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COMMENTARY

Mathematics as Gatekeeper: Power and Privilege in the Production of Knowledge

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This research commentary is generated in response to two recent events, each occurring under the National Council of Teachers of Mathematics (NCTM) umbrella. First, in the March 2010 issue of *Journal for Research in Mathematics Education* (*JRME*), editor M. Kathleen Heid stated, "*JRME* publishes research in which mathematics is an essential component rather than being a backdrop for another area of inquiry. I encourage readers to continue to examine articles in *JRME* with the 'Where's the math?' question in mind" (p. 103). Heid proceeded to describe seven studies,[1] exemplars, which "make sense only in the context of mathematics" (p. 103).

Second, we refer to NCTM hosting a research symposium titled *Keeping the Mathematics in Mathematics Education Research* at the 2010 NCTM Research Presession. The panelists for the symposium were Deborah Ball, Michael Battista, Guershon Harel, and Patrick Thompson (Jere Confrey was the discussant). The published symposium summary stated:

> This session focuses on the role of mathematics in mathematics education research. In particular, the session addresses a growing concern among many mathematics education scholars regarding the lack of attention to mathematics in much of the current work in mathematics education. (NCTM, 2010, p. 60)

[1] Ely (2010); Filloy, Rojano, & Solares (2010); Ng & Lee (2009); Oehrtman (2009); Speer & Wagner (2009); Stylianides, G. & Stylianides, A. (2009); Thanheiser (2009)

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The Myth of Neutrality: Mathematics Education is Political

We acknowledge that participation on a panel does not imply that all panelists hold the same views. However, because the session description referred to concerns among *many* unnamed mathematics educators, the statement could be interpreted to mean that the participants were among those who are concerned. During the session, each panelist presented her or his particular responses to the issue of "centering" mathematics content in mathematics education research. In the context of a philosophical argument, Harel (2010), in his handout, raised the following questions about the role of mathematics in mathematics education research:

- Are the methodologies and theories of mathematics education research independent of the discipline of mathematics?
- If no, how does mathematics factor in these methodologies and theories?
- What are the impacts of the different perspectives on these two questions on the fulfillment of the ultimate goals of mathematics education research?

He also stated, "These questions are neutral—they entail no political agenda" (p. 2). Harel further noted:

> The body of literature on whole number concepts and operations, rational numbers and proportional reasoning, algebra, problem solving, proof, geometric and spatial thinking produced since the 70s and into the 90s has given mathematics education research the identity as a research domain, a domain that is distinct from other related domains, such as psychology, sociology, ethnography, etc. In contrast, many current studies, rigorous and important in their own right as they might be, are adscititious to mathematics and the special nature of the learning and teaching of mathematics. Often, upon reading a report on such a study, one is left with the impression that the report would remain intact if each mention of "mathematics" in it is replaced by a corresponding mention of a different academic subject such as history, biology, or physics. There is a risk that, if this trend continues, research in mathematics education will likely lose its identity. (p. 4)

We question the neutrality suggested by Harel (2010). Heid's (2010) commentary and question, as well as the symposium summary and Harel's aforementioned statement, are *not* neutral (Blair, 1998). They are political statements and represent particular stances and positions on the value and production of knowledge. They should be acknowledged, recognized, and deconstructed as such.

In our view, these statements also represent very public displays of power and privilege. The implications for such exercises of power, under the auspices of an institutional and organizational entity such as NCTM, are profound, as they have the potential to marginalize scholarship within particular areas of focus as well as to marginalize scholars who devote themselves to this work. Young schol-

ars and graduate students are particularly vulnerable if the subtext of these statements is on pursuing what is valued in the field, as decided by those in positions of power, versus choosing what they want to make their life's work. Clearly, these can be overlapping choices but for many scholars they are not, and real conflicts can arise between senior scholars and junior scholars, between faculty members and graduate students, and along many other lines where issues of power and identity emerge as relevant.

What Mathematics? For Whom? and For What Purposes?

When these statements and stances are further mined for their political content, several questions emerge about knowledge production in the domain. For example, an ethnomathematical-inspired response (see, e.g., Powell & Frankenstein, 1997) would first require one to ask, to whose mathematics are Heid (2010) and Harel (2010) referring? Is it the very same school mathematics that has been used to stratify students, affording privilege to some and limiting opportunities for others (DiME, 2007; Gutierrez, 2000, 2008; Gutstein, 2003; Leonard, 2008, 2009; Martin, 2009a, 2009b, 2010; Stinson, 2009; Tate, 1995)? Mathematics, as a subject domain, is not acultural, without context or purpose, including the political (Leonard, 2008), yet many students perceive school mathematics to be a narrow set of rules and algorithms that have little or no meaning to their lives. Is *this* the mathematics to which Heid, Harel, and, perhaps, the other panelists might be referring? Mathematics can also be a tool for understanding the world and, in the case of marginalized students, it can aid in understanding the social forces that contribute to their marginalization (Gutstein, 2006; Martin & McGee, 2009). Is *this* the mathematics to which Heid and the panel members refer?

Who Decides What Counts as Mathematics Education Research?

More generally, in the spirit of scholarly exchange, we ask who is empowered or entitled to decide what counts as mathematics education research?[2] Are some types of studies, areas of focus, and theoretical perspectives privileged over others? Who is being silenced in the context of such exercises of power? Who belongs to the list of "many mathematics educators" to which the symposium summary refers? Why is there a "growing concern" among these scholars about particular areas of inquiry in mathematics education when the history of research in the field is characterized by shifts from behaviorism to cognitivism, to constructivism, to situated, to sociocultural analyses? Which areas of study are *now*

[2] We believe that "peer review" is an incomplete and insufficient response to this question given that the ideological parameters for what constitutes knowledge in the field are established and reinforced in many other contexts (e.g., advising of students, funding of grants).

the causes for such concern? Cannot significant and insightful findings about mathematics learning result from studies where there is not a focus on specific mathematics content?

We agree, without pause, with the basic premise that mathematics content is important. We do not wish to minimize its importance. Nor do we seek to overstate it. In fact, we have taught, and continue to teach, mathematics content in contexts ranging from elementary schools to universities. Yet, for many scholars, including ourselves, subsequent efforts to add needed complexity to the understanding of learners, their social realities, and the forces affecting these realities have led them (and us) to take social, sociopolitical, and critical turns in their (our) work, away from overly narrow concerns with mathematics content. These turns have made salient many issues not typically pursued in mathematics education research, including issues of identity, language, power, racialization, and socialization. Are these the turns that have prompted recent replies within the NCTM context?

A historical review of *JRME* would show that the vast majority of articles published do indeed focus on (school) mathematics content. So, the extra scrutiny imposed by "Where's the math?" is unclear. Moreover, it has been somewhat standard practice for *JRME* to confine issues of equity, for example, to "special" issues of the journal.[3] In many ways this practice has helped to relegate these issues and the authors of such scholarship to the margins. The most recent equity effort by *JRME* is being published in an online context where the special issue designation remains intact. Dealing with equity-focused scholarship in this way is all the more interesting considering that equity is the lead principle of the *Principles and Standards for School Mathematics* (NCTM, 2000), the signature document for NCTM. The fact that equity is the first principle in this document would seem to imply that equity is NCTM's foremost guiding principle. If this is indeed the case, then a fundamental question that could (should?) be applied to all articles and reports being considered for *JRME* and other NCTM publications is: To what degree does this article (or report) under consideration contribute to equitable mathematical experiences and outcomes?

It is interesting to note that none of the seven studies cited in Heid's (2010) editorial explicitly attend to issues of equity. Because this lack of attention is representative of a more general trend, it may be true that *JRME* is not regarded as a "go-to" journal for mathematics education scholars who employ research methods and take epistemological positions considered outside the mainstream. Of course, alternative outlets do exist, but this should not minimize efforts and events that

[3] See *JRME* 1984 Volume 15, Number 2: *Special Issue – Minorities in Mathematics* (edited by Westina Matthews) and *JRME* 1997 Volume 28, Number 6: *Special Issue – Equity, Mathematics Reform, and Research: Crossing Boundaries in Search of Understanding* (edited by William F. Tate and Beatriz S. D'Ambrosio).

impact the kinds of scholarship and perspectives that appear in what some scholars regard as the flagship journal in the field.

The Changing Faces of Mathematics Education

Examination of the excerpt from Harel (2010) presented earlier also reveals a concern about losing the "identity" of mathematics education research. Not only was that identity established based on studies in the areas he cited—whole number concepts and operations, rational numbers and proportional reasoning, algebra, problem solving, proof, geometric and spatial thinking—but also that identity can be linked to the researchers who carried out studies in those areas. In a very real sense, those researchers became, and perhaps remain, the faces of mathematics education. Throughout the time period identified by Harel, from the 1970s to the early 1990s, those faces were predominantly White and predominantly male and most studies in the areas he identified did not address issues of equity or attend to the "social" and "emotional" conditions that he noted as being important.[4] We note that as new scholars have entered the field and turned their attention to equity-oriented and critical scholarship, they have increasingly drawn from theories and methods outside of mathematics education and raised questions that go far beyond issues of content. We also note that many of the scholars conducting this research are scholars of color, female, and critical White scholars, who, while appreciating and respecting traditional areas of focus and research approaches, have partially eschewed tradition. Certainly, this research can make, and is making, positive contributions to the identity of mathematics education research.

Furthermore, we argue that the students on whom equity scholarship often focuses—African American, Latina/o, Native American, and poor students—serve as canaries in the mineshaft for the long history of content-focused scholarship in mathematics education; a history that is many times longer and more indicative of priorities in the field than any recent scholarship that might be implied in the symposium summary. Data on mathematics achievement among these students show that, despite some small gains, they continue to be underserved by mathematics education despite a proliferation of theoretical perspectives and content-focused research paradigms focusing on cognition, curriculum development, and assessment (Secada, 1992; Tate, 1997).

Rather than generating concern about studies that do not give priority to mathematics content, it may be more informative to understand why studies that have continued to do so have offered so little in the way of progress for students who remain the most underserved. Minimal progress for these students would

[4] The research of Ed Silver and colleagues is one notable exception (see, e.g., Silver, Smith, & Nelson, 1995).

seem to demand that we pursue *all* promising areas of inquiry informing us about how to help them experience mathematics in ways that allow them to change the conditions of their lives. It is important to document which approaches and practices are effective with these students (Leonard, 2008). Now is not the time for restricting the production of knowledge. As scholars who are deeply concerned with equity issues, not only for children but also within the domain itself—and clearly these should be concerns shared in the *JRME* and NCTM contexts—we believe the stakes are simply too high to remain silent on such efforts.

Many scholars in mathematics education have written about and acknowledged the gate-keeping role that mathematics has served in limiting meaningful participation in schools and society. Any move in the directions of (a) using mathematics as *the* critical filter in regulating the production of knowledge about mathematics learning and participation and (b) consequently including and excluding scholars and scholarly ideas because they fall outside of some preferred areas of focus, is, in our view, an unfortunate one. It is a move that merely appropriates and instantiates the most effective methods for creating hierarchies in our domain. It is also a move that appears to represent a "back-to-basics," traditional approach to mathematics education research. This move is contradictory; it implicitly calls for a return to prescriptive, narrow approaches to the study of mathematics learning and behavior in an increasingly complex world (e.g., the lives and mathematical development of students are more complex than the strategies they do or do not demonstrate; the lives and practices of teachers are more complex than their level of content knowledge). Is this move not reminiscent of the ideological and epistemological debates that characterized the math wars? Relevant and insightful knowledge about mathematics learning and participation should be welcomed not discouraged.

What's the Context?

We agree that the seven examples cited in Heid's (2010) editorial do a fine job of attending to mathematics content and are informative in their own right; but, in our view, they represent a limited range of approaches for studying mathematics teaching and learning and children's mathematical development. In that, mathematics teaching and learning and children's mathematical development are intertwined with a number of complex micro-, meso-, and macro-level forces. Understanding how and why children interact with mathematics content in the ways that they do as well as how and why they learn is not a question of mathematics content alone.

Consider a hypothetical study of children's systematic errors in multi-digit subtraction problems involving whole numbers.[5] Although hypothetical, the study

[5] An extended version of this narrative appears in Martin (in press).

description is representative of many that have focused on children's systematic errors in multi-digit subtraction problems involving whole numbers (see, e.g., Verschaffel, Greer, & DeCorte, 2007).

In our hypothetical study, the (hypothetical) female researcher draws primarily on developmental and cognitive psychology and her prior work has sought to identify universals in children's mathematical thinking. Her recent work has turned to questions focusing on the role of culture. In addition to this new focus, she has decided to extend her work to urban settings, hoping that it can contribute to discussions of equity by highlighting key areas of intervention for urban elementary school children. Highlighted in one portion of her study is a student identified only as Omari. It is reported that Omari demonstrated poor performance on a series of problems across clinical sessions such that even his pattern of errors differed significantly from known results presented in previous studies: many children develop only a concatenated single-digit conception of multi-digit numbers. She characterizes Omari's misconceptions as reflecting low cognitive ability. His case, in turn, is used as a data point in a larger argument about the at-risk status of poor, urban children and as evidence to support the claims that "most children from low-income backgrounds enter school with far less knowledge than peers from middle-income backgrounds" (National Mathematics Advisory Panel, 2008, p. xviii) and that "although low-income children have pre-mathematical knowledge, they do lack important components of mathematical knowledge" (Clements & Sarama, 2007, p. 534).

Here, we offer one possible, hypothetical contextualization of Omari's mathematical behavior relative to some of the considerations that we believe would shed additional light on his mathematical behavior; considerations that do not typically make their way into many content-focused studies. We build the context by drawing on recent research on the political economy of urban schooling that paints a vivid picture of how issues like race, class, housing and school segregation, and school policy interact to affect thousands of children in public schools (Lipman, 2004; Neckerman, 2007). We draw especially from work focused on Chicago; the nation's most racially segregated large city and a city whose districts and schools are emblematic of urban public education (Lipman; Neckerman). Our purpose in presenting a hypothetical contextualization of Omari is to demonstrate that context provides for profoundly different understandings of his "mathematics identity" (Martin, 2000, p. viii) that not only brings into question the findings of the hypothetical study but also much of the reported non- or under-contextualized findings found in existing mathematics education literature.

We begin our contextualization by noting that Omari is a Black child. We note this aspect of his identity not to essentialize his being in the world but to suggest the inextricability of identity development—racial, mathematical, gender, and otherwise—and mathematics learning and development, not as a predictor of

behavior but as a factor that influences how students are socialized and enculturated into local mathematical practices (Oppland, 2010). Omari lives with his mother, father, and grandmother in a working-class neighborhood. His neighborhood consists primarily of Black families. The history of the neighborhood reveals that it has existed as a cultural enclave, first for various European immigrant groups, then for Black residents. As the Black population in the neighborhood increased, city institutions have increasingly underserved the neighborhood (Neckerman, 2007). Recent investment in the surrounding area coincides with gentrification and the dislodging of long-time residents in favor of wealthier residents (Lipman, 2004).

Omari attends the neighborhood school, but the school is under threat of reconstitution or closure despite growth trends in achievement. The school is located in a district where nearly half the students are identified as Black and nearly 90% are identified as Black or Latina/o (Lipman, 2004; Neckerman, 2007). Eight percent of the students are identified as White and half of those are in special education, where they receive additional educational services. The remaining White students in the city attend either private schools or one of the selective charter schools. District policy is driven by attempts to close what it identifies as a racial achievement gap between the nearly 90% Black and Latina/o student population and the 4% White student population (Lipman; Neckerman). Community groups and leaders have protested against the growing number of charter schools and called for more school funding and school improvement plans that provide students in neighborhood, non-charter schools with equitable learning opportunities (Lipman). These groups and leaders have also argued that racial achievement gap rhetoric throughout the district sends a damaging message to Black children about their identities and contributes to a larger discourse in the city that pathologizes Black communities and families.

A number of new and inexperienced teachers have been hired recently at Omari's school (Lipman, 2004; Neckerman, 2007). Many of these teachers know very little about the history of the community, and they struggle to engage the children they teach (Neckerman). Omari's teacher reluctantly took her job after failing to be hired elsewhere and plans to leave when a better opportunity opens up, as many of the new teachers plan to do. Omari's teacher also struggles to teach mathematics and, as a result of her struggles, she has helped to proliferate some of the errors and misunderstandings that Omari demonstrated in the findings of the (hypothetical) study. Omari's test scores from the previous year, however, show that he scored in the 90th percentile for mathematics and 85th percentile for reading on the state assessment test. This year, Omari has been disciplined by his teacher many times, as have most of the African American boys in the classroom (Ferguson, 2000; Kunjufu, 2005). Omari's teacher is often upset with him for using non-standard methods in mathematics. Omari has stated to his teacher that he

likes his methods better than the "school way" and, like many of his classmates, is often confused because the teacher makes mistakes in her explanations. Mathematics is no longer Omari's favorite subject and he is resigning himself to doing "school math" in the way his teacher tells him.

However, outside of school, Omari prides himself on being able to help his mother and grandmother go shopping at the local grocery store. Omari is particularly proud of his ability to correctly add all the numbers on the checkout receipt. Omari's grandmother decided it would be good practice for him and, in the evening after shopping, she reads the numbers back to Omari so that he can add them cumulatively. Initially, this activity was a struggle for Omari but, with help from his grandmother, he began to develop efficient methods for carrying out the calculations. During the week in which Omari participated in the study, his grandmother was seriously ill and he was very worried about her.

Context Produces Different Knowledge

Although hypothetical, our contextualization of Omari clearly demonstrates how context produces *different* knowledge, and why asking *what's the context?* is important. Recent equity-focused scholarship provides scientific evidence that forces us to consider the multiplicities of complexities of Omari's mathematics development and identity. This research, by a growing number of scholars, brings attention to issues of power, identity, language, and race (e.g., Berry, 2008; DiME, 2007; Gutiérrez, 2000, 2008; Jackson, 2009; Johnson, 2009; Leonard, 2008; 2009; Malloy & Jones, 1998; Powell, 2002; Spencer, 2009; Stiff & Harvey, 1988; Stinson, 2009; Tate, 1995; Taylor, 2005; Walker, 2006; Weissglass, 2002) and has allowed us to begin altering the conversation on children like Omari who, quite frequently, have been constructed in deficit-oriented ways. Critical analyses of research (e.g., Gutiérrez, 2008; Martin, 2009a, 2009b, 2010; Valero & Zevenbergen, 2004) have shown that content-focused studies that ignore or simplify the larger social context have often helped to normalize these constructions by suggesting, for example, that poor and minority children enter school with only *pre*-mathematical knowledge and lack the ability to mathematize their experiences, engage in abstraction and elaboration, and use mathematical ideas and symbols to create models of their everyday lives. Left unanswered is whether researchers who report these findings understand, even partially, the everyday lives of these children (Martin, 2009b). Just 10 to 15 years ago, considerations such as those pointed out in Omari's story were either understudied or underconceptualized in children's mathematical development. Why return to a time when mathematics education research largely ignored such considerations (Lubineski & Bowen, 2000; Secada & Meyer, 1989)?

Closing Remarks

It is important to note that invoking equity-oriented concerns does not represent our own attempt to privilege one kind of scholarship over other forms. Nor is it an attempt to suggest that equity concerns are mutually exclusive with the personal commitments of Heid (2010) and the members of the panel (NCTM, 2010). Our concerns rise well above the personal and are focused on knowledge production and regulation in the field, including contexts like *JRME* and the NCTM Research Presession. Misinterpreting and misconstruing our scholarly critique as personal would be disingenuous and misses the point.

Questions such as "Where's the math?" (Heid, 2010) and expression of a "growing concern among many mathematics education scholars regarding the lack of attention to mathematics in much of the current work in mathematics education" (NCTM, 2010, p. 60) represent political stances and are symbolic of larger power relations in the domain. They are not neutral and we find it necessary to ask whose interests are served by these political stances? What intellectual territory and spaces are being claimed or reclaimed by such concerns? We raise these and our earlier questions knowing that the enterprise of mathematics education is no different than other societal contexts characterized by power relations. Mathematics education, as an enterprise, benefits from a variety of research perspectives and approaches. Nevertheless, mathematics should not be the gatekeeper for the production of knowledge in the field.

EDITOR'S NOTE: Deborah Ball, Michael Battista, Jere Confrey, Guershon Harel, and Patrick Thompson (the presession panelists) and Kathleen Heid (*JRME* editor) were provided an advance copy of this commentary and invited to write a response commentary; see Jere Confrey's and Michael Battista's responses, this issue.

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