

Talking About Race in Mathematics Teacher Education: An Analysis of Online Community Dialogues

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Abstract

This study reports on a race-focused case designed for use in online mathematics methods courses to encourage preservice teachers to talk about race, including the racial injustice observed in an authentic mathematics classroom situation and how a teacher might respond. Using the theoretical lens of Racial Noticing alongside the 8S Framework for Race Talk, findings indicate that preservice teachers, when prompted with the case, were able to recognize racial phenomena and identify both verbal and practice-based responses they would make as the teacher. Navigating online community dialogues also presented unique benefits and tensions in how to engage in conversations about racial noticing competencies. We argue that preservice teachers must be prepared to notice racial phenomena and develop skills for responding and that mathematics methods courses, regardless of the in-person, online, or hybrid setting, need to provide intentional activities that call attention to race and racism in mathematics classrooms.

Keywords: Mathematics teacher education, race, technology

Talking about race can be messy, emotional, and uncomfortable. The context in which race is discussed also adds another layer of complexity. Mathematics teacher educators (MTEs) must not feel reluctant to raise topics of race and racism in methods courses when preparing preservice teachers (PTs) for their classrooms. Research suggests that PTs who engage in such conversations begin to critically reflect on issues of race, including their own racial identities and ideologies in mathematics education, and use racial noticings to examine the lived experiences of students of color (Martin et al., 2017; Shah & Coles, 2020). Furthermore, PTs can use conversations about race and educational inequities to challenge oppression and create equitable

practices in the mathematics classroom (Association of Mathematics Teacher Educators, 2017; National Council of Teachers of Mathematics, 2020)

MTEs can provide opportunities for PTs to talk about race using case-based instruction, a pedagogical approach where real-life situations can be analyzed to bridge theory into practice (Gorski & Pothini, 2018). Particular emphasis on race-focused cases can be used to prompt discussions that explore race and racial injustice in the mathematics classroom (Gonzalez & Moldavan, 2021; Kavanagh, 2020; Moldavan & Franks, 2021). Due to COVID-19, the context of these discussions has had to evolve in response to remote learning spaces. Where one could once engage in conversations about race in person, many MTEs and PTs have had to rethink how they facilitate and participate in such conversations through digital platforms (e.g., asynchronous modules, discussion boards).

This study reports on how two MTEs designed a race-focused case for use in online mathematics methods courses to encourage PTs to discuss racial phenomena within a mathematics classroom situation. We use the theoretical lens of Racial Noticing (Shah & Coles, 2020) alongside the 8S Framework for Race Talk (Murray-Johnson, 2019) to examine the following research questions:

1. How do PTs talk about race using case-based instruction in mathematics methods courses?
2. What are the benefits and tensions experienced by PTs and MTEs engaged in online community dialogues addressing race-related issues?

We argue that PTs must be prepared to recognize and respond to racial phenomena in mathematics classrooms and that mathematics methods courses, regardless of the in-person, online, or hybrid setting, need to provide opportunities to do this work.

Literature Review

To conceptualize race in the mathematics classroom, one must first see race as socially constructed in institutional and structural forces that impact oneself and how one learns (Larnell et al., 2016; Ridgeway & McGee, 2018). Understanding that classrooms are highly racialized spaces evokes awareness of the influence such learning spaces have on the development of students' mathematical identities and how these identities are co-constructed with students' racial identities (Martin, 2006). MTEs can help PTs learn about the sociopolitical and sociohistorical contexts that have positioned racial groups in a hierarchy of mathematical abilities, beliefs, and opportunities (Martin, 2009). When PTs are able to notice the racialized nature of such a hierarchy, they can begin to examine the systemic inequities experienced by students of color and explore counterstories that dismiss rather than reinforce deficit-oriented ideologies.

For PTs to notice race and conceptualize racialized inequities within the context of mathematics learning, MTEs must assist PTs in developing their racial noticing competencies. We define racial noticing competencies as the skills and dispositions needed to notice and analyze racial phenomena for purposes of confronting racism in oneself and one's environment. Analyzing equity issues in mathematics classrooms is well-rooted in teacher noticing research (see Hand, 2012; Louie, 2018; Wager, 2014). However, pedagogy targeting race-focused noticing that can support PTs' development of racial noticing competencies is limited.

Case-based instruction is frequently used in teacher education to inform professional practice and develop competencies by positioning PTs in authentic classroom situations for collaborative discussion and reflection (Decker & Pazey, 2017; Heitzmann, 2008). For instance, Safford and Bales (2011) examined teacher educators during introductory teaching courses who

used case-based instruction to help PTs examine their beliefs about children who do not look like themselves. The teacher educators reported that through case-based instruction, their PTs developed an increased awareness of the complexities in teachers' pedagogical decisions. Findings from Safford and Bales' (2011) study, as well as others, provide insight into the benefits of case-based instruction to target reflection on, for example, beliefs and assumptions about marginalized groups of students.

A major factor that must be considered in facilitating case-based instruction is the context in which it occurs. In response to COVID-19, MTEs were forced to rethink their instructional strategies in online settings (Moldavan, 2021). The use of asynchronous and synchronous remote learning required innovation to "replicate" PTs' in-person experiences. For asynchronous remote learning, many MTEs turned to modules and discussion boards to initiate conversations and reflection. While there are benefits to using discussion boards, like flexibility in making contributions and opportunity for deeper exploration of topics (Aloni & Harrington, 2018), there are also challenges, such as low participation (Caspi et al., 2006) and feelings of "digital" anxiety (Abdous, 2019). Possible solutions to these challenges include leveraging online spaces to consider different perspectives, set clear expectations, and increase guided feedback (Bliss & Lawrence, 2009). Detailed directions and prompts can be used to guide participation in online community dialogues. Additionally, instructors can influence participation through strategic monitoring to encourage reflection (Gasell et al., 2021). When MTEs are aware of the benefits and tensions from engaging in race talk in online contexts, they can prepare strategies to

facilitate and support student learning and participation.

Theoretical Framework

Informing race-related educational research through a lens of critical theories of race allows for issues of race and racism to be critiqued to understand school inequity (Ladson-Billings & Tate, 1995). Such theories can serve as theoretically grounded approaches for researchers to explore areas of racial inequities by examining the experienced discrimination of people of color, eradicating racial subjugation, and telling counterstories that undermine deficit narratives (Creswell & Poth, 2018). Research that builds on these theories recognizes that race is a contrived system for categorizing people based on observable physical traits and that there is a need to allow marginalized voices to contribute knowledge based on their experiences with racism (Bryant et al., 2015; Jett, 2012). There is also awareness of the intersectionality of various oppressions (e.g., gender, sexual orientation, language) that contributes to the dynamics of exclusion (Carter & Vavrus, 2018). In this study, we reference the theoretical lens of Racial Noticing (Shah & Coles, 2020) alongside the 8S Framework for Race Talk (Murray-Johnson, 2019) to understand the racial experiences of students who have been marginalized in the mathematics classroom and assist PTs in uncovering racial biases to inform their professional practice.

Racial Noticing

Teacher noticing is an established framework that refers to how teachers attend to and interpret ongoing information presented during instruction and then respond to that information through intentional planning (Sherin et al., 2011). Shah and Coles (2020) extend teacher noticing through the lens of Racial Noticing to attend to the various ways in which teachers perceive,

make sense of, and react to moments where race and racism occur during instruction. For the purpose of this study, we focus on the interpreting and responding components of the framework.

Shah and Coles (2020) specify three types of racial interpretations in their framework. First, deficit/dismissive interpretations ignore or downplay the significance of racial phenomena. This may look like PTs attributing racial phenomena to something other than race or talking around race without specifically calling out racism. The second interpretation is recognizing indexed racial narratives, which includes identifying the racial narrative and making links between such narratives across multiple racial groups. The last interpretation addresses understanding the implications for racially minoritized students. These implications may include the suffering and disengagement of racially minoritized students and their reduced access to learning opportunities in the classroom.

While a teacher's awareness of racial phenomena is important, it is insufficient if there is no follow-up response. Racial Noticing also attends to teachers' verbal and practice-based responses. Verbal responses can either be public by means of whole class conversations or private with one-on-one conversations that are designed to challenge or undermine racist narratives. Practice-based responses are those that modify the classroom environment or teaching practices to positively impact racially minoritized students in the classroom.

8S Framework for Race Talk

Student resistance and instructor tensions can impede potentially rich conversations related to racial noticing that are essential for developing racial literacy, cross-cultural understanding, and learning experiences concerning racial injustice (Sue, 2013). The 8S Framework for Race Talk (Murray-Johnson, 2019) was developed as a tool for use before, during, and after classroom dialogues that evoke race-related discourse, such as discourse related

to racial noticings (Shah & Coles, 2020). It encompasses eight elements that work in tandem: self-awareness, sensitivity, sanctuary, solid relationships, speech, separation, shedding, and sacrifice. Self-awareness is knowing oneself in the context of the discourse and committing to continual reflection while maintaining sensitivity to others' needs. Sanctuary is the safe space in which individuals can communicate their ideas (speech) to be affirmed or respectfully challenged. To do this work, solid relationships that are diverse and intersectional can aid individuals in learning more about themselves and the world around them. Separation is the realization that some people may make stronger connections to the dialogue than others and that personal perspectives may have limitations. Shedding addresses the intentional decision to unlearn previously held beliefs that may impede race talk. The last element, sacrifice, involves the risk of being uncomfortable to engage in the needed conversations. This framework is used in this study to not only guide student reflection and strengthen instructors' facilitation of difficult conversations but also to inform the benefits and tensions of race-focused online community dialogues.

Research Methods

We conducted a qualitative case study (Yin, 2014) that consisted of four online mathematics methods courses at two universities during the Fall 2020 semester. The bounded case provided insights into how PTs at varying settings preparing to teach at various grade levels talk about race, thereby highlighting the benefits and tensions of online community dialogues exploring racial phenomena within a case. Moldavan taught two of the online mathematics methods courses, one focused on elementary PTs and the other focused on secondary PTs, at a university situated in an urban setting in the Northeast United States. Each course was offered online with asynchronous and synchronous components. Gonzalez taught the other two

asynchronous online elementary mathematics methods courses at a rural university in the Southeast United States. Of the PTs enrolled across the courses, a total of 80 PTs participated in the study, 32 PTs from the urban setting and 48 PTs from the rural setting. Most of the PTs self-reported as female, White, and seeking elementary certification (see Table 1). Moldavan and Gonzalez, the MTEs, identify as females from ethnically diverse families, and the other researcher, Kaufman, identifies as a White female.

Table 1

Characteristics of Preservice Teachers

Characteristics	n	%
Gender		
Female	71	88.75
Male	9	11.25
Race/Ethnicity		
Asian	3	3.75
Black	13	16.25
Hispanic/Latinx	10	12.50
White	54	67.50
Area of Focus		
Elementary	73	91.25
Secondary	7	8.75

Note. N=80; PTs self-reported their data.

Data Collection

This study utilized a written case since racial phenomena are less frequently captured on video (Shah & Coles, 2020). This case, *A Seat at the Table* (Appendix A), provided a

concentrated focus on racial injustice that occurred within a mathematics classroom interaction between students. In this case, it is the first day of school and the mathematics teacher wants to begin with a collaborative mathematics task. The students are randomly assigned to small groups, but Dominique is excluded by her group. Susan (a White girl) in the group says that she needs to stay away from people like Dominique (a Black girl). This case leverages noticings of Dominique's outward appearance of race and how one's racial background could deny access to a collaborative group activity, explained by Featherstone and colleagues' (2011) as status interactions within groups. The case's open-ended nature and prompt-based discussions elicited opportunities for PTs to examine how racial injustice finds its way into the mathematics classroom and the role of the teacher within the situation to ensure all students can participate in mathematics learning.

Given the online settings of the mathematics methods courses, the case was facilitated using a discussion board to generate an online community dialogue. All PTs were asked to read the case and post their initial response to the prompts on the discussion board by a specified due date. Following the due date, PTs were asked to respond to at least two peers' initial posts and reply to peers who responded to their own posts by another deadline. Moldavan followed up with a synchronous debrief with her whole class.

The data for this study includes all PTs' posts on the discussion board, the PTs' reflections shared during the synchronous debrief, and the emails that were sent to the MTEs regarding this case. We also analyzed the MTEs' reflections on the implementation of the case and their reactions to the PTs' posts and emails.

Data Analysis

We looked for specific evidence of Racial Noticing (Shah & Coles, 2020) within the PTs' discussion board posts. To inform the first research question, we noted two themes that pertained to recognizing racial phenomena and the teacher's response. The MTEs individually coded the discussion board posts using descriptive and in vivo coding techniques to maintain the PTs' language (Saldaña, 2016). Similarly coded data were grouped together into categories by shared characteristics. We came to a consensus on the responses that were difficult to place within the original categories to establish inter-rater reliability. Then, we conducted a second cycle of coding with Kaufman to confirm the appropriateness of the categories and themes to ensure the trustworthiness and validity of the findings (Grbich, 2013; Saldaña, 2016). Table 2 shows the codes, categories, and themes used.

Table 2

Codes from Preservice Teachers' Discussion Board Posts

Themes	Recognizing and Interpreting Racism in the Mathematics Classroom		Teachers' Roles in Taking Action	
Categories	Racial Exclusion	Social Exclusion	Verbal Responses	Practice-Based Responses
Codes	People of color	Different	Private	Broadening Representation
	Color of skin	Absence of race	Dominique	Books
	Black		Susan	History
	White		Pull aside	Posters
			Private	Building Relationships
			Public	Norms/rules
			Environment	Get to know each other
			Class	Showing respect
			Lesson	Teamwork

For the second research question, the reflections from both PTs and MTEs were systematically evaluated using the 8S Framework for Race Talk (Murray-Johnson, 2019). We individually and then collectively looked for evidence of the eight elements. Memos were made throughout the individual analysis and then discussed during collaborative analysis among all authors. We interpreted those memos using Kvale's (1996) meaning-making methods to capture the shared perspectives across the PTs and MTEs.

Findings

The findings are reported in response to the two research questions. First, we examine how PTs talk about race using case-based instruction in mathematics methods courses. Then, we assess the benefits and tensions experienced by PTs and MTEs engaged in online community dialogues addressing race-related issues.

Preservice Teachers' Racial Noticing

Using Shah and Coles' (2020) framework, the PTs' online community dialogues about the racial phenomena presented in the race-focused case were categorized into two themes. The first theme addressed how the PTs recognized and interpreted the racial phenomena within the case, and the second theme noted how the PTs would respond if they were the teacher.

Recognizing and Interpreting Racism in the Mathematics Classroom

After reviewing the race-focused case, the PTs responded to prompts about their racial noticing competencies. Specifically, the PTs were asked why Susan might exclude Dominique from the small group to see how they would recognize the racial exclusion or dismiss it as social exclusion.

Racial Exclusion. Most of the PTs (n=73; 91.25%) explicitly identified the racial phenomena within the case. An example of one PT's response is, "Susan obviously made a

prejudiced statement about Dominique based on the color of her skin.” Some PTs also demonstrated an understanding of the implications of this racial exclusion by stating, for example, “Susan has pushed false and negative stereotypes towards people of color, hurting Dominique in the process.” The impact on Dominique is essential to recognize since racial discrimination against Black females is related to negative psychological outcomes (Chavous et al., 2008).

Social Exclusion. Only 7 PTs (8.75%) described the social exclusion of Dominique without an explicit mention of race, thus ignoring or downplaying the significance of the racial phenomena. One PT wrote, “Susan would say those things because of what she has been taught by her parents or by what she has been falsely informed of through the media.” This example could be interpreted as referencing the racial phenomena related to the unjust killing of Black people covered in news outlets. However, this PT did not explicitly call out the racism that occurred. Another PT described their frustration with the case by writing, “Why can’t you just present a scenario of: How would you reply to a student being excluded for being perceived as different in some way?” This PT stated the case was “offensive” and “agenda pushing” and that it should not mention race at all.

Teachers’ Roles in Taking Action

Most of the PTs did recognize and call out the racial phenomena addressed within this case. Shah and Coles (2020) state that “awareness is important but insufficient” (p. 586) and that teacher education should also help PTs develop tools and approaches for diminishing racial inequity within their future classrooms. The PTs were asked about what they would do if they were the teacher and how they would build a safe mathematics classroom environment. Their responses were categorized into two groups: verbal and practice-based responses.

Verbal Responses. Verbal responses refer to the teacher's immediate intervention once the racial phenomena were recognized either through private conversations or through a public discussion with the whole class. There were 55 PTs (68.75%) who wrote that the teacher should pull Dominique and Susan aside for a private conversation. Pulling Dominique aside was mentioned to prevent her from further embarrassment or to reassure her that the statements Susan made were false. These explanations addressed protecting Dominique and making her feel "safe and like [her] physical and emotional needs will be taken care of in the classroom." The rationale for pulling Susan aside for a conversation ranged from providing "consequences for Susan's behavior" to providing Susan with an explanation for how her actions and words could hurt others. Of those 55 PTs who described the need for a private conversation with Susan, 18 (32.73%) PTs also stated that they would ask Susan to "apologize" to Dominique.

On the other hand, 7 PTs (8.75%) wrote that there should be an immediate conversation with the whole class to de-escalate the situation by "shutting down what Susan said" since the class was "a witness to the event." One PT wrote, "It is important to let your class know from day one that this type of behavior is unacceptable." Setting up classroom norms and expectations for how students should interact with one another is a way to equalize the effects of status within the classroom (Featherstone et al., 2011). There were also 18 PTs (22.5%) who described using a combination of both public and private verbal responses that started with public declarations shutting down the behavior followed by private conversations with Dominique and Susan.

Practice-Based Responses. Practice-based responses are those that "focus on modifying teaching practices or changing structures that comprise learning environments" (Shah & Coles, 2020, p. 587). Specifically, the PTs focused on broadening diverse representation within the classroom or building relationships among students through purposeful interactions. Broadening

representation of diverse groups of people accounted for 5% (n=4) of the PTs' responses and included ideas like "hanging diversity posters on the wall," reading "diverse children's books," and talking about "history as a whole instead of just White history." Most of the PTs (n=62; 77.5%) described structures for establishing classroom norms for students to "show respect" to one another and "get to know each other." Overall, there were 14 PTs (17.5%) who described a combination of both broadening representation while also setting expectations for student interactions. Although these responses focused on norms for how students should interact with each other, they lacked consideration for how students should participate in mathematics learning during collaborative group work (Featherstone et al., 2011). They also lacked an understanding of the sociopolitical and sociohistorical contexts that positioned racial groups in a hierarchy of mathematical abilities, beliefs, and opportunities (Martin, 2009).

Online Community Racial Dialogue

The 8S Framework for Race Talk (Murray-Johnson, 2019) was used to identify the benefits and tensions experienced by PTs and MTEs during the online community dialogues of the racial phenomena within a case. The following details the nature of self-reflecting as well as sharing and interpreting race-focused responses in an online format.

Benefits

The PTs and MTEs experienced benefits of using online discussion boards to actively talk about race and racial injustice. PTs shared how they had the opportunity to deeply reflect on what they planned to communicate in response to the prompts. The PTs could write a response and revise it before it was reviewed by both their peers and the instructor. This extra time to process a response demonstrated the element of sanctuary (Murray-Johnson, 2019) because it offered critical reflection in a self-paced space that was more comfortable than having to

communicate thoughts in real-time, particularly about a topic that elicits strong emotions within themselves and others.

Similarly, the MTEs noted that the online format encouraged participation from every PT without the worry of negotiating in-person time constraints and participation structures (sanctuary). As one MTE noted, “There is no place to hide, which helps mitigate feelings of being silenced or urges to take a backseat because others will dominate the conversation.” As with any conversation, there are participants who talk more and those who listen more. Balancing the element of speech (Murray-Johnson, 2019) encourages diverse perspectives and reflection on others’ responses. As PTs considered new perspectives, MTEs encouraged them to revise and elaborate on their thinking (shedding) to develop new understandings of racialized experiences in mathematics classrooms. Thus, online community dialogues provided PTs with opportunities to engage in the elements of sanctuary and shedding, all while the MTEs balanced the element of speech within the group.

Tensions

There also arose tensions in these online racial dialogues. One tension witnessed was the miscommunication between group members in online settings, particularly related to the elements of speech and solid relationships (Murray-Johnson, 2019). Since the PTs never had in-person opportunities to build trust and solid relationships among each other and with the instructor, some PTs expressed feelings of unease sharing their perspectives about race. One PT emailed the MTE to say, “It was uncomfortable for me to answer that question and begin to justify words or thought patterns of that sort without parameters.” Another PT felt as though their post was misinterpreted by their peers, which demonstrates what Abdous (2019) describes as “digital anxiety.” When the instructor shared that the participant’s post upset a classmate, they

responded, “I don’t make things personal internally. I simply make my point and people can interpret or respond to it any way they want. If I had a MAJOR issue with something I would address it with you.”

The asynchronous nature of the conversation meant PTs posted their responses to peers on their own time. While the flexibility can be beneficial (Aloni & Harrington, 2018), it can also be difficult for MTEs to cultivate and maintain sanctuary and intervene in a timely manner when needed so that the perspectives of PTs of color are considered. As one MTE noted,

When teaching online, I need to give up some of the control of the conversation and know that argumentation might take place among the PTs. I know PTs can benefit from the argumentation, but I feel as though I have to continuously check the conversation to ensure it is productive and inclusive.

The MTEs also noted the need to clearly state the intentions of the activity and provide more relationship building opportunities before beginning such conversations in the future.

Discussion and Implications

Online community dialogues about race are possible using case-based instruction. Furthermore, these conversations are crucial in helping PTs recognize how race operates in the mathematics classroom and the important role a teacher plays in responding to those situations. Most of the PTs in this study did recognize and explicitly call out the racial phenomena within the case, but recognition is not solely sufficient in helping PTs develop tools for responding to those situations (Shah & Coles, 2020). Prompt-based discussions and peer feedback can guide reflections on racial noticing competencies and how to respond.

This study helped us recognize that our PTs need to continue to develop strategies for responding to racial phenomena so they can implement verbal and practice-based responses that

challenge deficit views of students who have been marginalized in the mathematics classroom. We argue that MTEs must be intentional in centering issues of race at the forefront of mathematics methods courses, even when those courses may be online. Both a race-focused case and knowledge of the 8S Framework for Race Talk (Murray-Johnson, 2019) can serve as stepping-stones to get PTs talking about race and its implications for students' mathematics-related learning and identities. Nevertheless, we acknowledge that case-based instruction is one of many tools to do this work, and race-focused dialogues should be sustained throughout teacher education programs. We encourage future research that extends beyond methods courses to explore how PTs respond to racial situations during field experiences and examine what MTE support is needed in these new contexts. Mathematics teacher education must help PTs notice racial phenomena so they can not only develop skills to respond to race and racism in the mathematics classroom but also advocate for antiracist pedagogy.

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Appendix A

A Seat at the Table

On the first day of school, Ms. Taylor wants to build a classroom community with her students, so she randomly assigns their seats to work in small groups on a mathematics task. As the students enter the classroom, she notices that Dominique, a Black girl, has not sat down and looks upset. Ms. Taylor walks over to the group of girls, who are all White except for Dominique, and asks them why Dominique is not joining the group. Susan, one of the girls in the group, says, “We don’t want someone like her at our table.” Ms. Taylor responds, “What do you mean?” Then Susan says, “My parents said that I need to stay away from people like her.”

Discussion Board Prompts

1. Susan states that she does not want to work with Dominique. Why do you think Susan would exclude Dominique from the group? What has happened outside of the mathematics classroom that may have influenced that perspective?
2. How would Susan’s words affect Dominique’s experiences on her first day of school? How would it impact her mathematics identity and learning?
3. What impact could a teacher’s response have in a situation like this? What could Ms. Taylor say to Susan and Dominique?
4. What would you do in this situation to build a safe mathematics classroom community for every student in your class?