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Conducting “Good” Equity Research in Mathematics Education: A Question of Methodology

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Hostetler (2005) describes “good” education research as that which attends to the well-being of students, teachers, and communities. In this essay, the author proposes measuring equity-based research in mathematics education against Hostetler’s standard. She argues that current equity-based research has not adequately addressed the mathematical experiences of marginalized students due to its primary focus on the “achievement gap.” Such a focus leaves the social and political hierarchies that produce marginalization intact and unquestioned. She presents methodological diversity as a strategy for reconceptualizing mathematics education research in a way that addresses the more foundational quality and opportunity gaps that are at the root of equity issues in mathematics education. She also offers embracing methodological clarity, shifting the site of research, and pursuing interdisciplinary opportunities as three ways in which mathematics education researchers can begin to equip themselves to address equity-based mathematics education research in new and different ways that may better address the well-being of marginalized students.

Keywords: mathematics education, research methodology, equity-based research, achievement gap

Hostetler (2005) writes that “good” education research gives “adequate attention to the question of what good comes from educational policies and practices, how they do or do not contribute to the well-being of students, teachers, and communities” (p. 16). He proposes an assessment of research quality based on “good-ness”. Hostetler’s good-ness is not, however, interchangeable with “quality” or “rigor”. He presents these ideas as “confining” (p. 16) solely to issues of research design and implementation; whereas good-ness encompasses these issues and more. Rather, he suggests that education research is good, or has good-ness, when researchers can “make sound and articulatable, if not fully articulated, connections to a robust and justifiable conception of human well-being” (p. 17). In summation, he argues, “our ultimate aim as researchers...is to serve people’s well-being—the well-being of students, teachers, the community, and others” (p. 19). Hostetler’s position seems particularly appropriate in discussions of equity-based research in mathematics education given that its purpose is to address and resolve issues of inequity that affect the well-being of children who have been historically marginalized based on their race, ethnicity, class, gender, ability level, or sexual orientation.

Is the body of equity research in mathematics education good according to Hostetler’s (2005) standard? Considering that conditions in schools and in mathematics classrooms have not improved for marginalized children in the United States (Buckley, 2010; Lubienski & Gutiérrez, 2008), the answer appears to be “Not at all” or, at best, “Not enough”. If there is not a marked improvement despite a large body of research literature addressing equity in mathematics education and the National Council of

Teachers of Mathematics’ (NCTM) efforts to bring equity to the forefront in the *Principles and Standards for School Mathematics* (NCTM, 2000), it would seem that change is in order. There is not, however, a single point along the research continuum where change must occur. In this essay, I challenge mathematics education researchers to investigate diverse research methodologies as one way to address issues of equity in mathematics education in new ways that may lead to substantive change in the mathematical experiences of marginalized children.

Moving Beyond “Gap-Gazing”

The “achievement gap” is often presented as the launching point in conversations of equity in mathematics education (Gutiérrez & Dixon-Román, 2011; Strutchens et al., 2012). Efforts to document and eliminate the achievement gap are appropriate and necessary (Lubienski, 2008); however, closer examination reveals that such efforts are insufficient because the achievement gap is more of a symptom than a root issue (Flores, 2007). Flores (2007) warns against “blanket statements about the low performance of certain groups of students in our schools without mentioning the underlying causes” because these statements “may reinforce prejudices and stereotypical images” (p. 30). Gutiérrez (2009) challenges the discussion of the achievement gap:

The excessive focus that U.S. researchers place on the gap between the mathematics achievement of White, middle-class students and that of African American, Latina/Latino, American Indian, and

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working class students, as well as English language learners, and the need to close the gap (termed “gap gazing”) sheds light on issues of identity and power or broadened notions of learning from a critical perspective. (p. 9)

Achievement gap logic situates dominant—White middle class—students as the norm against which all students are measured (Frankenstein et al., 2011; Gutiérrez, 2009), thus maintaining the hierarchy that creates disparities in performance. The problem with gap gazing is it brings light to disparities between dominant and marginalized groups in mathematics but does so from the perspective of the dominant (Gutiérrez & Dixon-Román, 2011). According to Gutiérrez (2008), “deepening our knowledge in this arena [or gap gazing] is unlikely to advance the cause of marginalized students” (p. 357). Eliminating the gap, therefore, requires looking at marginalized students, their lived experiences, and their mathematical experiences in different ways.

It is important to note that Gutiérrez is not calling for a complete abandonment of achievement gap research. In an exchange with Lubienski, it becomes clear that Gutiérrez is calling for a broader focus for equity-based mathematics education research that extends beyond gap gazing to address issues such as identity and experience (Lubienski & Gutiérrez, 2008). If the achievement gap is indeed more appropriately discussed as a quality (Hilliard, 2003) or opportunity (Flores, 2007) gap, then I contend that research addressing these issues must attend to quality of resources and opportunity to move beyond “measuring and remeasuring the [achievement] gap” (Lubienski & Gutiérrez, 2008, p. 368).

Equity as a Principle of Mathematics Education

The National Council of Teachers of Mathematics (NCTM) established its “strong and long-lasting commitment to equity in mathematics education” (Gutstein et al., 2005, p. 92) in its *Principles and Standards for School Mathematics* (2000) by naming equity as its first principle. NCTM clarifies its stance on equity, stating “Equity does not mean that every student should receive identical instruction; instead, it demands that reasonable and appropriate accommodations be made as needed to promote access and attainment for all students” (NCTM, 2000, p. 12). Although this position seems reasonable and just, Lubienski (2007) argues that the NCTM has painted a picture of a particular type of classroom within which equity may not be possible. She questions whether a classroom environment which theoretically “expects students to share, puzzle over, and judge opposing ideas” (Lubienski, 2007, p. 12) could, in practice, privilege some students who are better equipped to reason in such ways while simultaneously excluding those who do not possess such cultural capital (Bourdieu, 1998).

Mathematics for all—“a commitment to the belief that all students can learn mathematics and to the objective that all students must learn more, and different, mathematics than in the past” (Hirsch & Coxford, 1997, p. 232)—has been a cry within the mathematics education community for many years (Martin, 2003; Stinson & Bullock, 2012). It is important to critique this commitment when many empirical studies purporting an equity focus appear, at best, to unknowingly reproduce practices that are detrimental to marginalized students (Gutiérrez, 2009), and, at worst, to be simply rhetorical (Martin, 2003). This rhetorical stance lacks depth based on a fundamental contradiction. On the one hand, “mathematics is treated as independent from important social, political, and economic issues facing our communities and our world” (Spielman, 2012, p. 40). On the other hand, however, equity issues in mathematics education are based upon these social, political, and economic issues and the researcher cannot *not* acknowledge them if she or he purports to address equity in a way that extends beyond rhetoric.

Spielman (2012) proposes a reversal of thought from focusing on how the social fits within mathematics to how mathematics fits within the social “as an integral component of a larger social system producing educated citizens” (p. 40). Such a shift requires a rethinking of ideas such as *Mathematics for all*. Martin (2003) urges mathematics education researchers “not [to] be satisfied with working toward equity in mathematics education and settling for small victories like *Mathematics for all*” and to embrace the notion that

equity discussions and equity-related efforts in mathematics education should extend beyond a myopic focus on modifying curricula, classroom environments and school cultures absent any consideration of the social and structural realities face by marginalized students outside of school and the ways that mathematical opportunities are situated in those larger realities. (p. 7)

Martin’s (2003) statements are a direct and appropriate challenge to mathematics education researchers who claim to do equity work in a climate where, despite a focus on equity-based research, inequities in mathematics education persist for marginalized students. A potential path forward on behalf of these students is to reconceptualize a mathematics education research that addresses the social and political issues that “have been cited in the research literature as being critically important” (Martin, 2003, p. 17).

Reconceptualizing Mathematics Education Research

Several mathematics education scholars are discussing ways in which mathematics education researchers can begin to rethink how we—mathematics education researchers interested in equity issues—design, conduct, and report

our work (Battista et al., 2009; Skovsmose & Borba, 2004; Stinson & Bullock, 2012). In one such discussion, Valero (2012) challenges mathematics education researchers to consider our understanding of “the political and social nature of mathematics education practices” (p. 375) drives our decisions regarding our approach to research. She continues to assert “mathematics education research with a serious concern and commitment with evidencing the political and social nature of mathematics education practices needs to open up its focus of study” (p. 375). Studies addressing issues of equity in mathematics education must, upon Valero’s (2012) suggestion, shift the focus of research to include other, non-classroom, sites of mathematical experience and practice including, but not limited to, community programs, curriculum development, and educational policy.

If our goal as mathematics education researchers concerned with issues of equity is to investigate ways to provide quality mathematical experiences for all children, then it behooves us to heed Valero’s (2012) call and expand our methodological approaches to research. Koro-Ljungberg (2012) posits, “Static, theoretically and methodologically singular research approaches might appear insufficient in studies that aim to reconceptualize and relocate complex social and institutional structures of oppression and exclusion” (p. 82). This statement is a call to extend methodological approaches within equity-based mathematics education research beyond counternarratives created through interview-based research (Gholson, Bullock, & Alexander, 2012). I do not suggest an abandonment of the research methods and methodologies that have served the equity agenda to this point, but rather a consideration of new approaches to research that can move the equity conversation forward. Moving beyond the research methods and methodologies that pervade equity-based research in mathematics education first requires a discussion to delimit methodology and address the potential that methodological choices have for equity research.

Methodology Across Moments

My approach to methodology is most closely based on Schwandt’s (2001) definition:

A methodology is a particular social scientific discourse (a way of acting, thinking, and speaking) that occupies a middle ground between discussions of method and discussions of issues in the philosophy of social science....There is no direct, unbroken, logically necessary link between various positions on issues in the philosophy of social science, methodologies, and methods. (p. 161).

Similarly, Hesse-Biber and Leavy (2008) describe methodology as “the bridge that brings epistemology and method together....[It] links epistemology and method, serving as the theoretical...and procedural...link between

the two” (pp. 2–3). In short, methodology describes the rationale used to approach data collection (or methods), analysis, and representation in research that is directly influenced by, although not singularly linked to theoretical perspective (LeCompte, Preissle, & Tesch, 1993; Schwandt, 2001).

In a previous paper (Stinson & Bullock, 2012), I describe four historical moments in mathematics education research: the process–product moment (1970s–), characterized by positivist, quantitative, statistical inference research; the interpretivist–constructivist moment (1980s–), where qualitative and progress-oriented approaches are prevalent; the social turn moment (1990s–), where researchers began to use more participatory methodologies; and the socio-political turn moment (2000s–), where analyses focus on power, discourse, and identity.¹ Although approaches to research vary across the moments, there is some overlap in methods. For instance, there are examples of researchers conducting classroom observations in different moments (e.g., Gutstein, Lipman, Hernandez, & de los Reyes, 1997; Senger, 1998; Wilson, Cooney, & Stinson, 2005). While each of these studies used classroom observation as a data collection method, what the researchers observed, how they observed, and how they wrote about what they observed was different in each.

Senger (1998) used classroom observations to discuss how mathematics teachers progressed along a continuum of effectiveness when adjusting to curriculum reform. She was careful not to label teachers as effective; instead, she focused on the progress that each teacher made toward a goal of effectiveness. Wilson, et al. (2005) observed nine teachers in an attempt to define “good” mathematics teaching. They generated a list of characteristics of good teaching based on frequency data from the teachers, using their observations of nine teachers to present a picture of good teaching for all mathematics teachers, regardless of context. Gutstein, et al. (1997) used participant observation within an action research context to address the use of culturally relevant teaching with Mexican American children. They positioned the teacher as part of the research team, demonstrating a value for the teacher’s expertise and offering the classroom observation not merely as research data, but also as a professional development opportunity for the teacher. Although the differences in the approach to classroom observation in these three studies are subtle, they illustrate how a difference in the methodology (or the rationale used in approaching the study) can provide very different results.

¹ See Stinson and Bullock (2012) for a detailed explanation of these moments and examples of studies that typify each.

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Resistance to Methodological Diversity

As time moves forward, there are continuous innovations with regard to research methodologies (Hesse-Biber & Leavy, 2008; Tillman, 2002). New methodologies have emerged within disciplines such as anthropology and sociology to address social, political, economic, and technological change (Hesse-Biber & Leavy, 2008). Unfortunately, education research has been resistant to diverse methodologies, with mathematics education research, perhaps, being more resistant than others (Harel, 2006; 2010; Lester, 2005). This resistance is not solely the result of unyielding researchers who do not want to approach research differently. There are two key areas of opposition to methodological diversity from education in general and mathematics education specifically. First, Lester (2005) argues that the narrow definition of acceptable scientifically based research in education is a significant contributor:

Much of the public discussion has begun with an assumption that the purpose of research is to determine “what works,” and the discourse has focused largely on matters of research design and data collection methods....The current infatuation in the U.S. with “what works” studies seems to leave education researchers with less latitude to conduct studies. (p. 457)

The lack of widespread pushback toward the reliance on a “rigid definition” (Harel, 2006, p. 58) of scientifically based research in mathematics education is easily understood given that accepted forms of scientifically based research drive federal funding decisions (Eisenhart & Towne, 2003).

The second area of opposition comes from within the mathematics education research community. In addition to the desire for “what works” research in education, there is a faction of mathematics education researchers who believe that mathematics content and direct issues of teaching and learning should be at the center of mathematics education research. In a recent editorial, Heid (2010), current editor of the *Journal for Research in Mathematics Education*, asks of manuscripts submitted to the journal, “Where’s the math?” (p. 102). Heid argues that research studies in mathematics education should “make sense only in the context of mathematics” (p. 103). Confrey (2010) warns that mathematics education research has drifted too far from close and careful attention to the mathematics we seek to have students learn” (p. 27). Confrey offers the marginalization of mathematics educators in policy discussions as a reason to maintain focus on mathematics and the classroom experience in research. While I agree that mathematics education researchers, and education researchers in general (Biesta, 2007), have been left out of policy conversations, I argue that this position supports research related to policy issues in mathematics education in addition to the more prevalent classroom- and content-based perspectives. We must persist

beyond traditional empiricism in the face of detractors who insist that mathematics education researchers subscribe to certain norms of acceptability (Hostetler, 2005). Before these changes can happen, however, background work is required to learn of new methodologies and their potential relevance to mathematics education contexts.

A Starting Place

Adding interdisciplinary training in research methodologies to our core training in mathematics education research will open up new possibilities for how we conceptualize mathematics education research and how we address issues of equity. These additions do not require a complete overhaul of existing programs. Hesse-Biber and Leavy (2008) explain: “Working with emergent [methodologies] is not about abandoning our disciplinary training but rather taking that training, adapting it, applying it, modifying it, and working beyond it as appropriate with respect to our research objectives” (p. 2). deMarrais and Lappan (2004) argue that “In order to prepare new scholars for the multiple paradigmatic perspectives of research, they must be knowledgeable about the historical, philosophical, and moral foundations of inquiry” (p. 3). Although Hesse-Biber and Leavy’s (2008) and deMarrais and Lappan’s (2004) suggestions require hard work, if we truly desire equity in mathematics education we must broaden the methodological landscape and treat methodologies as tools (Stinson & Bullock, 2012) that offer multiple ways to address our questions related to for equity in mathematics education.

Speilman (2012) suggests that mathematics education researchers should investigate how mathematics fits within the social. Following this direction necessitates a shift in the locus of our research. This is not a call for the abandonment of more traditional empirical research, but rather for intentionality in our methodological decision making by assuming a clear methodological stance and opening up our methodological repertoire to include new possibilities. I suggest three ways in which mathematics education researchers can begin to use methodology as a means to strengthen equity-based research: embracing methodological clarity (Caelli, Ray, & Mill, 2003), shifting the site of research, and pursuing interdisciplinary opportunities.

Caelli, Ray, and Mill (2003) define *generic qualitative research* as “that which is not guided by an explicit or established set of philosophic assumptions in the form of one of the known qualitative methodologies” (p. 2). This lack of methodological clarity often begins with the confounding of methodology and method. Researchers are often very detailed when explaining *what* they do (method), but lack explanation for *why* they do it (methodology) (Carter & Little, 2007). Why use a semi-structured interview? Why

use member checking? Why only a single participant? These, and many others, are important methodological questions that often speak to the researcher's core beliefs about the participants (Carter & Little, 2007). Researchers that use single cases often believe that experience is not generalizable and each site of research should be examined on its own (Donmoyer, 1990). Those who check semi-structured interview data with participants ascribe to a research ethic that values the participant's voice and perspective and wants the data to reflect that perspective as accurately as possible (Tracy, 2010). This value of the participant should be explicated as a reflection of their methodological choices, particularly in an equity-based study.

Valero (2012) outlines a network of mathematical practices that includes "sites of practice such as international or national educational policy making in mathematics, teacher education, textbook production, the labor market, and even the very same research on all these practices, among others" (p. 374). The existence of this network acknowledges that equity issues are not simply classroom issues, but rather "smaller pieces of larger societal narratives and racial projects" (Martin, 2009, p. 297). It is within this network that we find the root issues that produce the fruit of low achievement that forms the basis of the achievement gap (Flores, 2007). Shifting the site of research challenges the unspoken implication of achievement gap logic: that children—or perhaps their teachers—are responsible for their underachievement and thereby deficient (Flores, 2007; Gutiérrez, 2008; Martin, 2009). As long as these social, political, and economic forces work to reify marginalization, there is little opportunity for the equity that we crave. Addressing equity in mathematics education requires research that touches each of these sites of practice.

I have suggested methodological clarity and shifting the site of research as two areas in which a mathematics education researcher interested in investigating issues of equity can begin to embrace methodological diversity. Implied in each of these suggestions, however, is a need to look within other disciplines to find ideas that might benefit mathematics education. Paul and Marfo (2001) suggest that the education researcher's reading "should be both extensive and carefully selected to introduce [her or him] to basic, and in some instances classic, literature associated with different traditions" (p. 542). Limiting professional reading to mathematics education research literature limits the possibilities for future research to methodologies that are present in the existing literature base. Interdisciplinary reading, however, will expose the mathematics education researchers to methodological options that remain untapped in mathematics education research.

In addition to reading across disciplines, interdisciplinary research is another way to introduce new methodologies into mathematics education research. Many researchers have embraced participatory methodologies such

as action research to foster collaborations with mathematics teachers (Van Zoest, 2006). Such collaborations produce a genre of research that is relevant to both the research and practitioner communities. In addition to collaborations with practitioners, interdisciplinary collaborations with researchers can also provide an opportunity to conceptualize issues in mathematics education differently. Scholars outside of mathematics education or education in general bring different sets of knowledge that can inform issues of equity in mathematics education. They can also bring valuable expertise "that extends beyond the methodological boundaries of one's own research" (Paul & Marfo, 2001, p. 542).

In summary, equity in mathematics education is a complex issue. Addressing this issue within mathematics education research is equally complex and begins with the acknowledgement that existing approaches are not bringing about desired improvements for marginalized students. I have proposed methodological diversity as one strategy to expand the landscape of mathematics education research beyond gap gazing to address inequities in new ways. Although extending beyond our methodological comfort zones requires a lot of work, it is part of our responsibility as researchers concerned with equity in mathematics education. Hostetler's (2005) closing comments address this responsibility:

As [mathematics] education researchers, we have a particular obligation and opportunity to take a leading role in seeing that the research that is done is truly good research. As we do our work, we need to think beyond questions of how we will study students or analyze school policies: We need to think about how we can make life better for people. We need to think beyond our take-for-granted ideas of well-being and what is good and make those ideas the objects of serious, communal inquiry. Serving people's well-being is a great challenge, but it is also our greatest calling. (p. 21)

By placing the well-being of marginalized children at the foundation of our research decision making and doing what we can as researchers and scholars to equip ourselves to make appropriate methodological decisions, we can be sure that we are conducting good equity research.

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