

## Article

# Maintaining Tensions: Braiding as an Analogy for Mathematics Teacher Educators' Political Work

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**Abstract:** Although the field of mathematics education has made gains in centering the need for justice-oriented approaches and antiracist teaching practices in teacher education, much of this work remains in its infancy. Moreover, research focused on this area highlights teacher candidates' knowledge and dispositions and often ignores the role of the mathematics teacher educators facilitating the process. We contend that mathematics teacher educators must pay more attention to how intersectional identities, contexts, Mirror Tests, and principles of Rehumanizing Mathematics manifest in teacher education to better understand how teacher candidates develop political knowledge in teaching mathematics. To this end, we introduce a framework of considerations, which we call a compass, that identifies four dimensions (or strands) and offers guiding questions for mathematics teacher educators to consider. We offer examples from a multi-site research study to illuminate each dimension and build the case for the necessity of braiding the four strands together as we engage in this line of work. Implications for practice and future research are discussed.



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**Keywords:** teacher education; teacher educators; mathematics education; intersectional identities

## 1. Introduction

Teaching is political. Mathematics teaching is uniquely political in that mathematics is over-represented in high-stakes testing, serves as a gatekeeper for more rigorous academic tracks, and is often used as a proxy for intelligence. However, the general public views mathematics as absolute and culture-free [1–3]. As such, understanding and navigating the politics of teaching is a critical aspect of the profession. For instance, without understanding the history of the eugenics movement and standardized testing [4], teachers may not understand or be able to articulate to parents and others why such exams create inequities by race, gender, and socioeconomic background. However, teacher candidates (TCs) are not likely to develop political knowledge by simply being “on the job”; they must be actively supported to do so [5–7]. Unfortunately, most teacher preparation programs are not designed to prepare TCs to recognize or navigate the politics of teaching and learning mathematics or to dismantle oppressive systems within mathematics education, even though this work has been clearly articulated as central to mathematics teacher learning [8]. As such, TCs are underprepared to take on this work once they are in full-time teaching positions, and many find it difficult to resist the pressures of their schools to “teach to the test” and “cover standards” [5,9].

Our research asserts that there is parallel work involved for mathematics teacher educators (MTEs) to learn how to dissect and navigate the politics of teaching to successfully support their TCs to do the same. That is, even when individual MTEs are committed to supporting TCs' development of political knowledge, it is not clear that they have the

full support of their TCs [10], their program [11], or sufficient expertise to carry out this work in ways they intend [12]. For example, featuring the kinds of dilemmas that arise for nineteen MTEs in contexts across the nation as well as fifty-seven commentaries from additional MTEs, White, Crespo, and Civil highlight the ways that race and identities arise for MTEs and how they grapple with equity- and justice-oriented dilemmas [13]. While these dilemmas are raised in the White et al. book, and their associated microaggressions (for MTEs and TCs) are evident, the authors do not include overarching guiding questions, frameworks, or resources for MTEs in doing this work. This is one example that motivates the need for explicit tools to help MTEs both prepare for these dilemmas and make sense of dilemmas that are unique to themselves and their settings [14]. In fact, a significant gap persists in understanding how MTEs' intersectional identities and contexts are intertwined as they plan, implement, and reflect upon experiences designed to cultivate TCs' political knowledge.

We take the position that our community cultural wealth as three women of Color scholars [15], our experiences navigating teaching and teacher education, and our commitments to justice-oriented work in the highly politicized context in the United States combine to offer a unique lens for our current research project that focuses on developing political knowledge with K-12 TCs. Because the United States does not have national standards nor curricula for P-20 education (preschool through post-secondary education), aside from Advanced Placement and International Baccalaureate courses, each of us draws on the 2017 Standards for Preparing Teachers of Mathematics, as articulated by the Association of Mathematics Teacher Educators (AMTE), considered to be the leading United States professional organization for MTEs. Given this, we identify several themes and questions that MTEs might attend to as they endeavor to support TCs in promoting equitable teaching (AMTE Standard C.2.1), understanding the history of power and privilege in mathematics education (AMTE Standard C.4.4), and advocating for themselves and their students (AMTE Standard C.4.5), all of which we see as elements of cultivating TCs' political knowledge for teaching mathematics in the United States.

This article offers an identity and context compass we call A Compass for Preparing Teacher Candidates with Political Conocimiento, which we later discuss and present in the article, based on themes that emerged through the analysis of our research planning meetings, analytic memos, and reflection sessions. We offer examples from our data to illuminate how we attended to identity and context as we planned, implemented, and reflected on our research experiences with TCs. We conclude this article by articulating implications for the field to consider as we continue to understand how intersectional identities and contexts impact our planning, implementation, and reflection on political knowledge development for TCs.

## 2. Theoretical Framework

Political Conocimiento in Teaching Mathematics (PCTM) is a theory that helps explain the kinds of interlocking knowledge bases necessary for teachers to be effective, especially with students who have been historically marginalized by schooling [16,17]. Building upon Pedagogical Content Knowledge (PCK), which combines knowledge of content (mathematics), knowledge of pedagogy, and knowledge of students [18,19], PCTM does not merely add on "politics" as a fourth knowledge base; it reframes the way we think about knowledge itself [16]. That is, rather than viewing knowledge for teaching as objective/universal—something that one accumulates and then applies to one's context, thereby separating it from affective domains, like beliefs, dispositions, emotions, and ideologies—PCTM positions knowledge as relational, embodied, based upon experience, and co-created with others. This framing captures the fact that knowledge is always subjective/situational and negotiated with others. As such, knowledge of mathematics is considered knowledge "in connection to" the sanctioned version of mathematics; knowledge of students is knowledge "with" students and their home communities; and knowledge of pedagogy is experiential knowledge of specific pedagogies with others.

Moreover, PCTM assumes that having knowledge of mathematics, pedagogy, and one's students is not sufficient without knowledge of the politics that can arise from making particular choices in one's practice; the four knowledge bases interlock and operate within the histories of society and the comrades with whom we engage in El Mundo Zurdo (the left-handed world of activists) [20].

Within the framework of PCTM, "politics" means power dynamics that arise in interactions (e.g., with colleagues, administrators, and families) and in response to structures, where teachers feel pressure to follow authority (e.g., abide by policies). For example, a teacher who advocates for de-tracking might be met with resistance from those who benefit most from inequitable tracking practices (e.g., wealthy families of dominant backgrounds). Similarly, MTEs who advocate for racial healing within mathematics might be met with resistance from TCs who are mathematics majors and believe the system of school mathematics should maintain a focus on rigor, content, and logic, as those tenets have produced "good, hard-working people" like themselves. Second, teachers are not prepared to "question existing educational systems that produce inequitable learning experiences and outcomes for students", such as "personalized" computer-based learning, often framed as "equity-oriented", but may exacerbate inequities. Third, policies, such as teacher evaluation tied to students' standardized test scores, create pressures for TCs and teachers to teach to the test, rather than using rich tasks that promote long-term understanding and are sometimes not aligned with such standardized tests. In other work, we offer a heuristic for TCs to use as they work to deconstruct the narratives and politics in play in mathematics teaching and learning [21]. Here, we assert that MTEs face similar pressure(s) to teach to assessments (e.g., Educational Teacher Performance Assessment, abbreviated as edTPA) that are required by state and national licensing bodies [17] and need specific tools to support them as they engage in political work.

To prepare TCs to navigate such politics, MTEs must also be supported to develop this knowledge themselves, in partnership with their TCs. Rather than acquiring a pre-determined set of skills, PCTM focuses on a teacher's way of being, holding oneself and those with whom one interacts accountable to a set of principles that promote justice-oriented mathematics learning [16] and support human flourishing [22]. We use the "Mirror Test" [23] to refer to the ongoing vigilance with respect to holding oneself and others accountable to these principles. That is, rather than looking to external entities, such as the Danielson Framework [24], edTPA [25], or student test scores to decide whether one is an excellent teacher, MTEs and teachers need to develop the ability to look internally and hold themselves to a higher ethical standard. For further elaboration about the Mirror Test, see [26]. In turn, we ask ourselves, as three critical women of Color MTEs, if our actions reflect our mirror tests.

### 3. Methods

In writing this article, we engaged in a deep examination of our experiences as three women of Color scholar-activists working with primarily white TCs to foster PCTM. We used narrative inquiry [27,28] as a methodology and analytical tool in our research, as it allowed us to capture the multiplicity of our experiences engaging in justice-oriented work with TCs in ways that foregrounded our stories, lived experiences, and collaboration across spaces. The uniqueness of this method is that it allows us to think about the process that women MTEs of Color engage in with each other and with our TCs to understand better how our intersectional identities manifested as we planned for, facilitated, and reflected upon four PCTM tools.

### 4. Narrative Inquiry

We chose narrative inquiry for two primary reasons. First, narrative inquiry values stories and storytelling as a way to gain insight into how people live and make sense of their experiences [29]. Our research team met monthly during the fall 2020 semester and then weekly for three to four hours during the spring 2021 semester to discuss the

planning, implementation, data collection, and reflection on our PCTM tools. Data for this article were derived primarily from our planning meetings held in the spring of 2021. Much of this discussion and planning entailed telling stories about our contexts, our interactions with TCs, personal experiences regarding the COVID-19 pandemic, and the changing political landscape. Narrative inquiry as a framework allowed us the opportunity to interpret ourselves, our stories, our scholarship, our current research project, and the mathematics methods courses (required mathematics pedagogical courses for state licensure) through our past and present experiences of preparing ourselves to best prepare our TCs' development of political knowledge.

Next, narrative inquiry moves beyond a simplistic analysis of the story as if the story or narrative is an object to be analyzed. Instead, narrative inquiry situates the researcher as thinking with stories to allow the researcher to consider how they act upon the story and how the story acts upon them [30]. As researchers, we constantly considered how we were making sense of the tools alongside our TCs. That is, the tools are not “finished”, just as we and our TCs are not “finished” in our learning and development. We are constantly in motion and drawing upon each other to remake ourselves through story. As such, what it means for us to be MTEs of Color is being co-constructed with our TCs, who are developing meaning around what it means to be a teacher of mathematics, given their intersectional identities. This element of narrative inquiry is particularly salient for us as it presents a direct connection to the “C” in PCTM, conocimiento, which situates knowledge as existing with students and communities instead of knowledge of students and communities [17]. In this way, we see community and solidarity as core tenets of narrative inquiry and conocimiento. Therefore, we, as three women of Color scholars, *live* our stories. We consider our positionality and how our contexts shape us and our stories. We also highlight the importance of how our stories exist with each other in the community of our research team and the broader field of scholars of Color engaging in this work and how those stories reflect the ways we continue to develop our ability to prepare our TCs with PCTM.

## 5. Researcher Identity Statements

### 5.1. Author 1: Marrielle Myers Is Also Known as “A Southern Belle Turned Southern Bull”

I identify as a Black, cisgender woman who does not live with any disabilities. I grew up in a middle-class home in the South and was raised in a Christian family. I was taught to “respect” authority, and part of that meant not asking questions even when I did not understand. This led to me internalizing many of the narratives teachers had about me at a young age (e.g., too talkative or bossy), even though I disagreed with them. So, I did what I was told and experienced “success” in school. I was so indoctrinated in the system that it was not until I was teaching in a Title I high school that I realized I was actually reproducing the same structures that created my suffering. I remember choosing to teach at that school because I thought “those students” needed me. I was so wrong. I needed them. My students facilitated my growth and liberation. My high school teaching experience, coupled with experiences in my graduate program, helped me understand that both marginalization and privilege existed within me. I find myself constantly trying to understand my intersectional identities better and unpack my journey while simultaneously creating experiences for my TCs to engage in this work. In many ways, I see myself as vastly different from my TCs, yet when I think back to my upbringing, I am faced with the fact that we may be more similar than I am ready to admit. Recognizing our similarities gives me hope that change can occur. Yet, I am aware that my TCs may miss the message because I am the messenger. So, I am left wondering how to express my commitment to disrupt and dismantle the system that causes harm to so many with enough “Southern sweetness” to make it palpable to my audience.

### 5.2. Author 2: Kari Kokka Dancing with and around the Insidious Nature of Whiteness

I identify as a fourth-generation Japanese American cisgender nonqueer woman who does not live with a dis/ability. My family's unconstitutional incarceration experience during WWII and witnessing inequities in my public high school (e.g., fueled by standardized testing, tracking, lack of supports for all students, etc.) in San Jose, California, with approximately 90% students of Color, fuel my commitment to justice in education. I was a teacher activist, mathematics teacher, and instructional coach for ten years in a Title I New York City public high school with over 90% students of Color. I often feel the need to assert my identity as a woman of Color, given how white supremacy positions Asian Americans in proximity to whiteness. For instance, in my first institution as an assistant professor, I found that colleagues did not understand that I identify as a person of Color and that I grew up with and worked amongst people of Color, and I was often viscerally uncomfortable in the predominantly white space of the university. When I reflect on my work in the predominantly white institution of my previous position, where I was employed when writing this article, I realize that I may have centered whiteness by preoccupying myself with white people's feelings and discomfort when exposing my TCs (and colleagues) to interlocking systems of oppression, e.g., white supremacy, cisheteropatriarchy, imperialism, capitalism, ableism, etc. My inclination to center whiteness may have been influenced by my role as a pre-tenure assistant professor and because I understand that the institution is an actualization of whiteness and that my (white) colleagues would be determining my tenure case and reading my (white) students' evaluations. I tended to overly preoccupy myself with my teaching evaluations because my identity is wrapped up in being a teacher. Being a high school math teacher was my most fulfilling, rewarding professional experience, and I am still in touch with my high school students. I often dream about engaging in future research with high school student co-researchers where we can build meaningful, lifelong relationships.

### 5.3. Author 3: Rochelle Gutiérrez Is a Nepantlera Working to Embrace Her Contradictions

I identify as a Xicana, cisgender, nonqueer, white-passing bilingual woman with Rarámuri roots. I am also not living with a dis/ability. Growing up in an activist family on Muwekma Ohlone lands, my father, Rubén (an electrician), taught me the power of union organizing, and my mother, Josefa (a previous farmworker, turned stay-at-home mother, turned community college counselor), modeled creative insubordination and how to advocate for others' rights. As a secondary mathematics teacher in a Title I school, I sought to challenge and embrace my primarily Latine and Black students. I wanted them to bring their full selves to the mathematics classroom, something I did not experience while in the mainly white "gifted program" of my K-12 years. But, I struggled with that kind of teaching, as I had lived most of my life code-switching (home/school, English/Spanish, cultural significance/academic rigor). I knew how to do one or the other, but not both simultaneously. Only later in life could I embrace my contradictions (privilege/oppression) to weave together the multiple worlds I belong to and become a nepantlera. In working with TCs, I do not always admit to sharing their privileged stances (e.g., HS math team member, knowing songs about SOH-CAH-TOA), mainly because these are painful parts of my schooling. Instead, I often expect them to drink through a firehose in learning abolitionist teaching and Rehumanizing Mathematics [31] approaches because of my sense of urgency about addressing the injustices and trauma that many historically oppressed students experience in school. Yet, it took me decades to get beyond my code-switching ways toward more translanguaging. In embracing my contradictions, I aim to empathize with my TCs and recognize they have their lives ahead of them to grow into the kind of teacher they want to be, as political clarity does not come in a semester or year.

## 6. The Tools

We used four scenario-based tools developed and piloted by the Political Conocimiento Development Tools (PCDT) team at the University of Illinois to support TCs in cultivating

PCTM. Funding for the tool development was provided by the University of Illinois in the form of a Campus Research Board grant (Political Conocimiento Development Tools) awarded to Rochelle Gutiérrez. Graduate student members of the development team included: Alexandria Cervantes, Theresa Dobbs, and Shafagh Hadinezhad. The suite of tools captures various elements of political knowledge and has multiple entry points. The tools (named in parentheses) help TCs: (1) identify aspects of equity in their workspaces (How Would You Classify It?) based upon four dimensions [32,33]; (2) consider how certain scenarios might feel riskier to deal with than others (Difficulty Sort); (3) reflect on how some scenarios feel similar and might lead to general approaches for student advocacy (Similarity Sort); and (4) prepare for and rehearse the kinds of politics they might face in teaching so that they can be strategic in their actions (Mapping and Rehearsal), which might require creative insubordination [34,35]. Using the tools places TCs in somewhat uncomfortable spaces, as they need to reflect on their identities, the kinds of microaggressions that have repeatedly harmed students (and perhaps themselves), and the knowings (e.g., mathematics, pedagogy, students, politics) they carry or with which they are familiar. Engaging with these tools raises issues for them to consider whether they actually act upon what they say they stand for in terms of their teaching and their commitments to Black students, Indigenous students, and students of Color, as well as other historically marginalized students and teachers. Elsewhere, we provide empirical results of TCs' PCTM cultivation [36]. Here, we focus on how we, as women of Color scholars and MTEs, are placed in the position of needing to navigate our identities, contexts, and positions with our TCs when using the tools and co-constructing knowledge with our TCs.

## 7. Context, Data Sources, Collection, and Analysis

This multi-site study occurred at three different teacher preparation programs in various locations (East Coast, Midwest, and Southeast). The three sites varied in size/enrollment, degree programs (e.g., B.A., B.S., M.A.T.), grade-band focus (elementary, middle, and secondary), and commitments to antiracist principles throughout the program. Our research team engaged in monthly meetings during the fall 2020 semester and weekly three-hour meetings during the spring 2021 semester.

### *Data Reduction and Analysis*

We began our data analysis process by listening to over 24 hours of recorded Zoom meetings, reading transcripts of the recordings produced by Otter.ai, and reviewing Google document files that we used to take shared meeting notes. Next, we identified transcript segments that focused on planning or reflecting upon using the four tools. We coded these segments using open coding to identify emergent themes in our conversations [37]. This process led us to identify the following themes: MTE identities, TC identities, the Mirror Test, Rehumanizing Mathematics [31], programmatic connections, creative insubordination, current climate, and MTE pedagogy.

Next, we created data tables where we organized the transcript segments by tool, listed which of our voices were present in the segment, and recorded the results of our initial round of open coding. We then sorted the segments into two groups: teaching and tool implementation versus research/scholarship considerations. An example of a quote that incorporated discussions of our identities and context but focused on research and implementation was when Kari noted that we should modify the interview protocol to talk about ourselves before asking our TCs to talk about themselves, stating, "Oh, just that I always felt awkward. I just feel a little extractive when I'm like, 'Oh, tell me all these things about yourself. And I'm not going to share anything about me'". While Kari noted that doing this was important to humanizing the research process, this particular quote was not relevant to how MTEs consider their intersectional identities and contexts in planning classroom activities; rather, it was a methodological consideration. This sorting process left us with eleven transcript segments, which we then coded again.

The second round of coding allowed us to collapse and categorize themes under four larger headers (intersectional identities, Rehumanizing Mathematics teacher education, MTE Mirror Test, and contextual considerations). For example, we combined MTE identities and TC identities into a broader code of intersectional identities. We also collapsed programmatic considerations and the current climate under contextual considerations, as that code was more expansive and honors the range of contextual concerns (e.g., program, grade band, regional location, political climate, virtual learning) that MTEs should consider when engaging in this work. This process resulted in creating a compass that highlights the complexity of our work as women of Color scholar-activists seeking to develop PCTM with TCs. In the next section, we frame, present, and offer robust examples of our stories to illuminate the compass.

### 8. The Compass: Braiding Our Multidimensional Work

Because there is a gap in understanding how MTEs' intersectional identities and contexts are intertwined with their political work, we sought to develop a framework of considerations for MTEs to foreground the influence of context and intersectional identities. Our framework for considerations, which we call A Compass for Preparing Teacher Candidates with Political Conocimiento (see Table 1), characterizes how we engage in our work and includes four strands (or dimensions): intersectional identities, Rehumanizing Mathematics teacher education, MTE Mirror Test, and contextual considerations. Within each dimension (strand), we offer empirically derived questions for MTEs to consider as they engage in justice-oriented work with TCs. It is important to note that although these strands are presented in a linear format, we do not assign any rank order of importance based on the order in which the dimensions are presented.

**Table 1.** A Compass for Preparing Teacher Candidates with Political Conocimiento.

|  | MTEs  | TCs  |
|--|---|--|
| Intersectional Identities                  | <ul style="list-style-type: none"> <li>a. What are my intersectional identities?</li> <li>b. How might my intersectional identities influence how I engage with the tool (e.g., understanding scenarios related to being an Asian American woman, living with autism, etc.)?</li> <li>c. How might my intersectional identities influence the ways I facilitate this experience for TCs? Specifically, how will my identities and TCs' identities influence how they perceive me, the course and its content, PCTM, the tool, etc.? How might I modify the tool delivery (e.g., racial affinity grouping) for my specific TCs?</li> </ul> | <ul style="list-style-type: none"> <li>a. What are my TCs' intersectional identities? How do I know this, or how do I respectfully gather this information?</li> <li>b. How might my TCs' intersectional identities influence how they make sense of the tools?</li> <li>c. How might my TCs' intersectional identities influence how they make sense of the tool in relation to other people (e.g., being open-minded, hopeful, resistant, skeptical, worried, etc.)?</li> </ul>                              |
| Rehumanizing Mathematics Teacher Education | <ul style="list-style-type: none"> <li>a. How will I care for myself in this experience with my TCs (e.g., recognize and attend to my emotions and needs) without disrespecting TCs' emotions?</li> <li>b. How will I use a healing-informed approach for TCs and myself (when using the tool, particularly considering how the scenarios may be triggering for me)?</li> <li>c. What resources, colleagues, comrades, friends, networks, and support systems do I have?</li> </ul>   | <ul style="list-style-type: none"> <li>a. How will I care for my TCs in this experience (e.g., who may feel (re)traumatized or who may be of dominant backgrounds and use emotions, such as tears, to center themselves)?</li> <li>b. How might I involve my TCs' perspectives? Whose perspectives might be centered versus marginalized?</li> <li>c. How can I create spaces to learn about and with my TCs in authentic ways? What challenges might my TCs be facing, and how can I support them?</li> </ul> |

**Table 1.** *Cont.*

|                           | MTEs   | TCs |
|---------------------------|--|-----|
| MTE Mirror Test           | <ul style="list-style-type: none"> <li>a. How do I make sure I am consistent with the principles I value and the communities with whom I hold myself accountable?</li> <li>b. What do I do when promising or problematic perspectives and/or actions of TCs arise?</li> <li>c. How will I recognize and manage tensions in this work?</li> <li>d. In what other ways might I work toward my justice goals?</li> </ul>  |     |
| Contextual Considerations | <ul style="list-style-type: none"> <li>a. How might my context support and/or constrain me, my TCs, and my work with them (e.g., my institution's policies and requirements for licensure, student teaching school placements, and cooperating teacher relationships)?</li> <li>b. How might the political climate in my country, state, city, or region (e.g., Black Lives Matter movement, Capitol insurrection, elections, police brutality, Critical Race Theory bans, teacher surveillance) influence this experience?</li> </ul> |     |

As we share examples in the next section, we highlight how we are constantly holding multiple strands (or dimensions) of the compass simultaneously. We liken this holding and constant tension to braiding hair [38]. When you braid or plait hair, you begin by gathering strands of hair (see Figure 1). For us, these strands are the four dimensions of the compass (intersectional identities, Rehumanizing Mathematics teacher education, MTE Mirror Test, and contextual considerations). Once you start the process of braiding, it is imperative that you hold each strand until you complete the braid. There is never a time while braiding that your sole focus is on one strand such that you disregard the other pieces. The level of focus or priority may shift slightly as you grab one strand and thread it in with the others, but if you do not maintain tension with all of the strands (dimensions), you will lose the braid. Likewise, MTEs should consider what it means to consider intersectional identities, Rehumanizing Mathematics teacher education, their Mirror Test, and contextual considerations such that all strands remain engaged, despite being moved from the foreground to the background depending on the particular tool or experience. The strength and beauty of the braiding process—in this case, in cultivating TCs' PCTM—depends on the MTE's commitment to acknowledging and maintaining tension with these four strands.

As three women of Color scholars who are acutely aware of our positionalities as we engage in political work, we offer this compass as a framework of considerations that rejects knowledge of how to prepare TCs' political knowledge (e.g., read, plan, do) and centers knowledge with our contexts, mirrors, and TCs. As three women of Color scholar activists, we must constantly explore and interrogate our stories and intersectional identities while always seeking to maintain tensions, as articulated through the braiding analogy. In our identity statements, each of us briefly explained our personal herstories (we use the word "herstories" to center our experiences as women), connections to, and tensions in this work. Additionally, we described our commitments to justice-oriented teaching that foregrounds antiracism. These commitments are our mirrors. And, in doing this work collaboratively, we are each other's mirrors. The examples that follow highlight the complexity of this type of work and how we, in our work, embrace and maintain tensions in the different strands.



**Figure 1.** Braiding. We honor the creativity, brilliance, and power that Monique “Mo Thunder” Bedard shares via their artwork. We presented an abstract of this paper to Mo and requested permission to use this image in our piece, as this image not only captures the concept of braiding but also Indigenous wisdom and stars, which are critical to the identity of our research team. Mo graciously accepted our request. We are honored to be in community with Mo and to share their artwork [39].

## 9. Examples from Our Work

Our tools, which focus on broader narratives around historically marginalized learners and teachers taking risks in an increasingly toxic social and political climate, made us highly conscious of our racialized and gendered identities. Because this work is inherently complex, and we construct knowledge with our TCs, you will notice several strands of the compass that emerged throughout our discussions. As we unpack our quotes, we support the reader in drawing connections by bracketing the relevant strands of the compass.

### 9.1. Gaining TC Buy-In

Each of us considered several factors when planning to use the tools. Kari often considered the whiteness of her institution (where she worked at the time of writing this article) in relation to her positionality as an Asian American woman. When she began her professorship there, she was the only faculty member of Color in teacher education, with all-white secondary math TCs and a few TCs of Color in her elementary mathematics methods class. Because white supremacy positions Asian Americans in proximity to whiteness, Kari felt that her TCs may perceive her as “less threatening” than if she were Black, Brown, or of another marginalized group of Color. Kari danced with and around whiteness, centering

the essential question, “What actions can I take as an antiracist/abolitionist teacher?” for her courses. Other times, Kari feared (white) backlash and therefore softened her pedagogical goals for the comfort of her (white) students. Rather than using terms like “backlash” or “risk-taking” when discussing advocating for students, Kari used “pushback” and “navigation of dilemmas”. In this dance, she privileged the strands of TCs’ identities and rehumanizing teacher education for them in negotiation with her Mirror Test.

Rochelle also grappled with when to foreground language about abolitionist teaching, Rehumanizing Mathematics, or creative insubordination. Rochelle’s students had already had her as the instructor of their social justice foundations course where politics were front and center, and they came from a range of backgrounds, not all intending to stay in education. But now, these students were mathematics majors in a methods course, obtaining licensure and a minor in education. In one of our meetings, Rochelle explained how she framed the work to her students:

“I will expose you to perspectives you haven’t had access to”. Our purpose as MTEs is not to present a list of teaching practices. There is no destination or prescribed way to get there. It’s more about, “Do you pass your Mirror Test? Are you doing the right thing for students? If not, what are you going to do about it? In our foundations classes, we learn about the difference between education and schooling. Are you educating, or are you schooling? What does that mean for the students you teach?” Our job as MTEs is like being a good parent is to put healthy food in front of our TCs, but we can’t force them to eat it.

As a Brown woman who has taught these students a course 1–2 years earlier where her activist politics were front and center [MTEs’ intersectional identities], Rochelle considered how her identity needed to be braided with her TCs’ identities, recognizing that they have already had exposure to some social justice ideas, but they may not have made explicit connections as mathematics majors [contextual considerations]. Rochelle drew upon language that softened the idea that she might be trying to “indoctrinate them”. By framing it as a Mirror Test and no destination, Rochelle was able to ask, “Are you educating, or are you schooling?”, which perhaps might feel less threatening. The strand brought forward is the identity of the TCs, though Rochelle’s intersectional identities and Mirror Test were also at play.

Marrielle taught a K-2 math methods course that focused on teaching mathematics for social justice, multilingual learners, and addition and subtraction problem types. Because of previous TC feedback and course evaluations indicating that some course activities “were not mathy enough” and that the professor was too focused on being a “social justice warrior”, Marrielle struggled with how to position herself and her commitment to developing PCTM. These concerns, coupled with preparing elementary TCs who sometimes think that K-5 classrooms are “sunshine and rainbows”, create unique challenges for conducting justice-oriented work in elementary grade bands. Marrielle described how she communicated her approach to TCs:

My approach seems to be more providing my TCs with food for thought, looking with different lenses. An offering. And while I recognize that my TCs will do what they want to do when they go into schools, I hope they will put these lenses (e.g., anti-racist teaching and advocacy) on and carry them with them. My former colleagues and grad school professors offered things for us that we didn’t know we needed and we realized we could have been doing things that were harmful. Even today, we (MTEs) continue to have dilemmas.

Marrielle is holding several strands of the compass in this excerpt. As a Black woman who has been previously accused by TCs of having an “agenda” [MTE intersectional identities], Marrielle, too, softened the language against indoctrination by noting that she will offer several lenses for TCs to consider throughout the semester. Second, Marrielle connected her experiences to the TCs’ experiences by indicating that we do not always know what we need as novices, and that she continues to face political dilemmas as a professor

that require the use of specialized knowledge and creative insubordination [Rehumanizing Mathematics teacher education and contextual considerations].

These examples highlight how the authors softened their desire to want TCs to “drink through a firehose” related to developing PCTM. While the sense of urgency is still there, these quotes highlight a balance between wanting to relate to students (e.g., we all face dilemmas) and wanting to honor TCs’ agency (e.g., we are providing choices but not forcing anyone), while also advancing elements of our teaching philosophies (e.g., Mirror Test and different lenses).

### 9.2. Considering Our Identities and Contexts in This Moment

The next excerpt is from a conversation where we were reflecting on engaging our TCs with How Would You Classify It? In planning for this tool, we each reviewed a set of scenarios that Rochelle used in previous iterations of this work. We used ten identical scenarios across our three sites, and we each created two additional scenarios unique to our grade levels and local contexts. The scenarios included Indigenous students, Black students, and students of Color viewed in deficit or harmful ways, such as teachers or administrators discounting their perspectives, their abilities in mathematics, or their funds of knowledge. In the conversation that follows, Rochelle initiated a conversation with our research team about the potential impact of our current climate on our work, saying:

Here’s my question...does doing these kinds of scenarios, and with everything else that’s going on with Black Lives Matter for example, is it making some of our students who wouldn’t normally be conscious of, the kind of role of this extra violence that’s happening when people have to relive these things? Or when people are being reminded of these things? Is there something about this moment, that’s also influencing how TCs are making sense of the scenarios, separate from just, how do pre-service teachers make sense of these scenarios? We have individual students (TCs) who’ve had those traumas.

Here, we see that Rochelle highlighted the world context [contextual considerations] and especially needing to care for her TCs of Color [rehumanizing for TCs] who might be triggered by the violence when reading the scenarios. Marrielle built on the notion that the current context may be causing more people to reflect on the moment and added:

Our students are also having to navigate their own positions at this moment. Some of them are trying to do that and think about “what is this going to mean, for me as a teacher, right, how do I handle this for myself? And how do I handle this as a teacher?” Whereas before, I don’t know that some students have even had to think about where they stand on some of these issues, right? Because...depending on who you’re friends with on social media...it’s pretty feasible that you really hadn’t heard of these social issues, but now...if you’re paying any level of attention to any news source...you don’t really have much of a choice. And, so I think, there is this level of just heightened awareness. I had a student say, “Can I ask something?” And he said, “I’m concerned that I’m a white male, and I know that I have privilege and haven’t experienced other things people have experienced”, and he said, “I’m scared, like, what if I get this wrong?... At first, I... didn’t necessarily see this as my role, right? Now I’m thinking, Okay, this is something I should be doing. But what if I messed it up?”

Marrielle continued to consider the impact of the context of “heightened awareness” around racial justice (e.g., Black Lives Matter movement), maintaining tension with the strand of [contextual considerations]. She then connected context with how TCs are navigating their positions as individuals and teachers and more broadly in society, thereby bringing forward the strand of [TCs’ intersectional identities]. Rochelle responded, saying:

What does it mean TCs to be in this moment, trying to figure things out, maybe for some of them feeling like they don’t want to mess up or get it wrong, in front of three women of Color who are running these activities, right?

In this excerpt, Rochelle reminded us of our original question of what it means to engage in political work in this moment [contextual considerations] and for TCs to be grappling with the notion of “doing this work the right way” [TCs’ intersectional identities], thus highlighting the tension between how TCs see themselves in this work at this time. Rochelle highlighted that the tensions TCs were feeling could have been exacerbated because they were navigating their identities in front of women professors of Color [MTEs’ intersectional identities], thus bringing the strand of our intersectional identities to the fore. This was important to note, given that most of the TCs we worked with across all three sites were white. Kari built on this notion of the whiteness of her teacher education program and what this means for her work with TCs and stated:

All of the TCs in my class are white. And my institution has this tendency to place them in all white schools. All of my TCs grew up in only white communities. And they have been very thoughtful around what is my role as a white educator? And I think the trickier thing is, what is their role as a white educator who works with white students? And so, I’ve included some readings around the Rethinking Ethnic Studies book so they’ve been thinking a lot about, how do I do social justice pedagogy or culturally relevant pedagogy with white students?... In terms of “messing up”...they don’t want to culturally appropriate [...] So we’ve been having similar conversations.

Because Kari’s TCs did not have foundations classes in their program, she supplemented her methods course with additional readings [contextual considerations]. While Marrielle and Rochelle were considering their social and political contexts, Kari’s use of contextual considerations highlights her attention to the whiteness of the space along with the structure of the teacher education program, which represents how her localized context became a dominant strand here. Like the white male TC in Marrielle’s class who noted he was scared to be “wrong”, Kari’s students were also worried about “messing up”, but they were more specific and used the language of cultural appropriation [TCs’ intersectional identities]. This distinction is important, as Kari’s TCs were able to name that phenomenon because of her commitment to preparing TCs to understand culture and privilege even in the absence of a foundations course [MTE Mirror Test]. Rochelle echoed this statement by noting that her TCs recognized the need to be careful when engaging in justice-oriented work, given that they did not come from the same cultures as their 6–12 students [TCs’ intersectional identities].

## 10. Implications

In the examples we presented above, we highlighted multiple dimensions of the Compass for Preparing Teacher Candidates with Political Conocimiento (See Table 1) and how various strands were foregrounded or backgrounded as we engaged in our work. Although the questions in each dimension are offered as a list in the compass (See Table 1), our examples dispel the notion of linearity and underscore the tensions that are raised and maintained as we braid these various strands together. For example, we encourage MTEs to consider the questions from the intersectional identities strand: “What are my intersectional identities?” and “What are my TCs’ intersectional identities? How do I know this, or how do I respectfully gather this information?” We also encourage MTEs to simultaneously consider questions from the Mirror Test strand, such as, “How do I make sure I am consistent with the principles I value and the communities with whom I hold myself accountable?” These questions from the compass, in addition to those in the other dimensions, aim to support MTEs’ work to consider multiple questions simultaneously, maintaining the tensions that hold the braided complexity of this work together.

We argue that attending to the questions in the compass is essential if MTEs are going to be prepared to develop mathematics TCs to engage in justice-oriented pedagogy by promoting equitable teaching, cultivating positive mathematical identities, drawing on students’ mathematical strengths, understanding power and privilege in the history of mathematics education, and enacting ethical practice for advocacy [8]. Gutiérrez asserts

that conocimiento, or political knowledge, is not objective or concrete [16]. Conocimiento is subjective, and each person has their own relationship, lens, or ways of knowing a construct. Conocimiento represents knowledge *with* students, schools, and communities. As such, we did not treat the tools, scenarios, or implementation as fixed. Instead, we treated each of the scenarios in their current form as entry points. We read, evaluated, and revised scenarios before using them to account for our intersectional identities, TCs' intersectional identities, how the scenarios allowed TCs to make assumptions or "read" them through their lenses, as well as individual contexts. We also considered how our intersectional identities and contexts influenced how we presented the tools, how we were perceived by our TCs, and what TCs felt "safe" to share during the activities.

If we do not think about and attend to all of the ways we are entangled within each other's lives as teacher educators, teacher candidates, and teachers, we miss the opportunity to co-construct new forms of knowledge that are appropriate for our contexts. Furthermore, without being intentional and maintaining tensions with the strands in the compass, MTEs (including ourselves) run the risk of implementing critical work in ways that uphold white supremacy and capitalism (e.g., preparing TCs to challenge explanations of gaps that occurred during remote learning but still citing "learning loss" as the problem) instead of preparing teachers to dismantle oppressive systems and advocate for students.

We urge MTEs to consider how we (as MTEs) change as we engage in our work. MTEs should expect to be challenged, grow, and change as much as they seek to foster growth and change with TCs. Here, we return to the braiding analogy to highlight that one way MTEs can engage in going deeper into themselves is to consider the four dimensions of the compass. We invite MTEs to consider if their justice-oriented work with TCs includes braiding. Moreover, we argue that it is critical for MTEs to consider which strands of the compass they may privilege, move to the background, or ignore as they are braiding and how this impacts their recreation of self and their Mirror Test as they engage with TCs. This process of change and transparency can be challenging, and we encourage the field to consider the emotional labor required to do this work [40], how we care for our healing and emotions as we engage [41,42], and that this process is integral to rehumanizing the research experience for MTEs and TCs.

## 11. Closing Considerations

We acknowledge and center tensions that emerge in our work. While we offer this compass for MTEs' work, we also encourage MTEs to consider the strengths, limitations, and implementation challenges of the compass in relation to their own intersectional identities and contexts. For example, we created and used this compass as a team of three women of Color scholar activists with different intersectional identities and varying contexts. In doing so, we were able to recognize how our unique contexts (e.g., grade level bands, foundations courses, structure of student teaching) influenced what we had conceived of as "normative" and offered up options for framing things differently from the view of other contexts, such as considering teaching in another country where there is less emphasis on teacher surveillance. But what happens if an individual MTE uses the compass? Are there other sources of community that could support dialogue and learning from others' perspectives? For example, might Facebook, Instagram, TikTok, or #MTBoS Twitter/X posts help individual MTEs recognize the perceived constraints of their locations and intersectional identities and understand how teachers in other countries might offer creative ways to navigate those constraints? Furthermore, how might MTEs with additional intersectional identities (e.g., gender expression, sexual orientation, language, ethnicity or race, social class, caste, religion, immigration status, or living with a dis/ability, etc.) find value or drawbacks in the compass? Additionally, are there certain strands of the compass that MTEs should consider first (e.g., a scaffolded approach) as they engage in this work? The compass should be used and studied to understand other relevant dimensions of intersectional identities and global contexts more fully as MTEs and TCs work to collectively develop PCTM. By utilizing the compass and braiding (while maintaining tensions in the

strands), we position the field to move forward by co-creating new knowledge around how MTEs' intersectional identities and contexts manifest in developing TCs' PCTM.

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