CRITICALLY ANALYZING AND SUPPORTING DIFFICULT SITUATIONS (CARDS): A TOOL TO SUPPORT EQUITY COMMITMENTS

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Mathematics educators sometimes have trouble enacting equity-based pedagogy. Part of this is due to the lack of authentic opportunities to engage in analyzing difficult scenarios involving power, identity, and access. Additionally, mathematics educators sometimes have trouble finding, sharing, and collaborating on activities and materials that interrogate these spaces. In this research report, we present how a collective of equity-oriented mathematics educators created, enacted, and studied the use of scenarios presenting difficult situations to pre- and in-service mathematics teachers. More importantly, this report shows how we, as a field of mathematics educators, can enact large-scale collaboration that disrupts the capitalistic norms of knowledge ownership and neoliberal approaches to teacher preparation. The CARDS tool was not created by an individual, but by an amorphous group aligned and committed to equity.

Keywords: Social Justice, Teacher Education – Preservice, Teacher Education – Inservice / Professional Development, Teaching Tools and Resources

The 2020 PME-NA conference theme, *Across Cultures,* promotes the exchange of ideas and collaborations across cultures in addition to thinking beyond traditional forms of educational research. This research report introduces a curricular tool, whose design, implementation and subsequent research of, directly aligns with this *Across Cultures* theme. The Critically Analyzing and Responding to Difficult Situations (CARDS) tool promotes dialogue across the many cultures and stakeholders involved in dismantling inequities embedded within mathematics education. The CARDS, intended to support each of us in rehearsing and preparing for difficult conversations associated with equity issues, aligns with the perspectives of the PME-NA Equity Statement (2019). Additionally, this research report is not just about presenting the CARDS tool, but about sharing and analyzing the process in which the CARDS were refined over several years by a collective of critical mathematics educators across institutions, generations, and geographies.

The MathEdCollective is a loosely organized and open membership group organized in the Fall of 2017 in response to attacks on mathematics educator Dr. Rochelle Gutiérrez by white supremist media (Gutiérrez 2017b, 2018). The CARDS were designed to help pre-service teachers, in-service teachers, and teacher educators develop and promote critical perspectives of mathematics as sociopolitical (Gutiérrez, 2010/2013). The CARDS ask users to image or enact difficult scenarios and practice potential responses, largely based upon Gutiérrez's (2015) "In My Shoes" activities and Crockett's (2008) case studies for mathematics educators to contemplate the intersection of culture and mathematics teaching.

Enterprise

The MathEdCollective

When mathematics education scholar Dr. Rochelle Gutiérrez (2017b, 2018) was attacked for her scholarship, white supremacist attacks on equity and justice work in mathematics education in the

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U.S. rose to a previously unseen level of vitriol. Professional and personal attacks crossed every imaginable boundary, causing colleagues to maintain open lines of communication via email and weekly video calls to organize, provide solidarity, and support to Gutiérrez and other scholars who might be the next to come under attack. As a result, the MathEdCollective was formed to organize and exhibit solidarity with U.S. mathematics educators and organizations under attack. Quickly, the MathEdCollective defined its collective principles based on used various sources of inspiration, including U.S. Civil Rights Era activism, works by Paulo Freire and bell hooks, and the hacker-activist group Anonymous (The MathEdCollective, 2019). As the group grew in number and increased its activities, a series of implicit organizing principles began to evolve.

The MathEdCollective (2019) practices (1) shared ownership of ideas, which creates a community that can shield individuals from further harm by "anonymizing" their ideas through the MathEdCollective's voice, (2) heterarchical and open membership, which means that it is without hierarchy, "leaders", "representatives", defined membership, or email list, (3) collective action, meaning no decisions or action by the MathEdCollective reflect individuals but reflect the consensus of the moment with whoever happens to be participating at the time, and (4) taking the high road, transforming negative hate and energy into something positive and productive.

The CARDS Emerge

The previously mentioned attacks on mathematics educators and researchers underscore an ideological war present within our field, making necessary the need for preparing teachers to engage in these difficult and critical conversations. During one call with several mathematics educators and graduate students, the MathEdCollective discussed the importance of the reactive work of the collective which provided support and trauma aftercare to those attacked. But we also recognized that being reactive was not enough, we needed to move toward a more proactive, educative approach. One member of the collective suggested using a set of playing cards that could be used to help a person rehearse for difficult situations. Essentially, the idea involved supporting a broad range of stakeholders in mathematics education through helping them be ready to respond to difficult conversations by practicing in advance using real-life scenarios and simulations of politically dangerous interactions that might emerge within the work of teaching (Crockett, 2008; Kazemi et al., 2016).

Teaching rehearsals are a simulation of conversations, interactions, situations, and/or relationships that might emerge during the work of teaching (Kazemi et al., 2016). By engaging in and practicing these rehearsals, teachers can improve "routine and improvisational decisions in practice" (p. 18). Therefore, the CARDS describe scenarios rooted in the social, historical, and institutional contexts related to the work of mathematics teaching. These scenarios, similar to and inspired by "In My Shoes" activities (Gutiérrez, 2015), provide opportunities to rehearse such conversations as a means for developing preservice teachers' sociopolitical toolbox. Like the "In My Shoes" activities, the CARDS aim to develop "nuanced perspectives on situations" and to consider multiple options or a "repertoire of moves that can be used and the kind of language that would accompany those moves in challenging situations" (pp. 22–23) for mathematics educators of all levels of experience.

The CARDS reflect not only a commitment to collective enterprise and shared intellectual ownership, but also to emergent design research (Tom, 1996). All persons who were involved with the ideation, refinement, and conversation around the CARDS are recognized as equal participants in the design, feedback, piloting, and intellectual development of this work. The mathematics teacher educators, the teachers we worked with, the various members of professional organizations who attended conference sessions or engaged in conversations related to the CARDS, and the MathEdCollective are collectively always "gathering" and "generating" data and knowledge in the form of anecdotes, videos, and feedback. This collective participatory design research method (Bang & Vossoughi, 2016) means that all participants helped guide the research questions, the research

design, and even the interpretation of the data. Additionally, the development of the CARDS reflects the anti-hierarchical organizing principles of the MathEdCollective that disrupts colonial ways of defining people, land, and ideas as things to be owned, taken, and sold (MathEdCollective, 2019; Patel, 2016).

Development of the CARDS

The development of the CARDS started with solicitation and creation of scenarios based upon conversation within the MathEdCollective calls. This led to the idea of engaging in mathematics teacher education that was proactive in helping mathematics teachers be prepared for difficult conversations in their careers. We briefly describe the three cycles of development of the CARDS here.

This first cycle of the CARDS development consisted of soliciting and creating scenarios and possible responses to the scenarios, sharing those scenarios and responses with the MathEdCollective, and then creating a public, online space in which various individuals could add comments or questions about the scenarios and responses. The scenarios and responses were formatted to be able to be printed as physical cards that are approximately four inches by four inches each. The CARDS and pilot data based on small enactments within our mathematics methods courses were shared at the Association of Mathematics Teacher Educators (AMTE) conference in 2019. After that presentation, several members of the MathEdCollective immediately used these cards in their own teaching and reported back about issues they encountered through emails to the CARDS development team or directly on the CARDS google document itself.

Once a set of pilot cards had been developed, using the process and resulting in the materials as described above, we set forth on a second cycle to implement and, this time more intentionally, study the sorts of learning that the CARDS seemed to support. We decided to each use the cards in ways that made sense in our particular mathematics teacher education contexts: some of us work with pre-service teachers, some with in-service teachers; some of us with work with elementary teachers, some with middle or high school mathematics teachers. Some of us were most interested in using the CARDS as an in-class activity, others assigned them as outside-of-class work to be completed individually; some incorporated them with reflective writing, others used them as prompts for discussion, and others had teachers interact with the cards over innovative, virtual spaces for communication. Some of us were additionally interested in having a graduate student or a "more junior" mathematics teacher educator lead others in the use of the cards, so that we could study how the cards were taken-up and implemented by a mathematics teacher educator who was NOT involved in their development.

The second cycle involved refining and printing out eight physical cards for distribution to the MathEdCollective for use in their practice. The authors used these cards in their own mathematics methods courses in various ways. The authors then came together to engage in constant comparative analysis (Dye et al., 2000) through reading transcripts, listening to audio interviews, and watching video responses that the pre-service teachers generated when encountering the scenarios to create a list of themes. We then engaged in conversation to collapse these themes to those that seemed most important, and then re-analyzed specific points of data with this collapsed list of themes in mind.

A third cycle followed, involving the creation and solicitation of eight additional scenarios and then sharing them in three more situations: the 2020 AMTE conference, an elementary mathematics methods course with 25 pre-service teachers, and a professional development course with 20 practicing elementary teachers and assistant teachers in a public elementary school.

Through these cycles of analysis, multiple questions arose, such as: How are people using these cards? How do people respond to the cards? How are the enactments mitigating the historical violence that might be triggered through some of these scenarios? What are potentially dangerous

assumptions that we and the MathEdCollective have made in the creation and implementation of these scenarios? While we collected a large amount of data that can be analyzed in multiple ways, we focus this paper on unpacking the critical conversations that the authorship team engaged in after these three cycles. We feel this analysis best serves the goal of the PMENA conference, engaging in our own difficult conversations about and across cultures.

These various solicitation and collaborative cycles informed the design and content of the cards in several ways. We regard everyone who has been engaged with the CARDS as co-authors/designers. These individuals provided feedback on current scenarios and responses and made suggestions for new scenarios, things to consider, example responses, and resources. In addition, the co-authors/designers offered suggestions for a user guide. These suggestions were often a result of their own local contexts and connected to their own experiences, allowing the CARDS to involve scenarios that moved across cultures. These interactions and reflections provided valuable data on how the CARDS were taken up, both in their purpose and structure. Co-authors/designers also provided key reminders of how critical tools such as the CARDS could potentially cause harm, discomfort, or trauma for people using the cards. The feedback also included ways to think carefully about various audiences, how to scaffold the CARDS, and the necessary pre-work in building a community of trust.

Design of the CARDS

The CARDS are the result of an on-going collaborative effort involving a broad community of mathematics teacher educators, teachers, coaches, pre-service students, etc. Many voices contributed to the content and design considerations of the evolving tool. The CARDS (see Figure 1) were designed to be a tool intended to both 1) serve as a catalyst to open up dialogue between us about a variety of situations related to equity in mathematics teaching/education; and 2) support the development of our preparedness to engage in difficult conversations with others.

The front of each CARD includes a short scenario related to a topic in mathematics education. The scenarios are deliberately short, often with a variety of details omitted. This is purposeful. The vagueness of some of the scenarios provide an opportunity for further conversations and things to consider. Below the scenario, a list of "Things to Consider" are included. These are meant to be used to help the user think about external issues that might impact one's response to the scenario.

The back of the CARD includes a range of possible responses as well as a list of resources that may support the topic or issue raised in the scenario. The possible responses are NOT intended to be used as actual statements to be used as response to but rather to further open up conversations among us as we engage with the CARD. The range of possible responses also aims to further promote dialogue about the topic and how the response contributes to a productive conversation or not. For example, some provided responses could be taken up as inviting others into a conversation versus some that intentionally shut people out.

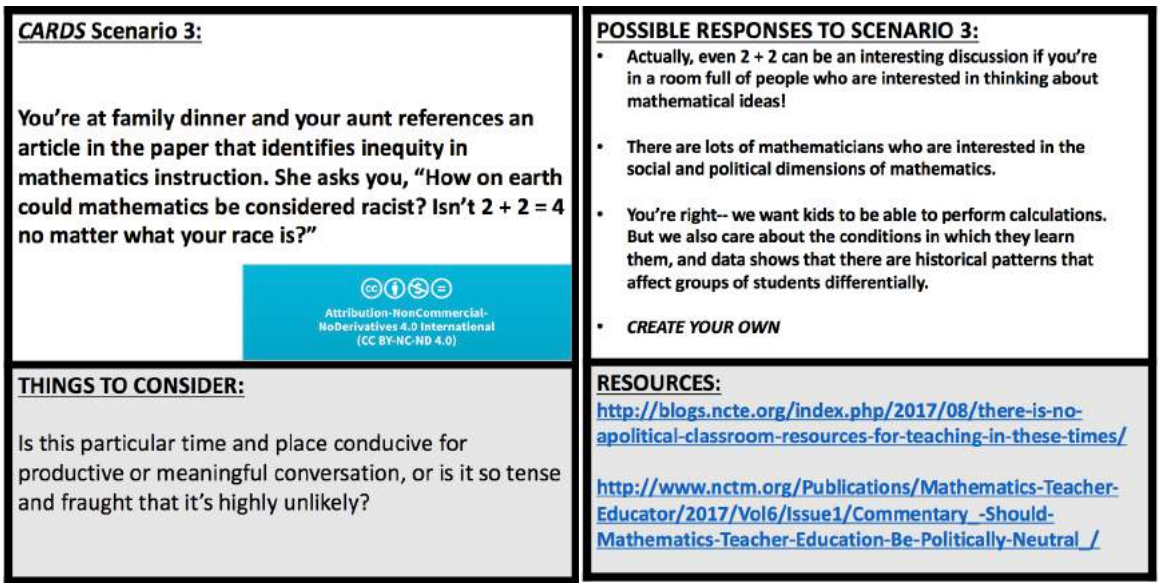

Figure 1: Front and Back of Scenario 3 CARD

Findings: Impact of the CARDS

We present three of the main impacts that we found as a result of our initial implementations with the cards. We refer to these as impacts in the sense that these are three ways in which the cards seem to provoke moments of learning for us mathematics teacher educators: about the cards themselves as curricular materials, about our preservice teachers' experiences in teacher preparation programs; and about our own orientations toward our work as mathematics teacher educators working with teachers. Below we briefly present three initial findings about these impacts, sharing illustrative examples from the interview transcriptions; the video responses, and written assignments. As a reminder of our data analysis process: we reviewed selections the data together (we watched videos, listened to interviews, read transcripts and submitted assignments) and engaged in consensus-building discussion about what themes seemed to emerge in multiple instances (i.e., in more than one preservice teachers' response) and what themes seemed most compelling to us and most immediately informative to our work as mathematics teacher educators.

The Importance of Place and Space

As preservice teachers reacted to the scenarios on the cards, they considered both the individual scenarios and the possible responses. In doing this, we noticed that the specificity of place (i.e., the grocery store or a family dinner) was a significant detail in how several participants responded to scenarios, particularly as they thought about the ideas of the "appropriateness" of having "sensitive" conversations in those places. Several preservice teachers said they would want to talk about things in a different place or at a different time. For example, as she was interacting with the cards, Marta was also influenced by the setting of the scenario. She mentioned that if she were at the grocery store, the scene of Scenario 1, she would probably be "in a rush" and "not be in the right mindset to have that kind of serious conversation." Other preservice teachers told us that they would want additional information about the topic before they would feel comfortable responding if they were in similar situations. We reflected on the ways that the preservice teachers' responses may have been affected. That is, we see the consideration of place as very understandable and relatable, but realize that the content on the cards may have influenced responses of this nature. As retreating is a frame of whiteness, in how white-identified peoples hold the privilege to be able to retreat from difficult situations (Picower, 2009), we realize the need to have preservice teachers, and ourselves, explore

the different possibilities for responding to issues of power, identity, and access given the different settings, times, and people involved in our interactions.

Considerations of Our Teachers

Students of color or from marginalized identities bear some emotional weight related to personal experiences with the content of the cards. In Kat's interview, she expressed how a recent experience in her university courses influenced whether or not she was comfortable with certain responses to the Columbus Day scenario (Scenario 2). For example, she recalled the racial tension in her class after speaking up about an issue. She said: I was in a class, and me being the only, well, one out of two black students that were in the class. I spoke up and said something about, something relating to social studies and Columbus Day and things like that, where I felt like people in the class weren't taking seriously… And I received a lot of backlash...it was hard for weeks...now things are getting a lot better. But it was just hard because you can feel the racial tension and just the divide. The weight of that experience influenced which possible responses to the scenarios she saw as acceptable and which felt like "an attack to somebody".

As Abdulah worked with the cards, he specifically connected with Scenario 5, where the scenario is related to a teacher who is unable and unwilling to learn the correct pronunciation of his students' names. Abdulah shared personal experience of how his name was very often mispronounced. In sharing his experience, Abdulah discusses the need for teachers to learn the correct pronunciations of students' names from the start, but he also mentioned that his name is never pronounced correctly due to differences in language. Although Abdulah said that he took no offense when people mispronounced his name, another preservice teacher reacted differently this saying, "My name has always been mispronounced which makes me feel uneasy." The situations on the cards brought out the emotional weight these preservice teachers have experienced throughout their schooling in a range of different experiences, and we want to acknowledge concerns we have heard from MTEs about using these cards framed as worry for upsetting or triggering their students of color.

Moving from Deficit to Asset Perspectives of our Teachers

The data were a reminder that all of our students have backgrounds, knowledge, and experiences that they can draw on in meaningful ways during activities with the cards. As the preservice teachers worked with the cards, they referenced what they knew based on their experiences in schools. For example, Norah mentioned experience from her field placement school where students were making predictions based on the cover of a book. On the cover, a group of children were standing around another child holding a cap. As the students in the field placement classroom made predictions, one of the students predicted that the two Black children on the cover were brother and sister because they had the same skin tone. Norah used this as an opportunity to begin a conversation in the classroom. Several other preservice teachers related the scenarios on the cards to concepts they had discussed and explored in other coursework, such as their social studies methods course, educational policy courses, literacy course, among others. They weren't required to make connections to what they knew or had learned in their teacher preparation courses but many of them did.

Discussion and Next Steps

Working Groups and professional conference sessions extended our methodology, in which participants learned about, received, and were challenged to use an early iteration of the CARDS. These opportunities to work across cultures (mathematics educators, teachers, parents, other stakeholders) served as an impetus for multiple MTEs to implement the cards in their own institutions. The feedback received has helped make improvements related to content, context, form, and delivery. Content and context details have been added along with the addition of new scenarios. Variations of the cards are being developed to be used with different audiences (teacher candidates,

teachers, administrators, etc.) The form of the cards is being modified to become more user-friendly and incorporate additional resources and technology. Different delivery options (online, game formats, etc.) are also being explored and will be included in a user guide. We did not "construct" the cards and then evaluate them, rather they were a result of emergent design research (Tom, 1996). In other words, and an ongoing effort of collectively collaborating to create/design tools that come out from the larger community.

As a next step, we reiterate our invitation and our plea that our colleagues (and by that we mean anyone who plays a role in mathematics teacher education) continue to join in the shared creation and improvement of the cards. We will continue to share the cards, user guide, and other relevant materials freely- not only to download, but to add to and to suggest revisions. These materials are licensed under creative commons copyright law, so as long as users are doing so with attribution and for educational, non-commercial purposes, they are free to do so. This is what we mean by collective ownership.

In fact, we consider the collective ownership of the cards to be one of, if not the, most significant findings of this project thus far. Our field is dominated by scholars who work in higher education institutions, which are organized by a capitalist framing of knowledge creation and ownership. We recognize that we ourselves are a part of this problematic structure which inhibits true collaboration or idea sharing, in which individual knowledge creation and selfish ways of thinking are rewarded and incentivized. We seek to enact a decolonizing stance to educational research (Patel, 2015) to think about ways to create true collaboration in our field and to enact research designs that honor all voices. In this project, we have offered a glimpse of what this might look like, through the ideation, creation, enactment, and study of a tool for mathematics teacher education that has been completely collaborative from start to finish. Even now, we do not present the CARDS project as a finished project, but as an evolving tool that will grow through collective action.

Turning our attention to use of the cards: there are many concepts and frameworks regarding equitable mathematics teaching practices from which mathematics teachers can base their work with these CARDS. Paradigms and frameworks such as Guitierrez's *Four dimensions of equity,* Tuner, Drake, McDuffie, Aguirre, Bartell, and Foote's (2012) *learning trajectory for building on children's multiple mathematical knowledge bases* (Project TEACH MATH), and the *antiracist tool for mathematics teacher educators* (A3IMS Project) all offer foundations from which MTEs might regard the cards as resources. We do not intend to homogenize differences between these approaches, thereby trivializing the significance of theoretical framework and the intellectual work involved in articulating the affordances of any one perspective. We ourselves have been intrigued by Love's description of abolitionist teaching (2019), and the statements in our data expressed by Abdullah and Kat echo Love's call that students of color--in our case: our preservice and inservice teachers of color--need to know that they *matter*. They need to be repeatedly and resolutely assured that their communities, their families, their neighborhoods, their stories, their bodies, their hopes and their dreams *matter.* The Cards provide one mechanism to support our practice of inviting, eliciting, and honoring these multiple dimensions of our students' and teachers' lives into our interactions with them.

For our colleagues in mathematics teacher education who share our interest in developing deep, theoretical understanding alongside a skillful, practical usage of the cards, we invite researchers to develop and apply their various conceptual and analytic frameworks. As we have analyzed the data together, we have begun to wonder in what ways interactions with the cards reveal whiteness within our teachers, ourselves, and our systems and institutions, our practices and policies. Battey and Leyva's (2016) *framework for understanding whiteness in mathematics educatio*n offers one tool for this.

Interestingly, and perhaps counterintuitively: as a result of the efforts described here, we are learning more and more about what might be the most appropriate intentions for using these cards. When we began developing these resources, we admittedly did not have a clear objective. We were guided by curiosity, a sense that these would be useful, and a lot of encouragement and expressions of interest from colleagues. In some ways, these cards were developed antithetically to the "design" approach so ubiquitous in education research wherein problems of practice are identified and then answers are proposed, studied, and refined. Our process was more akin to an "undesign" approach (Leander & Boldt, 2018), wherein we were motivated by a "What can we do with these?" wondering about a curricular resource that we found ourselves compelled by. The "What can we do with this?" curricular approach has been adopted by mathematics teachers in productive and interesting ways for posing rich mathematical tasks and we are intrigued by what this stance could bring to mathematics teacher education.

Fundamentally, we do not view equity, diversity, and inclusion as "problems of practice" that need to be "solved:" rather we view them as the existential commitment most relevant and animating to our work as mathematics teacher educators--individually and collectively. We will never be finished, we will never get to cease remaining vigilant in our commitment to remaining watchful and attentive to harm that arises in mathematics teaching and learning as a result of abuses of power. Contributing toward more equitable mathematics classrooms is a practice: we will need to hold ourselves accountable and reaffirm our commitments again and again. These cards-and this approach to collaboratively developing and owning them--are one way to do this. They do not "hold" or "convey" the right answers because there are no such things, but a commitment to return to them again and again, always adding to our collective understanding, is a stance worth taking.

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