and there were built in opportunities to reflect on facilitation strategies.

2.3.3 Facilitator recruitment. From the first implementation of the new facilitator training model, we learned that we needed to be more intentional in our facilitator recruitment process to build a cadre of facilitators who would be ready to implement the course at the end of the training. It was evident from our first training that participants who were engaging in equity-focused discussions for the first time had a lower comfort level with topics of bias and inclusion in CS. Participants made substantial progress during the training, but some were just getting started in their work around inclusive CS teaching and needed additional support. Therefore, instead of engaging any willing facilitators for our second training, we placed emphasis on inviting educators who had prior experience with equity-driven training. For our second facilitator training, we engaged a group of educators from

the Computer Science Teachers Association (CSTA) Equity Fellows program with a deep commitment to equity in CS education. Their involvement enriched the facilitator cohort, contributing diverse perspectives and a preexisting sense of community, which expedited their integration into the course material and discussions.

To recruit strong facilitator trainees and promote scaling of the course, a compensation model was also utilized. While their attendance at the training was unpaid, facilitators would be paid for leading course sections in the future. This financial incentive aimed to attract and retain qualified educators as facilitators and encourage implementation of the course with their own teachers. We also hoped that financially supporting facilitators to implement the course would improve the overall quality of course delivery by removing barriers that might prevent excellent facilitators from having the capacity to offer the course to teachers. The virtual nature of the training offered flexibility in selecting participants, removing geographical constraints and cultivating a broad pool of skilled educators to eventually implement sections of the course.

The evolution of our facilitator training course demonstrates a deliberate commitment to an adaptive and inclusive instructional model that is revised on an iterative basis to reflect the needs of expansive and diverse populations. The iterative changes in content, approach, and recruitment have collectively transformed the learning experience, fostering a community of skilled facilitators who can guide educators in navigating the complex landscape of equitable CS education.

3 EVALUATION OF FACILITATOR TRAINING

To understand the effectiveness of our redesigned facilitator training and the impacts of changes made to the structure and content of the training, we aimed to answer the following questions:

1. How and to what extent did the facilitator training course prepare participants to implement the equity-focus professional learning course with teachers?
2. How did the facilitator training course improve participants' knowledge and understanding of inclusive and culturally responsive instruction that addresses the needs of diverse learners?

The following sections detail the participants of two facilitator trainings hosted during the 2022-23 academic year and the data collection and analysis methods we used to assess the effectiveness of the training.

3.1 Participants

Two facilitator trainings were conducted with different groups of participants in the United States. The first training consisted of 28 participants, 14 of whom completed the training. Nearly all (95%) participants identified as women and one (5%) as a man, and almost all (90%) identified as white, with two (9%) as Black or African American, one (5%) Hispanic or Latino/a, and one (5%) as

American Indian or Alaska Native (participants could select multiple race/ethnicity categories, so total exceeds 100%). Participants represented seven states and the majority (59%) were certified CS teachers.

For the second training, participants were intentionally recruited based on their prior experience with centering equity in CS teaching. The second training consisted of 22 participants, and 12 completed the training. About three-quarters (74%) identified as women and one-quarter (26%) as men, and over two-thirds (68%) identified as Black or African American, one-quarter as Hispanic or Latino/a, two (11%) as Asian, and one (5%) as white. Participants of this training represented 11 states, and less than half (42%) were certified CS teachers.

3.2 Data Sources and Analysis

To answer our research questions, a post-survey was administered to participants at the end of the course. The survey included items about participants' preparedness to implement the course with their own teachers, knowledge and understanding of inclusive and culturally responsive teaching practices from the facilitator training, and what aspects of the training were most valuable to participants. Eleven of 14 participants who completed the first training and six of 12 participants who completed the second training completed the course post-survey, for a total response rate of 65%. All 17 survey respondents answered all closed-ended Likert-type items, and 16 of the 17 respondents answered open-ended items. Observations and field notes from the course developers (the second and third authors) who lead the two facilitator trainings were also utilized to triangulate and make sense of participant survey responses.

To analyze Likert-type survey items, we computed the percent of respondents who selected each response option. To analyze open-ended survey items, we developed thematic codes from participant responses. We then calculated the percent of responses within each code to see which themes were most prevalent. Responses could be characterized by multiple codes.

4 OUTCOMES

Our findings show that the facilitator training course 1) helped participants feel prepared to implement the equity-focus professional learning course with teachers and 2) increased participants' understanding of inclusive and culturally responsive instruction that addresses the needs of diverse learners. We present data and discuss each of these in more depth below.

4.1 Preparation to Implement Course

Our findings show that the facilitator training course prepared participants to implement the equity-focus professional learning course with teachers. All survey respondents ($n=17$) reported that, as a result of the training, they felt prepared to facilitate course discussions, comfortable in their role as a facilitator, and ready to create safe spaces for their teachers to discuss challenging or uncomfortable topics (see Figure 1). Participants also indicated they felt comfortable researching and asking teachers about

current events related to technology and equity, and all were excited to facilitate the course. The one area in which some participants (24%) did not feel prepared was in managing the course on the online course platform, Canvas.



Figure 1: Facilitator participant post-survey responses about preparedness to implement course

Two key aspects of the training that contributed to participants feeling prepared were the effective modeling of course facilitation by the course developers and immersive learning experience. Thirty-one percent of survey respondents (n=16) described how modeling of course discussions helped them see what effective implementation might look like and 19% explained how experiencing the course as teachers allowed them to better understand the content and what questions may arise with teachers. As one participant explained, “The most valuable part of the course was hearing how the facilitators would deal with the variety of responses that might occur,” and another said the facilitators did a good job “modeling the facilitation of the course and showcasing how everyday tech conversations impact the classroom today to spark conversation, curiosity, and debate.” Another participant described the most valuable aspect of the course as, “Experiencing it as the teachers that I will be leading in sessions will experience it. I know what they should experience, when I should allow the awkward silences, when I should prompt discussions, and how to lead the hard discussions.” Other participants described the value of the Teacher Moments, saying for example, “[The Teacher Moments] are great – real world applications of the scenarios are really helpful.”

4.2 Understanding of Inclusive and Culturally Responsive Instruction

Overall, participants increased their knowledge and understanding of the professional learning course content on inclusive and culturally responsive instructional practices. By the end of the training, all participants agreed that they had a better understanding of their own biases, how implicit bias can impact their teaching and their students' perceptions of CS and were more aware of cultural misunderstanding in CS classrooms (see Figure 2).

All participants also reported that they had a better understanding of intersectionality and the role it plays in students' lives, knew more strategies to recruit diverse students to CS and reach minority students, and were more knowledgeable about inclusive strategies in CS and how to advocate for inclusive CS programs at their schools.

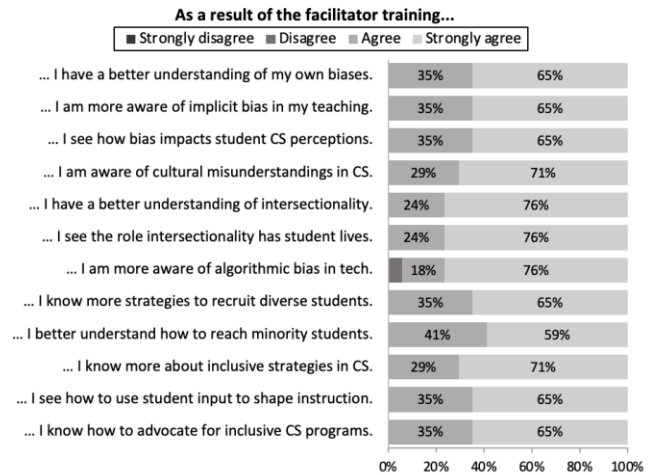


Figure 2: Facilitator participant post-survey responses about knowledge and understanding of inclusive CS instruction

Nearly two-thirds (63%) of survey respondents said that engaging in the bias and equity-focused course content and resources was the most impactful aspect of the training. For instance, one participant said, “I think deep diving into my biases and misconceptions was valuable in preparing me to offer this course to teachers.” Another said, “The most impactful aspect of the facilitators' training has been the emphasis on culturally responsive teaching methods and pedagogy. This training has equipped me with the tools and strategies needed to ensure that the computer science courses offered to teachers are not only inclusive but also tailored to the diverse needs of our students. It has provided me with a solid foundation in creating an environment where every student feels seen, heard, and valued, which is essential in fostering a love for computer science.” Additionally, 44% said that learning from and having conversations with fellow participants about challenging topics during synchronous sessions was the most valuable part of the course. One participant emphasized the value of these discussions by saying that the most impactful aspect of the course was “Synchronous conversations with fellow facilitators...Engaging and challenging dialogue that everyone was willing to dive into.” Another participant similarly said, “I liked the Zoom meetings and the *Consider This* topics of discussion.”

5 IMPLICATIONS AND RECOMMENDATIONS

The pervasive inequities in CS education in the U.S. [16] point to the need for widespread professional learning to help teachers better support students from diverse backgrounds. A unique challenge of these professional learning experiences lies in their often hypothetical nature, as the specific demographics of a teacher's future classroom are unknown, and the sensitivity of topics related to bias. Educators, therefore, must be intentionally trained and equipped with a broad array of tools to engage with and positively influence students from diverse cultural backgrounds, each with their own unique stories and experiences. These individual narratives significantly influence how teachers should tailor their instructional methods for effective communication. CS professional learning that addresses the wide range of diverse experiences and backgrounds that students may bring to the classroom and prepares teachers to engage with their students in culturally responsive ways presents complexities that are often absent from more traditional, content-focused professional learning.

While there is still ample need for advancements in professional learning focused on culturally responsive CS teaching, findings from our work can inform the growth and development of similar efforts aiming to scale teacher training and foster belonging in CS. Our experiences designing and implementing a facilitator training for an equity-focused CS professional learning course shed light on effective components of scaling inclusive CS teaching practice. Participants in our facilitator training reported feeling empowered, prepared, and confident in almost all course objectives. Critically, they felt prepared to create spaces for teachers to have *courageous conversations* about equity and inclusion in CS education.

Scaling inclusion and equity-based professional learning using a train-the-trainer model poses challenges to maintaining consistency across facilitators and contexts. Despite our team's expertise in teaching CS in culturally relevant and identity-safe ways, we experienced challenges when leading the facilitator trainings described previously for iteration three. Some facilitator training participants did not seem sufficiently confident to lead all aspects of the course with teachers, raising concerns that the essence of the course may be "lost in translation" when these participants implement the course.

Merely possessing the ability to learn about diversity, equity, and inclusion topics does not necessarily equip someone with the skills and tools to lead sensitive discussions in these areas. Conducting trainings that emphasize diversity and inclusion presents a universally challenging task. In our facilitator trainings, course participants consistently sought to lead discussions on topics with which they felt familiar, which was limiting. For example, some White women participants tended to focus on issues of gender inequity and avoid issues of racism, demonstrating that they were not yet comfortable enough discussing essential topics of the course to be able to facilitate these discussions for others. While it is important to engage such participants in the work of examining bias and inequity in areas with which they are less comfortable, these participants were not yet prepared to lead others in this work. Consequently, we have actively sought the involvement of esteemed professionals in the

CS education community who have experience sensitive discussion of equity. Their contributions are vital because training facilitators to address equity-based topics involves navigating nuanced and context-specific issues that extend beyond straightforward content delivery or basic pedagogical approaches. These complexities underscore the importance of casting a wide net to identify potential facilitators who will be prepared to lead courageous conversations about all diversity, equity, and inclusion topics, especially around race. Ideally, these individuals should either possess the requisite conversational skills or demonstrate the capability to adapt to the unique demands of facilitating this type of professional development.

Another challenge we encountered was that only half (52%) of facilitators completed the training. Redesigning and expanding the facilitator training requirements in iteration three made the training more time intensive and demanding. However, we believe the commitment needed to complete the training is commensurate with preparation needed to effectively implement the course. In light of this, our team is exploring strategies to sustain facilitator training participants' motivation and engagement, ultimately striving to further increase the completion rate.

Over the course of this work, we have identified several best practices that added to the overall health of the proposed expansion of this inclusive CS teaching professional learning course. Those best practices are as follows.

5.1 Immersive Modeling and Scenarios Key to Making Content Tangible

The immersive model of requiring the facilitators to experience the course as a participant is integral to a facilitator's ability to effectively lead. By immersing themselves in the content and pedagogical strategies, facilitators not only gain a deeper understanding of the course material but also empathize with the learner's journey. This experiential engagement enhances their ability to guide and support their teachers effectively, especially when engaging in *courageous conversations*. The modeling of facilitation techniques within the facilitator training sessions served as a pivotal component in supporting skill acquisition. As previously noted, facilitating meaningful discussions about sensitive topics such as race and culture is particularly challenging in a virtual environment. These discussions require the establishment of a strong sense of community among participants and facilitators, fostering an atmosphere where open dialogue on these subjects is encouraged. To foster a sense of community, facilitators proactively engaged participants during the training by posing thought-provoking questions and providing prompts related to these delicate topics. Deliberate pauses were built into the training sessions as these topics were presented to allow for the ideas presented to resonate with the participants. These interludes served as a reflective space, allowing participants to process their immediate experiences. It also offered them an opportunity to envision themselves in the facilitator's role and contemplate how they would navigate and lead such complex conversations. By observing skilled facilitators adeptly navigate through diverse pedagogical scenarios,

participants were able to gain valuable insights into the application of best practices, thereby bolstering their confidence and competence. To further develop facilitator comfort with the course content, participants needed to complete 80% of course content to be considered trained facilitators. As previously described, this objective not only signifies an adequate grasp of the material but also signifies a commitment to the learning process.

5.2 Intentional Facilitator Recruitment Enhanced Quality of Training Sessions

To establish a cadre of adept facilitators poised to effectively implement course content about inclusive CS teaching, deliberate recruitment steps should be taken. Enlisting the services of educators with established equity-oriented experience is a key factor to training more facilitators who are confident in teaching the course. Collaborating with educators renowned for their commitment to equity, especially in CS education, can enrich facilitator cohorts with diverse perspectives. This integration can expedite seamless assimilation into training materials and discussions, offering valuable insights for similar initiatives.

5.3 Synchronous Sessions Allow Needed Engagement and Discussion

The inclusion of synchronous sessions within the facilitator training course was a critical change to the structure of the training that provided a dedicated space for fostering *courageous conversations*. These interactive real-time discussions enabled facilitators-in-training to engage in open dialogue, address challenging topics, and refine their facilitation techniques in a supportive environment. Moreover, the intentional recruitment of facilitators, encompassing a diverse array of backgrounds and perspectives, enriched the conversations and overall training experience in our second facilitator training by promoting a comprehensive understanding of inclusivity and equipping facilitators to effectively engage with a broad spectrum of learners.

5.4 Iterative Revisions Integral to Scaling

Related to course material development, a proactive approach to regular updates was important. While focusing on conceptual frameworks rather than specific scenarios, the facilitator training encouraged participants to adapt content to their unique contexts. This approach not only cultivates critical thinking and adaptability, but also ensures that facilitators can seamlessly integrate course principles into their respective teaching environments. Scaling to reach more teachers while preventing professional learning from becoming too generic and surface level that it is no longer specific to the situations and needs of the teachers we reach is a challenge that requires intentional monitoring.

6 POSITIONALITY OF AUTHORS

The authors of this paper come to this work their own backgrounds and experiences. Given the topics of racial and gender bias that are central to the professional learning course and facilitator training described here, we believe it is appropriate to share the demographics of our team and the roles they played in this work. The first and third authors identify as White women, the second author as a Black man, and the fourth author as a Black woman. The second and third authors are two of the curriculum developers and facilitator training leads for iteration three of this work – a third curriculum developer and facilitator training lead credited in the acknowledgements also identifies as a Black woman. These authors have years of expertise delivering professional learning and supporting CS educators to center equity in their practice. For this paper, they brought critical first-hand knowledge of the design decisions made in rewriting the professional learning and facilitator training course content, and experiences leading facilitator trainings and interacting with participants. The first author leads the evaluation and research of this work, and she has expertise in evaluating programs aimed at broadening participation in CS and STEM education. She developed and analyzed course surveys, monitored course implementation data, and helped the team identify key findings and outcomes. The fourth author is a communications professional with a background in research and evaluation and a commitment to equity in education. As someone not directly involved in the design, implementation, and evaluation of the professional learning or facilitator training, she provided a critical lens to this paper that helped us better articulate the experiences and learnings described here.

7 LIMITATIONS

We acknowledge several limitations to this work that impact the interpretation of our findings. A primary limitation for understanding the outcomes of the facilitator training is our small sample size ($N=50$ facilitators enrolled across two trainings) and our post-survey response rate (65% of participants who completed the training, but only 34% of participants who enrolled in the training). Not knowing why participants did not finish the facilitator training limits our understanding of the training's effectiveness. Another limitation is that we do not yet have much data from facilitator training participants *after* they implement the course with their own teachers. A facilitator follow-up survey is administered after trained facilitators finish implementing the course with their own teachers. However, at the time of this paper, only two teacher-facing professional learning courses had been implemented by newly trained facilitators, so little data from the facilitator follow-up survey was available. Although we have outcome data from the end of the facilitator training, it will be essential moving forward to analyze follow-up survey data about facilitators' perspectives after they implement the course.

8 CONCLUSIONS AND NEXT STEPS

Our experiences show that training facilitators can be an effective way to scale equity-focused professional learning and require a holistic strategy that combines experiential learning, modeling of successful facilitations strategies, intentional recruitment, and adaptive content development to be effective and successful. By utilizing these principles, we can cultivate a cadre of adept and culturally responsive facilitators poised to champion inclusive pedagogy and foster transformative learning experiences for CS teachers. As we continue our work, we will administer follow-up surveys to trained facilitators after they implement the professional learning course with their own teachers to further assess the impacts of the facilitator training. We intend to continue our partnerships with the NSF BPC Alliance Expanding Computing Education Pathways (ECEP) and the Computer Science Teachers Association (CSTA) to recruit additional facilitators and expand this work to reach more educators.

ACKNOWLEDGMENTS

We would like to thank all the educators who participated in the facilitator trainings described in this paper. We would also like to recognize the invaluable contributions of Vanessa Jones for her work on the professional learning course redesign and facilitator training. Thank you to our collaborators at the MIT Teaching Systems Lab, Justin Reich, Sara O'Brien, and Josh Sheldon, and to our colleagues Stephanie Baker, Sarah Dunton, Carol Fletcher, Lisa Garbrecht, John Owen, and Kate Woodward Young for their contributions to the course redesign. This work was made possible by funding from Google and the National Science Foundation (#1822011).

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