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Growth through Reflection in Mathematics Education

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A Qualitative Metasynthesis of Culturally Relevant Pedagogy & Culturally Responsive Teaching: Unpacking Mathematics Teaching Practices

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ABSTRACT This article uses Culturally Relevant Pedagogy (CRP) and Culturally Responsive Teaching (CRT) as the theoretical frameworks and qualitative metasynthesis as the methodological framework to synthesize qualitative research published between 1994 and February of 2016. Initial searches produced 1,224 articles, but through a process of appraisals, 12 articles were synthesized to understand how researchers interpret mathematics teaching practices that support CRP and CRT in pre-kindergarten through 12th grade. There were five findings focused on teacher practices, classroom interactions, and student experiences with CRP and CRT within mathematics education, including: caring, context, cultural competency, high expectations, and mathematics instruction.

KEYWORDS *qualitative metasynthesis, culturally relevant pedagogy, culturally responsive teaching, mathematics teaching practices*

Mathematics education has benefited from teaching and research using the tenets of Culturally Relevant Pedagogy (CRP) and Culturally Responsive Teaching (CRT), yet there is little understanding about the impact of these tenets on mathematics teaching practices. Much of the research focused on CRP and CRT employs qualitative methodologies to examine the intersections of mathematics teaching with CRP and CRT frameworks. This research has yet to be synthesized, analyzed, and interpreted to provide the field of mathematics education with deeper insights and broader perspectives of teaching practices within the frameworks of CRP and CRT as evidence-based practices. CRP and CRT are frameworks that respond to traditional mathematics teaching practices by empowering learners to see the multiple purposes for learning mathematics, helping learners appreciate why mathematics is important in their lives, and allowing learners to believe they can succeed in mathematics.

Within CRP and CRT, mathematics is experienced as problem-solving and ways to critique and understand the world (Gutstein, 2009). The ways in which students experience mathematics significantly impact the ways in which they identify themselves as doers of mathematics. CRP and CRT are frameworks that recognize that learners' identities in mathematics are highly contextualized and mediated by environments; consequently, these frameworks consider the contexts of learners' lives, experiences, and backgrounds. Mathematics teaching varies across context and is challenging to generalize because teaching is dependent on contextual, cultural, and social factors. While it is challenging to generalize across varying context, we can learn a lot from unpacking research focused on mathematics teaching that considers contextual, cultural, and community factors. Significant research centralizes the experiences and contexts of marginalized¹ learners. Mukhopadhyay, Powell, and Frankenstein's (2009) work

¹ When we use the term marginalized learners, we are not ascribing a sweeping set of attributes to the collectives of Black, Latinx, Indigenous, and poor peoples; we recognize that collapsing these groups into one group does not acknowledge the intersectionality within these collectives. Martin (2015) argued that one dominant discourse in mathematics education research focuses on a fixed set of cultural and cognitive explanations for negative outcomes, including cultural differences or deficits, limited mathematical knowledge and problem-solving skills, family background and socioeconomic status, and oppositional orientations to schooling. Although there are differences among the collectives, they share legacies of being positioned as deficient in research and they also share values and beliefs that prioritize community and family, a respect for spirituality, and interconnectedness with the natural world (Barnhardt, 2001; Berry, 2008; Gutiérrez, 2013).

acknowledged that mathematics teaching must consider the practices of all peoples. Lampert (2001) found that mathematics teaching should include building relationships with all students so that diverse ideas can be examined and understood. Building relationships and considering the practices of all peoples are described by many researchers as building on students' "funds of knowledge." Funds of knowledge assume a broad range of elements in peoples' lives including cultural experiences, artifacts, values, feelings, language and identity (Moll & Gonzalez, 2004). Bonner (2014) described three teachers using identity, language, and culture in their teaching of mathematics. Civil and Khan (2001) unpacked teaching practices to connect students' families' experiences with teaching counting, measurement, perimeter, and area. The common thread through these works challenges the notion that mathematics teaching is culturally neutral and that there are universal truths regarding teaching practices. These studies situate mathematics teaching as eliciting shared frames of references to make meaningful connections between teaching and the cultures, lives, and experiences of learners.

Frameworks

Theoretical Frameworks: CRP & CRT

This research used Gloria Ladson-Billings' (1994) and Geneva Gay's (2000) frameworks to unpack and understand mathematics teaching practices embedded in classrooms as sites for social change and social justice. These frameworks connect cultural framing to academic skills and concepts, build cultural competence through teaching, and use teaching as a way to critique power discourses and representations.

Gloria Ladson-Billings (1994) defined CRP as pedagogy "that empowers students intellectually, socially, emotionally, and politically using cultural referents to impart knowledge, skills, and attitudes" (pp. 17-18). Teachers must develop both sociocultural consciousness and a holistic view of caring before they can truly engage in CRP (Morrison, Robbins, & Rose, 2008; Ladson-Billings, 1995; Ladson-Billings, 2006). The three tenets of CRP are:

- *Academic achievement* refers to helping learners realize that they have the potential to attain high levels of achievement. Teaching practices associated with this tenet include setting high expectations for learners, providing support mechanisms, assisting learners in determining long-term goals, and helping learners advocate for their own well-being.

- *Cultural competence* refers to ways in which teachers keep the cultures of their children in the forefront of their minds and honor and respect the learners' home culture within daily interactions and instruction (Ladson-Billings, 1994). Teaching practices related to cultural competence include providing supports for learners in navigating dominant cultural capital to attain academic achievement while simultaneously helping learners to honor their own cultural identity.
- *Sociopolitical consciousness* is developed within historically marginalized youth when teachers help their students "to understand the world as it is and equip them to change it for the better" (Ladson-Billings, 1994, p. 139). Teaching practices linked to sociopolitical consciousness create structures to help learners recognize, understand, and critique current and social inequalities.

Geneva Gay (2010) defined CRT as "...using the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning encounters more relevant to and effective for them" (p. 31). CRT is the behavioral expression of knowledge, beliefs, and values that recognizes the importance of racial and cultural diversity in learning. Gay (2010) outlines six dimensions of CRT:

- CRT *validates* children's cultural heritages to "build bridges of meaningfulness between home and school experiences as well as between academic extractions and lived sociocultural realities" (Gay, 2010, p. 31). Teaching practices validate learners' cultural heritage by incorporating instructional strategies and multicultural resources and curricula.
- Culturally responsive teachers develop intellectual, social, emotional, and political *comprehensive* learning opportunities to teach the whole child (Gay, 2010). Teaching practices related to comprehensive learning opportunities create structures where learning is communal and supports helping learners maintain their cultural identities as members of their communities.
- CRT is *multidimensional* because it "encompasses curriculum content, learning context, classroom climate, student-teacher relationships, instructional techniques, classroom management, and performance assessments" (Gay, 2010, p. 33). Teaching practices have to engage extensively with cultural knowledge, experiences, contributions, and perspectives.
- CRT leads to *self-determination and empowerment*. Self-determination and empowerment help learners believe that achievement is within their reach. Teaching practices linked to self-determination and empowerment support learners, holding them to high expectations both academically and socially.

- CRT is *transformative* because it defies traditional educational practices and cultural hegemony and develops social consciousness, intellectual critique, and political and personal efficacy. Teaching practices that are transformative create structures to help learners combat prejudices, racism, and other forms of oppression and exploitation.
- CRT is *emancipatory and liberating* because it “lifts the veil of presumed absolute authority from conceptions of scholarly truth typically taught in schools” (Gay, 2010, p. 38). Teaching practices associated with being emancipatory and liberating challenge the notion of universal truths and the belief that knowledge is permanent.

Aronson and Laughter (2016) collectively examined the work of both Ladson-Billings and Gay and defined culturally relevant education (CRE). They identified four markers of CRE: a) academic skills and concepts, b) critical reflection, c) cultural competence, and d) critique discourse of power. Aronson and Laughter (2016) stated that their findings were supported by a sufficient body of research. We examined their study critically because their literature search produced “more than 286 results” across all subject areas (p. 16). This qualitative metasynthesis produced 1,224 articles just in the discipline of mathematics education. In the end, Aronson and Laughter (2016) synthesized eight studies in mathematics from 1995 to 2013 while we synthesized 12 studies focused on teaching practices that support CRP and CRT in pre-kindergarten (Pre-K) through 12th grade.

Methodological Framework: Qualitative Metasynthesis

Qualitative metasynthesis is a methodological process to integrate a large body of related research literature. While reviews of literature and meta-analyses synthesize research, a qualitative metasynthesis is distinct because of its methodological framing. A review of literature summarizes the strengths and weaknesses of previous research for the purpose of establishing previous findings and claims that are relevant to the current focus of inquiry. During a review of literature, researchers locate their original inquiry within the context of what has previously been studied so as to convince the reader that this additional study is justifiable and that the results of the study will have relevance to some aspect of advancing the body of literature (Thorne, Jensen, Kearney, Noblit, & Sandelowski, 2004). A qualitative metasynthesis is not a review of literature; it is an analysis and in-

terpretation of the findings from selected studies. Researchers conducting qualitative metasynthesis use a deliberate process of selecting studies with the emphasis on synthesizing, analyzing, and interpreting findings across the selected studies. The process of selecting, synthesizing, analyzing, and interpreting findings across studies differentiates qualitative metasynthesis from a review of literature (Thorne et al., 2004).

Synthesizing a collective body of qualitative research in education provides us with deeper insights and makes for a greater contribution to understanding how a collective body of research contributes to our understanding of a particular topic within the field. In this milieu of evidence-based support, qualitative metasynthesis broadens the perspectives on evidence-based research, practice, and policy by expanding how knowledge can be generated and used. In an effort to connect research to practice, qualitative metasynthesis moves from knowledge generation to knowledge application by helping researchers make sense of a collective body of research for practice (Erwin, Brotherson, & Summers, 2011; Berry & Thunder, 2012).

Six discrete steps were followed for this qualitative metasynthesis: 1) identify a specific research metaquestion; 2) conduct a comprehensive search; 3) select initial relevant studies; 4) appraise the quality of initially selected studies; 5) synthesize findings of selected studies; and 6) present findings across the studies.

The formulation of a research question for a qualitative metasynthesis is similar to the formulation of a research question for a qualitative research study. A qualitative research question encapsulates the purpose of a qualitative study and identifies the central phenomenon to be studied. A qualitative metasynthesis research question is referred to as a metaquestion—a question that has already been studied qualitatively. The research metaquestion for this study is: How do researchers interpret mathematics teaching practices that support Culturally Relevant Pedagogy (CRP) and Culturally Responsive Teaching (CRT) in pre-kindergarten through 12th grade?

The purpose of this study was to synthesize papers that demonstrated CRP and/or CRT in mathematics education, which has yet to be done within the methodological framework of a qualitative metasynthesis. For the purpose of this work, we will specifically look at our findings as they relate to unpacking mathematics teaching practices that support CRP and CRT in pre-kindergarten through 12th grade.

Design/Methods

Researcher Positionality

We take the position that researchers conducting qualitative research should acknowledge their influence in the study by describing their experiences and assumptions with which the researchers enter the research (Foote & Bartell, 2011). Both our experiences as mathematics teachers and the equity lens that we bring to this study shape the ways we position teaching mathematics. As former secondary mathematics teachers, we reflect upon ways to improve teaching practices to make mathematics more accessible, equitable, and empowering for all learners, especially those who have been historically marginalized. We do not discount the fact that race, gender, social class, and political views affected the research process. Acknowledging the roles that race, gender, and power play in the research process, the co-authors identify themselves as a White woman and a Black man; and as doctoral student and doctoral advisor.

Data Collection

Published peer reviewed research papers between 1994 and 2016 using qualitative methodologies focused on CRP and CRT were sought for this qualitative metasynthesis. Prior to conducting database searches, inclusion

and exclusion criteria were developed based on four parameters: topical, population, methodological, and temporal (as seen in Table 1). All papers used CRP and/or CRT as frameworks (topical) and the research focused on mathematics teaching and learning in Pre-K-12 contexts in the United States (population). Qualitative research was the methodological framework for all papers; however, mixed methods research studies were included if the qualitative findings were distinguishable.

Subject term searches were conducted using EBSCO to simultaneously search five databases for peer reviewed journal articles. The five databases included: Academic Search Complete, Education Full Text (H.W. Wilson), Education Research Complete, ERIC, and Psychology and Behavioral Sciences Collection. The search terms were *culturally responsive teaching* or *culturally relevant pedagogy*, and *math**. *Math** was used to encompass all articles which may have used math and/or mathematics as keywords. Additional criteria were selected to generate articles which were peer reviewed and fell within the source type as academic journals and journals within the time frame specified. Book reviews, reports, chapters, and dissertations are examples of items that were excluded. Figure 1 shows the flowchart of inclusion and appraisal to determine articles for the qualitative metasynthesis.

Table 1
Inclusion and Exclusion Criteria

| Inclusion Criteria | Exclusion Criteria |
|---|---|
| Topical Culturally Responsive Teaching/Culturally Relevant Pedagogy | Topical Not Culturally Responsive Teaching/Culturally Relevant Pedagogy |
| Population <ul style="list-style-type: none"> Pre-K-12 students and educators Preservice Teachers Only within the United States Only Mathematics: with strong mathematics focus Teachers/Students: with strong focus on teaching and learning practices | Population <ul style="list-style-type: none"> Not within the United states Doesn't focus solely on Mathematics |
| Methodological <ul style="list-style-type: none"> Qualitative Research Mixed Methods if it clearly distinguishes qualitative data from quantitative | Methodological <ul style="list-style-type: none"> Quantitative Research Qualitative data with no student/teacher interactions Mixed Methods that doesn't distinguish qualitative data from quantitative |
| Temporal 1994 – February 2016 | |
| Additional Inclusion Criteria Peer reviewed and refereed journal articles | Additional Exclusion Criteria <ul style="list-style-type: none"> Newspaper Articles/Journalistic Dissertations, non-peer reviewed articles, and book chapters |

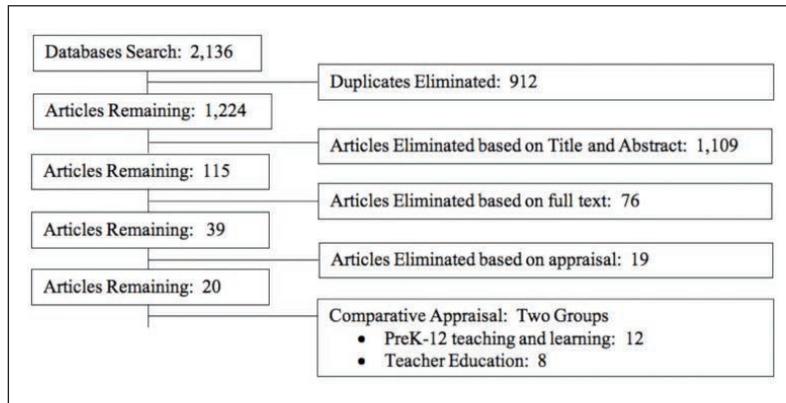


Figure 1. Flowchart of Inclusion and Appraisal

The initial EBSCO search produced 1,224 articles. Following our initial search, we worked through a validation process by looking at the titles, abstracts, subject terms, and full text for published peer reviewed journal articles. This process left further 39 articles fitting the inclusion criteria. We then performed individual appraisals for each article, appraising the quality of the research methodologies using the rubric published by Thunder and Berry (2016) as seen in Table 2. Following their appraisal process, 20 articles

Table 2
Appraisal Rubric

| Criteria | Possible Appraisal Points | Appraisal Points Given |
|--|---------------------------|------------------------|
| 1. Research Problem, Purpose, and/or Question a. Problem is stated clearly and related to the research literature b. There is a clear statement of research purpose and/or question | 2 | |
| 2. Method: Data Collection and Analysis a. Study is methodologically qualitative i. Sample plan and data collection are appropriate to the question ii. Data analysis plan is consistent with design and purpose b. Described the participants of the study and how they were selected c. Researcher showed an awareness of their influence on the study and its participants (describe experiences and/or assumptions with which the researcher entered the research) d. Data collection procedures are fully described e. Steps/process of the data analysis are clear with examples f. Techniques for credibility and trustworthiness are described and used correctly | 6 | |
| 3. Findings a. Interpretations of data are plausible and/or substantiated with data b. Overall findings address the purpose of the study c. Ideas (themes, categories, concepts, etc.) are precise, well developed, and linked to each other d. Results offer new information about or insights into the targeted phenomenon e. Quotes provide support/evidence for each theme/concept presented | 5 | |
| 4. Discussion and Implications a. Return to the research questions/purpose proposed at the beginning and discuss interpretations and significant findings b. Recommendations for intended audience and future research issues | 2 | |
| Total Points | 15 | |
| High overall standards of quality and credibility = 11-15 points. Moderate overall standards of quality and credibility = 6-10 points. Low overall standards of quality and credibility = 0-5 points. | | |

were identified. Further, we did a comparative appraisal, dividing the articles into two groups: 1) Pre-K-12 teaching and learning; and 2) teacher education. This qualitative metasynthesis treats the findings from 12 articles focused on Pre-K-12 teaching and learning as informants (the 12 articles are marked with an * in the reference section). Dedoose, a data analysis software, was used to support data analysis and initial codes were developed and defined. Six initial codes with eight child codes were used to code the data; we re-read, re-coded, and unpacked the data to synthesize and interpret for reporting.

Data Analysis

Throughout every step within this process the two authors initially worked separately. We then came together to negotiate the retention of articles and our findings, documented within an audit trail. For instance, once we determined our search terms in EBSCO, we separately mined through the 1,224 articles, prior to collectively deciding which articles met our criteria from those which we had both selected. Once we determined the 12 articles that would be treated as informants for this qualitative metasynthesis, all 12 articles were read and re-read by each researcher to note emerging themes. We met to negotiate the themes and to identify initial codes. Our initial codes lacked specificity (especially the one noted as mathematics instruction), and so our definitions were revisited and articles were re-coded. We periodically determined two to three articles to double-code on Dedoose, and we later met to negotiate the codes from each article in its entirety to ensure credibility; all articles were coded in this way. Following the coding process, we examined the excerpts identified for each code across the 12 articles to unpack our findings and to determine mathematics teaching practices that support CRP and CRT in pre-kindergarten through 12th grade.

Findings

Twelve articles were synthesized to understand how researchers interpret mathematics teaching practices that support CRP and CRT in pre-kindergarten through 12th grade. There were five findings: a) caring; b) knowledge of contexts and teaching practices using contexts; c) knowledge of cultural competency and teaching practices using cultural competency; d) high expectations; and e) mathematics instruction/teacher efficacy and beliefs. The five findings focus on teacher practices, classroom interactions, and student experiences with CRP and CRT within mathematics education.

Caring

Caring is a continuous cycle of working to establish a rapport, using knowledge gained from that rapport to inform teaching practices, and then, reflecting upon teaching and learning to understand learners' mathematical knowledge. Caring was demonstrated in the ways in which teachers created positive learning environments where learners saw themselves as participatory; teachers took an active role in seeking out knowledge about learners and communities; and teachers supported learners emotionally and academically by making mathematics content accessible and empowering learners mathematically. In the following excerpt, we see the significance of teacher-student relationships and how that translates into mathematics instruction.

When establishing relationships, teachers cannot merely go through the motions because students know when teachers are genuine and really care about them. African American students must relate to the teacher and the teacher must relate to them. The teachers realize they must have a relationship before they can make mathematics lessons relevant to the students. They take the opportunity to know their students and discover their motivations and interests. They tailor their instruction with this knowledge. (Jackson, 2013, p. 7)

Although caring is not specifically noted as a tenet of CRP or CRT, it is clearly evident within the dialogue surrounding the tenets. For instance, Gay claims that CRT is multidimensional, for which a key dimension includes fostering positive student-teacher relationships. Likewise, CRP places emphasis on the teachers having respect for learners' culture. "Respect" was noted as one of our vocabulary terms which indicated a caring rapport.

Context

In addition to developing rapports with learners, context played a crucial role in making mathematics relevant and accessible. *Context* incorporated two dimensions as seen in *knowledge of context* and *teaching practices and strategies that use context*. Knowledge of context is related to space and place in the ways teachers gained knowledge of their students' home-life, communities, and neighborhoods. In the following excerpt, we see how Ms. Finley gained knowledge of context.

Ms. Finley often "walk[ed] the neighborhood," taking time out in the evenings to visit with students and their families. She knew that this type of connection with the community was important, and she was able to weave the knowledge that she

gained through these interactions into the mathematical content that was the basis for her lessons. (Bonner & Adams, 2012, p. 30)

After the teachers sought out knowledge, they integrated mathematics instruction and knowledge of context by making meaning of the mathematics curricula and tasks. Teachers were actively engaged in communities to work with learners' parents and families for mathematizing contexts, creating and adapting mathematical problems, utilizing questioning strategies to elicit learners' local knowledge, requiring explanation and justification as it relates to context knowledge, and creating project-based opportunities incorporating funds of knowledge. Gay states that CRT is *validating* and should build bridges between school and learners' homes; essentially, the presence of this bridge is how we have defined *context* and the findings that support the presence of *context*.

Cultural Competency

Cultural competency was found in the ways teachers developed knowledge and skills associated with various forms of communication and funds of knowledge. Further, the teachers acted on this knowledge of cultural practices by incorporating such knowledge into their teaching practices. Teachers promoted engagement by incorporating nonverbal communication through proximity and by integrating music and movement into teaching practices. The teaching practices and strategies primarily focused on classroom discourse including storytelling, utilizing call and response, and dynamic forms of interactions. Teachers made mathematics accessible by unpacking and connecting cultural artifacts.

In the following excerpt, we see how Inga engaged in interviews with her learners to develop an informed understanding of her learners' cultural practices and funds of knowledge as it relates to shopping and currency.

...From this, Inga learned about her students in ways she did not expect, finding that those students who shopped with their families were able to quickly solve problems regarding currency. These students demonstrated a remarkable facility with these transactions that suggest they had powerful strategies for dealing with the situation. Although Inga learned much about her students' interaction with money when outside of school, she could have taken this further by exploring the specific strategies they used. The strategies children use with money are often non-routine, and

this might have offered an opportunity to gain a deeper knowledge of students' understanding. (Wager, 2012, p. 16)

As previously mentioned, the findings for cultural competency strongly aligned with the ways in which Ladson-Billings unpacked cultural competency with CRP. Additionally, this finding also ties into CRT and how it *validates* learners' cultural heritages in such ways that teachers build cultural practices into classroom instruction.

High Expectations

Teachers must have *high expectations* both for their learners and for themselves. Teachers made necessary teaching revisions based on their learners' needs, interests, and understandings as they relate to mathematics. There was a level of flexibility and impromptu teaching that was evident with the teachers who were most capable of reaching their learners. Furthermore, teachers were warm-demanders who established learning environments in which learners were held accountable and empowered by taking an active role in their own learning; we see these practices within the context of Ms. Bradley's classroom.

...Ms. Bradley's classroom was highly structured and disciplined, focusing on high expectations and success through "tough love." When a student did not have his or her homework, for example, Ms. Bradley would take the student in the hallway to call his or her parent or guardian...Ms. Bradley explained that this type of discipline is "what they get at home from their mama or grandmama—you can't mess around." Furthermore, she indicated that this type of culturally connected communication and maintenance of high expectations allowed students to develop racially and culturally "so that they don't have to give up what they are used to for the sake of passing class...they have to do this in other classes and I'm not going to teach them to be White." (Bonner, 2014, p. 395)

This excerpt specifically demonstrates how the finding is not just about having high expectations for learners, but rather how those expectations are culturally connected to learners' lived experiences. The conceptualization of high expectations is seen both in CRP by focusing on academic achievement and in CRT by focusing on the comprehensive achievement of the whole child. Additionally, both frameworks advocate for teaching

practices that support students in realizing that achievement is within their reach, translating into student empowerment and self-determination.

Mathematics Instruction

Mathematics instruction highly correlates with teaching practices and strategies for both context and cultural competency. The findings are specific to mathematics teaching practices and incorporate aspects which are indicative of high-quality mathematics instruction. For instance, teachers utilized technology, incorporated tools and manipulatives in their instruction, and engaged in modeling their thinking for learners. It is important to keep in mind that we are not claiming that when one practices high-quality mathematics instruction that he or she is engaging in CRP and/or CRT; rather, when a teacher has high confidence in teaching mathematics and high self-efficacy, believing that mathematics instruction should be student-centered, open-ended, inquiry-based, highly interactive, and impromptu, based on learners' needs and interests, CRP and CRT are more likely to occur. When teachers felt confident with mathematics, they were more likely to create opportunities for their learners in which they were able to take ownership of their own learning and make personal connections to the content. In the following excerpt, we see Chela make relevant connections to everyday classroom experiences and mathematics.

...Chela loved math. Chela turned this passion for math into a professional strength—she took advantage of all math professional development opportunities and she made mathematics a central part of her practice. Unlike many of her peers, Chela didn't have a math center or a math time—that seemed silly to her, as math was everywhere. Weaving math into daily activities was what Chela did best. As she designed different games or visual supports she looked for the math hook. For example, Chela used 10 frames in attendance... a typical opportunity for name recognition and counting; extending the activity in several ways that deepened learning opportunities. (Graue, Whyte, & Delaney, 2014, p. 308)

Within the excerpt, the mathematics instruction is explicit as we see Chela using mathematical tools such as ten frames, which are two-by-five arrays often used to help students learn to subitize, to connect the mathematics instruction to everyday activities and practices like student attendance. Though this finding is specific to

mathematics teaching and learning, it does relate to the theoretical framework for CRT in that it calls for transformative education that defies traditional educational practices.

Discussion & Implications

As with any synthesis of literature, this piece is time sensitive. This work specifically examines articles that were on the EBSCO database up until February of 2016. Thus, since data collection, surely more papers have been published which would fit our inclusion criteria, but performing a qualitative metasynthesis is simply a laborious process that demands an extensive amount of time to appropriately analyze the data. Such process requires at least two researchers who have some knowledge of literature and who understand the nuances necessary to make decisions throughout the process. In our case, we made decisions to focus on peer reviewed articles, negotiated codes, and negotiated the appraisal process. Because we focused only on peer reviewed articles, researchers can build from the work to examine book chapters, dissertations, and non-peer reviewed works. Our contribution to the field of mathematics education is providing one frame from which qualitative metasynthesis can be conducted.

There is a dearth of research focused on unpacking mathematics teacher actions focusing on CRP and CRT. While Ladson-Billings and Gay provide frameworks for CRP and CRT, there appears to be inconsistent ways in which these frameworks are interpreted in mathematics education research. There are inconsistent interpretations on whether mathematics or culture should be centralizing agents. There were examples in which the research documented teaching practices of simply changing the context of mathematics tasks to reflect the cultures of learners. There were examples in which the research documented teaching practices mathematizing elements of contexts and communities to highlight social justice issues. A critique of the body of work is that very little research documented sociopolitical consciousness and critical consciousness. It is not clear whether critical consciousness is central in mathematic teaching using these frameworks.

More work is needed in the field to unpack teaching practices that promote access, equity, and empowerment. The findings of this research suggest that teachers who incorporate CRP and CRT know their learners and the communities of their learners. More work is needed to unpack the continuous cycle teachers use to develop

rapport with learners and communities. It is not clear in what ways contexts and support within schools and communities are central elements in CRP and CRT. That is, what are the kinds of supports teachers need to draw on to incorporate elements for funds of knowledge and communal aspects? The findings from this work suggest that mathematical knowledge for teaching positively impacted teachers' lens for CRP and CRT; more work is needed to understand and unpack the interactions of teachers' knowledge of context and culture with knowledge of mathematics and teaching mathematics.

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