

2025 AMTE Virtual Institute Session Descriptions

Across the Arc: Sustaining Our Learning, Sharing Our Practice

11:30 AM -12:30 PM EST

Opening Session

Learning as a Mathematics Teacher Educator

Joel Amidon, Dusty Jones, & Jennifer Wolfe – hosts of the Teaching Math Teaching Podcast

Moderated By: Ayanna Perry

Join the hosts of the Teaching Math Teaching Podcast for a roundtable conversation about what they have learned from over a hundred podcast episodes and conversations with educators across the field, the hosts will explore the stories, strategies, and struggles that shape mathematics teacher education.

Through the lens of authentic dialogue, they will highlight themes such as:

- Supporting productive struggle in teacher learning
- Connecting theory and practice in meaningful ways
- Centering relationships in teaching and teacher education
- Sustaining professional growth through community and conversation

Participants will be invited to consider their own journeys as mathematics teacher educators—how we learn from one another, how we create spaces for reflection and vulnerability, and how we continue to grow as a community committed to improving the teaching of mathematics teaching.

12:30 PM - 1:20 PM EST

New Research Room 1

Listening for Brilliance: A Counterstory of a Black Girl's Resilience in a Mathematics Lesson

Bea Ellis

Moderated By: Frances Harper

In this session, I share a counterstory centering a Black girl's brilliance and resilience during a whole-class discussion in a standards-based mathematics lesson. During the discussion, Amari (pseudonym) negotiated micro-invalidations of her thinking and deficit positioning through two acts of resistance: persisting with her own sense-making and remaining silent. The counterstory challenges deficit narratives about Black girls' mathematical ability by inviting educators to recognize brilliance and agency in moments often misinterpreted as misconceptions or disengagement, revealing how Black girls exercise agency in ways that can remain invisible without careful attention. I invite the audience to consider: What can we learn by listening to Black

girls and assuming brilliance in their mathematical thinking? What possibilities emerge when we reimagine mathematics lessons from these perspectives? My hope is that participants leave with a renewed commitment to noticing, valuing, and amplifying Black girls' brilliance and resistance in mathematics classrooms.

New Research Room 2

Holding on to Justice in Mathematics Education during Times of Crisis

Sandra Zuniga Ruiz

Moderated By: Ann Wheeler

What is the role of mathematics teacher education during times of crisis? In this session, my goal is to create a space to consider how we can strive to center humanity and justice in our current roles, despite the constraining circumstances we are living in. I will share two examples, one from my research and one from teaching, that provide opportunities to humanize mathematics education and center identity and power. We will conclude the session by co-constructing possibilities that help us hold onto justice and envision more collective futures.

1:30 PM - 2:20 PM EST

Lightning Talks Room 1

Moderated By: Hyunyi Jung

Veteran Florida Elementary Teachers' Lived Experiences with Traditional and Reform-Oriented Mathematics

Kayla Sutcliffe

This session will share findings from my (in-progress) dissertation which uses Interpretative Phenomenological Analysis (IPA) to examine the lived experiences of veteran Florida elementary mathematics teachers with both traditional and reform-oriented mathematics instruction—experienced first as students and later as teachers. The study utilized exclusively qualitative data sources: a pre-interview reflection, a semi-structured interview, and a post-interview journal prompt for each of the seven participants.

The study focuses on teachers with at least twenty years of experience, a group research suggests is more likely to question reform-oriented practices and whose beliefs may be more entrenched (Hargreaves, 2005; Pajares, 1992). This makes their experiences and beliefs critical for mathematics teacher educators seeking to understand both resistance and readiness for instructional change (Gregoire, 2003). Guided by two main research questions, the study examines: (1) teachers' lived experiences with traditional and reform-oriented mathematics as students, and (2) their perceptions of the personal, professional, and contextual factors that shape their beliefs, mathematical knowledge, and teaching practices in relation to these approaches.

Key findings illuminate how teachers' prior experiences, beliefs, teacher self-efficacy, and mathematical knowledge for teaching (MKT) intersect with contextual constraints, such as curriculum and testing mandates, time pressures, and student needs, to influence their instructional choices. These insights reveal both the affordances and the barriers to enacting reform-oriented mathematics, offering teacher educators concrete entry points for targeted professional learning design.

This session will invite participants to critically examine how veteran teachers' experiences and beliefs can inform strategies that intentionally develop both cognitive (MKT) and affective (TSE) dimensions. Through collaborative discussion, attendees will consider ways to leverage teachers' professional wisdom while addressing the factors that hinder reform-oriented practice, ultimately strengthening the preparation and ongoing development of mathematics educators.

Enhancing Mathematical Understanding: The Role of Writing in Reasoning, Communication, and Reflection

Su Liang

Limited opportunities for mathematical writing in K–12 education often carry over into college classrooms. Faculty frequently observe students struggling to articulate mathematical ideas, both orally and in writing (Stylianides & Stylianides, 2008; Author, 2014). These challenges are especially evident in proof-based courses, where clear communication is essential (Weber, 2005). In this session, we will share classroom activities designed to engage preservice teachers in written and oral mathematical communication, helping them deepen their mathematical thinking and understanding within a preservice teachers' content course.

Writing to Learn Mathematics: Classroom-Ready Strategies for Amplifying Student Thinking

Alexandra Cuadra

Writing-to-Learn Mathematics (WTLM) activities provide teachers with powerful tools to make student thinking visible, foster deeper engagement with concepts, and support formative assessment. In this lightning talk, I share practical classroom-ready strategies from my dissertation research on undergraduate students' understanding of partial derivatives that can be readily adapted across grade levels and mathematical topics.

Specifically, I highlight two WTLM tools: The Important Prompt, a short reflective writing task that asks students to articulate what they see as most important about a mathematical idea, and the Aspects of Mathematical Phenomena (AMP) Chart, a structured framework that supports students in representing concepts across multiple modes (verbal, graphical, and symbolic). Through these activities, students learn to use mathematical language as a sense-making tool rather than solely a means of producing answers.

For mathematics teacher educators, these activities illustrate how writing can function as both pedagogy and assessment. Teacher candidates can experience how carefully designed prompts encourage students to connect procedural fluency with conceptual understanding, while also providing instructors with authentic evidence of students' thinking. Importantly, these writing tasks are accessible, flexible, and easy to integrate into existing courses without sacrificing instructional time.

This session will focus on how mathematics teacher educators can introduce, adapt, and scaffold WTLM activities in their own contexts—whether preparing pre-service teachers to teach algebra or guiding undergraduates in advanced calculus. By the end of the talk, participants will leave with concrete examples of prompts and frameworks that they can immediately use to enrich their practice. Ultimately, this work underscores writing's dual role as a tool for learning mathematics and for fostering belonging in mathematics classrooms.

1:30 PM - 2:20 PM EST

Lightning Talks Room 2

Moderated By: Kim Yoak

Making a House a Home: A Conceptual Framework for Building Mathematics Teacher Self-Efficacy through Belonging and Practice

Jennifer Malue Bartone

This lightning talk shares conceptual and practice-based research from my dissertation in practice, which investigated how university-based secondary mathematics teacher education programs can empower preservice and novice teachers to build strong self-efficacy in teaching mathematics (SETM). In response to high attrition rates and early-career pressures, I introduce the Making a House a Home conceptual framework which is a metaphor for holistically and sustainably supporting secondary mathematics teachers.

Grounded in practice-based teacher education (Forzani, 2014), mathematics teacher identity development (Aguirre et al., 2024), and proactive coaching (Baker & Knapp, 2023), the framework centers belonging as the foundation for SETM. Drawing from qualitative data (semi-structured interviews and a focus group), I highlight participant voices describing how relationships with faculty, exposure to core practices, and extended mentoring made them feel seen, heard, and professionally prepared for the realities of a secondary mathematics classroom.

Preservice teachers must develop pedagogical content knowledge rooted in core practices, aligned with the NCTM (2014) eight effective teaching practices. After program completion, mentoring and coaching (referred to as the “roof”) are vital to help teachers weather professional challenges. Using Baker and Knapp’s proactive coaching model, I advocate for coaching that extends beyond first-year induction to continue to build mathematics agency and mathematics teacher identity. Professional learning, framed as ongoing “renovations”, supports long-term growth and retention.

This study contributes to the field of mathematics teacher education by: (a) connecting content and practice; (b) promoting equitable mathematics teaching practices; (c) addressing the absence of special education and multilingual learner preparation; (d) prioritizing coaching and professional learning; (e) uplifting teacher voice; and (f) emphasizing sense of belonging.

Aligned with AMTE (2017) Standards for Preparing Teachers of Mathematics, the framework offers a tool for helping novice teachers thrive, not just survive. This session will engage those reimagining preparation pathways, particularly around identity, coaching, and sustainable support while amplifying an early-career researcher’s voice in the field.

Holistic Personalized Coaching (HPC): Foregrounding Teachers’ Mathematics Instructional Quality and Wellbeing

Dionne Cross Francis, Pavneet Kaur Bharaj, Anna Gustaveson, Boran Yu, & Katie Habib

Effective teaching requires not only content and pedagogical knowledge, but also psychological and emotional awareness and the capacity to regulate them (Schutz et al., 2020). Typical professional development (PD) models tend to focus on advancing teachers’ knowledge and practices with less attention paid to teachers’ individual attributes (e.g., emotions, identity), adopting group-based, one-size-fits-all designs, which often result in surface-level change (NASEM, 2015), and overall mixed results. As Knight and Nieuwerburgh (2012) suggest, teacher PD needs to evolve from a one-size-fits-all to a one-size-fits-one design. Mathematics coaching emerged to address the drawbacks of traditional professional development (PD). However, although coaching has resulted in improved teaching quality, it has fallen short in key areas, including teachers’ resistance to coaching, inconsistent improvement in student learning, and

rising levels of teacher stress. Scholars suggest that these challenges may result from existing coaching models overlooking the factors that support teacher motivation and well-being (Kennedy, 2016). Current mathematics coaching models tend to be individualized, tailored to address teachers' mathematics content and instructional needs; however, they are less personalized and deemphasize teachers' psychological and affective attributes. In this talk, we describe how we used mixed methods to understand the effect of participation in a personalized coaching model, called Holistic Personalized Coaching (HPC), on teachers' instructional quality and well-being. Findings show that in addition to improved mathematics instructional quality, participants had better calibrated mathematics teaching efficacy, stronger mathematics teaching identities, and experienced more productive emotions related to teaching. This approach has the potential to advance mathematics teacher development in ways that optimize teachers' overall well-being.

The Promise of Practice: Using Digital Clinical Simulations to Enhance Equitable Mathematics Coaching

Gregory Benoit, Erin Barno, & Pelin Jackson

In many cases, urban schools and districts have hired mathematics coaches as the critical support to improve instruction toward equitable asset based mathematical instruction. The work of one-on-one coaching is situated, and coaches are tasked with being responsive to the respective needs and values of the students, communities, and teachers with whom they are working. Similar to the need for teachers to respond to students' thinking when designing and implementing instruction (Loewenberg Ball & Forzani, 2009), mathematics coaches work in response to their understanding of the teachers and students with whom they work, as well as the institutional contexts in which that work occurs (Gibbons & Cobb, 2016). And while coaches often use coaching cycles as a regular routine that can support teachers to develop ambitious and equitable teaching practices (Kraft et al., 2018; Kraft & Hill, 2020; Russell et al., 2020), one thing often missing from coaching cycles is the opportunity for teachers to practice, or to rehearse or try enacting new or unfamiliar instructional skills or practices prior to enacting them with students. As a result, teachers currently have to rely on trial and error within their own classrooms, potentially leading to frustration and hindering the successful implementation of new teaching methods (). We contend that digital clinical simulations (DCS) have significant potential to serve as practice spaces in one-on-one coaching cycles. There is a robust body of literature indicating that deliberate, targeted practice has significant potential to support teachers' learning (Loewenberg Ball & Forzani, 2009). Additionally, digital simulations show promise as tools for creating practice spaces in both pre-service and in-service teacher education settings (Herbst, et al., 2014; Barno et al., 2025; Benoit et al., 2025).

1:30 PM - 2:20 PM EST Lightning Talks Room 3

Moderated By: Travis Weiland

AI-Mediated Math Lessons PreK-12

Gianna Shields

Artificial intelligence (AI) tools such as ChatGPT and Eduaide.ai are becoming increasingly visible in education, yet preservice teachers often lack preparation to use them responsibly and

effectively in mathematics instruction (Luckin, 2018; Holmes, Bialik, & Fadel, 2022). This lightning talk introduces the AI-Mediated Mathematics Teaching Framework, which integrates Pedagogical Content Knowledge (PCK), Learner Agency & Access, Applied AI Fluency, and Ethical & Reflexive Practice to support preservice teachers in designing rigorous, inquiry-driven, and equity-focused math lessons. Building on research that highlights the importance of content knowledge for teaching (Shulman, 1987; Ball, Thames, & Phelps, 2008) and equity frameworks such as culturally sustaining pedagogy (Paris & Alim, 2017) and Universal Design for Learning (CAST, 2018), the framework positions AI as a reflective design partner rather than a shortcut. Drawing on findings from a pilot study in a PK–5 mathematics methods course, I share how preservice teachers used AI to develop data science–infused lessons, along with the opportunities and challenges they encountered. Key insights highlight the need for AI literacy in teacher education (UNESCO, 2024), strategies for aligning AI outputs with math standards and equity goals, and ways the framework can be used to scaffold reflective lesson planning. Attendees will leave with practical ideas for introducing AI literacy in mathematics teacher preparation.

Influence of Boundary Objects in a Mathematics Methods Course and Clinical Experience

Erin O'Halloran & DeAnn Huinker

Clinical experiences are a cornerstone of teacher preparation, yet they pose significant challenges for preservice teachers (PSTs) who must navigate complex negotiations between university coursework and field placement expectations. These challenges are particularly pronounced in mathematics education, where PSTs are prepared to implement approaches to mathematics instruction that often differ substantially from the approaches they encounter in their clinical placements. At the same time, the relationships between PSTs and cooperating teachers are often shaped by hierarchical master–apprentice models that privilege knowledge of the cooperating teacher and constrain PSTs' opportunities to enact practices learned in their coursework. Together, these dynamics make it challenging for PSTs to integrate ambitious mathematics practices into their clinical experience.

This lightning talk reports on a case study that explored how a mathematics methods course assignment, *Taking the Lead*, functioned as a boundary object to bridge coursework and clinical practice. The assignment required PSTs to (1) select a mathematics instructional routine not currently used in their placement classroom, (2) provide their cooperating teacher with a mini–professional development session on the routine, (3) implement the routine with the whole class, and (4) reflect on the experience through guided questions. PSTs chose routines such as *Would You Rather*, *Which One Doesn't Belong*, and *True or False*.

Findings show that the assignment created structured opportunities for PSTs to initiate professional dialogue, surface tensions around instructional practices, and assert agency in ways not typically afforded by traditional placement dynamics. While the assignment did not eliminate hierarchical relationships, it offered a pathway for greater coherence between coursework and practice.

This study contributes to mathematics teacher education by illustrating the potential for assignments to serve as boundary objects that support PSTs in navigating the complex relational dynamics of clinical practice.

Renewable Assignments in Mathematics Teacher Education

Webster Wong

In contrast with disposable assignments, renewable assignments invite students to create Learning Objects (LOs) that are shared publicly, openly licensed, and of educational value to others. Renewable assignments benefit student creators in various ways. Research has shown, for example, student creators developed a deeper understanding of the topics covered by the assignments and performed better than their peers when they were given renewable assignments. Students also found the work they were asked to do more meaningful. And as a result, they were more motivated and engaged in the process. Other benefits include opportunities for the student creators to represent their personal identities, and improve their creative thinking, research, and digital literacy skills.

The creation of such LOs has proved quite beneficial to the student creators. Additionally, there is some evidence that LOs created by students can be beneficial to other learners. In particular, LOs created to be used in future iterations of the same class where the renewable assignments are given have the potential to be especially valuable to their users.

In this talk, we will briefly talk about what renewable assignments are, i.e., the criteria of renewable assignment, and the types of LOs that appear to be more (or less) valuable to their users. We will then focus on renewable assignments as a teaching practice for mathematics teacher educators. In other words, how different types of renewable assignments may be used in teacher preparation courses to benefit prospective teachers' mathematical, pedagogical, and curricular reasonings.

1:30 PM - 2:20 PM EST

Lightning Talks Room 4

Moderated By: Ayanna Perry

Designing Belonging: Humanizing Mathematics Through Setup and Upkeep

Eva Thanheiser

How can we humanize mathematics in ways that are durable, measurable, and portable across courses? This lightning talk shares a design-for-durability architecture that treats belonging and community as design variables. I outline an arc of belonging (foundation, engagement, application, internalization) supported by setup routines (identity mapping, co-authored norms) and upkeep routines (rotating roles, belonging pulses, discourse audits). Two sustaining mechanisms anchor the approach:

- (1) Critical data literacy as dialogic practice, interrogating categories, sources, and visualizations while authoring alternative representations that serve local communities; and
- (2) A humanizing lesson sequence, community, authentic questions, mathematical/social investigations, and reflection with a public audience.

Practice-based snapshots from teacher preparation illustrate concrete moves: structured peer response beyond "I agree," micro-affirmations that make intellectual risk-taking safe, Number Talks with negotiated sociomathematical norms, and community-facing artifacts (e.g., infographics on wage gaps or local climate). I will share quick-start tools (one-page protocols for belonging pulses, role rotations, discourse audits) and discuss pragmatic ways to study their effects (equity-of-voice and equity-of-ideas traces). Participants will leave with routines they can adopt tomorrow, plus a researchable pathway for connecting belonging, negotiated norms, productive disciplinary engagement, agency in methods courses, and school-based partnerships.

Supporting Prospective Teachers to Design Discipline-Rich Project Based Learning Projects

Shelia Orr, Sarah DiMaria, & Carlee Madis

Project-based learning is a powerful opportunity to bring students' cultural experiences and backgrounds to the classroom. In this session, we will share how to use a framework designed around creating discipline-rich mathematics projects to support prospective teachers to design learning opportunities that are authentic and relevant to their students' lived experiences.

Could Games Be the Way to Go for Dual Language Learners?

Rebecca (Beki) Romeis-Markham, Kerry Burner, & Ginny Smith

In the 21st Century, young learners are more and more driven by technology and its instant gratification through interactivity. How can we replicate that interactivity and fun in our classrooms while teaching mathematics? What if we shifted the math block to a centers-based instruction model where direct instruction took place in a teacher center and student work happened through learning games? That is what we propose to do. In a group with researchers Kerry Burner from Florida State University and Ginny Smith from SUNY Oneonta, we will first conduct a meta-narrative review of current research on math centers' relationship with Dual Language Learners' (DLLs') scores, and then we will train and coach volunteer educators in K-2 classrooms to create developmentally appropriate games that will support their DLLs in learning mathematics skills through play and discovery. Teachers would still complete their direct instruction as required by their district, but it would be delivered in small groups, allowing for differentiation to target the students' needs. The two-year training and coaching time is expected to see an increase in the number sense skills of our DLLs on their district and state tests.

1:30 PM - 2:20 PM EST

Lightning Talks Room 5

Moderated By: Frances Harper

Nudging Mathematics Teacher Education Toward a Radically Modest Approach

Oluminde Banjo

This event's theme prompts us as teacher educators to ask ourselves whether our efforts toward improving mathematics instruction are being sustained and spread in the realm of practice. It seems as though university-based professional development (PD) projects for mathematics teachers are difficult to sustain and spread, perhaps because they often aim toward transformational changes in practice, requiring a great deal of time and effort from teachers and developers alike. We propose an alternative PD approach where "less is more." Within nudge-based incremental PD, teachers are simply offered a variety of standalone instructional "nudges"—modest suggestions designed for easy implementation with minimal time investment. Developers must carefully design these nudges to be easily graspable by teachers with a high likelihood of initial success during implementation, but beyond that there is little involvement from developers. Instead, teachers make their own choices and are the drivers of sustaining and spreading these small, portable instructional nudges.

Sharing from a five-year, NSF-funded PD project, this presentation includes examples from a set of 18 published nudges. "First, Attempt" nudges teachers to change the first moments of presenting a worked example. Based on a meta-analysis of 50+ studies (Sinha & Kapur, 2021), it may be beneficial to have students briefly try the problem before the teacher's explanation. "Going Downhill" is the homework idea that teachers encourage students to work on harder problems first, while still in class, rather than just starting at #1. "Put a Bow On It" nudges teachers to wrap up a lesson by articulating the big mathematical idea for the day, which often makes more sense to students at the end of a lesson than at the beginning. Overall, this nudge-based incremental PD can promote modest but potentially widespread instructional change, even reaching teachers who are not served by transformational PD.

Collegial Conversations in Professional Development: Opportunities for Teacher Learning

Joseph DiNapoli, Helene Leonard, Amy Daniel & Denis Cook

The focus of our lightning talk is to explain how dialogue among secondary mathematics teachers in a professional development (PD) setting affords opportunities for teacher learning. Guided by the theoretical perspective of a community of practice (CoP; Wenger, 1999), we view teacher learning as occurring through changes in participation and reification. For such learning to occur, teachers must engage in discussions and construct new meanings by reflecting on and reshaping ideas. We argue that a move toward more collegial conversations, where teachers openly challenge, extend, and build other's ideas, is indicative of a participation change in the CoP and provides fertile ground for teachers' reification of research-based pedagogies.

Our research draws on a three-year study of professional learning communities involving 33 secondary mathematics teachers. In each PD session, teachers analyzed video cases of instruction using the Teaching for Robust Understanding (TRU) framework (Schoenfeld et al., 2023) as a common pedagogical lens. We employed frame analysis (Bannister, 2015) to classify talk-turn types from congenial to collegial and examined their alignment with TRU.

From a binary perspective, findings show that collegial talk turns (in contrast to congenial) were most strongly associated with teacher learning, as evidenced by higher TRU alignment scores, more frequent justification of ideas, and more connections made across TRU dimensions. From a non-binary perspective, we also found evidence suggesting a spectrum of collegiality. We identified potential for collegiality across nearly all talk-turn types, suggesting that even contributions often considered congenial can spark productive learning opportunities within a supportive environment.

During our talk, we will share details of these findings and spark a meaningful discussion about how different talk turns can contribute to collegiality. Together, we will consider how teacher educators might intentionally cultivate PD environments where collegial participation fosters deep teacher learning through reification of ambitious instructional practices.

Professional Development as Reflective Space: Examining Student Worldviews for Math and Computer Science

Temvy Matsebula & the CRRAFT Partnership

Professional development (PD) can move beyond skill acquisition to become a transformative space for educator reflection. This talk aims to examine how a PD session supported teachers in critically exploring their beliefs, knowledge, and worldviews while also actively incorporating

students' perspectives and lived experiences when exploring computational thinking activities. Teachers' conceptual frameworks influence what and how they teach, at the same time, students bring unique ways of understanding their communities, topics and the world. When PD creates opportunities to explore and connect these perspectives, educators can engage in culturally responsive and create intellectually rich classrooms even if that looks messy.

Drawing from a professional development series focused on computer science and mathematics, we aim to share strategies that invite teachers to interrogate their own thinking, leading to exploring ways to center student knowledge in a project to explore modularity in coding and programming. Examining the PD discussion and teachers approaches and artifacts as evidence of the impact of tailored discussion will be presented. The artifacts showed how teachers rethinking lessons after recognizing assumptions, integrating authentic student input, shaped student engagement and conceptual understanding. These cases highlight how PD can evolve into a co-constructed space where teachers and researchers can reflect on ways to support equity, honoring students' knowledge as relevant in STEM.

2:30 PM - 3:30 PM EST

Closing Session

Maintaining Joy in Mathematics Teacher Education

This session will explore how we share knowledge, collaborate, and sustain ourselves in the midst of shifting expectations.

Closing Session Room 1

Moderated By: Sunghwan Byun

This panel will engage participants in conversation about maintaining joy in knowledge sharing (e.g., conferences, books, journals)

Panelists: Maria Fernandez, Michelle Stephan, & Trena Wilkerson

Closing Session Room 2

Moderated By: Travis Weiland

This panel will engage participants in conversation about maintaining joy in collaboration as a MTE (e.g., getting started, finding collaborators)

Panelists: Colleen Eddy, Jennifer Suh, & Maisie Gholson

Closing Session Room 3

Moderated By: Frances Harper

This panel will engage participants in conversation about maintaining joy in the midst of shifting expectations and requirements (e.g., balance, belonging, enjoying the work; how to avoid quiet quitting; finding communities of joy)

Panelists: Daniel Reinholz, Sandra Crespo, & Theodore Chao

