
INSIDE CRITICAL/RADICAL MATHEMATICS EDUCATION: A VIDEO EXPLORATION

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Symposium participants will observe and discuss video of two distinct enactments of the practice of two experienced critical/radical educators, Eric (Rico) Gutstein and Robert Moses. A major goal of the session is to further theorize and problematize practical applications of critical/radical mathematics education.

The goals of the proposed symposium are for participants to: (a) compare, contrast, problematize two paradigms of critical/radical mathematics education in practice and better understand how teachers may enact them; (b) analyse relationships between critical/radical mathematics educators' claims regarding their philosophical, political, and pedagogical perspectives and how they enact these in practice; (c) watch classroom video of experienced critical/radical mathematics educators attempting to enact their theoretical perspectives in practice, that is, to get a sense of what it "looks like" in classrooms; and (d) examine how critical/radical mathematics education teachers may position students in the classroom with respect to their participation as meaning makers and creators, both doing mathematics and awaking/engaging politically. To achieve these aims, we will engage the symposium participants in the central question: *Why might this be critical/radical mathematics education?*

AN EXAMPLE OF READING AND WRITING THE WORLD WITH MATHEMATICS

Gutstein (2006) has built on the scholarship of Freire (1970/1998) who coined and defined the term *reading the world* and *reading the word* as two dialectical processes that lead to critical consciousness and critical, reflexive action. Freire's pedagogical aims were to engage adults in learning how to read the word (literacy) while simultaneously learning to read the world (critically reading society). Through critical literacy (reading the word/world), Freire advanced the notion of writing the world (acting upon the world to transform it) as the interrelated complement to reading the world. Similarly, Gutstein's teaching of reading and writing the world with mathematics (RWWM), building on Frankenstein (1983), entails learning to read the mathematical word (school-sanctioned mathematical

knowledge) while simultaneously learning to read the world with (and without) mathematics –both competencies necessary to effectively change or write the world with mathematics. To teach using a RWWM framework accordingly means that

... students develop deeper sociopolitical awareness through learning and using mathematics to study reality, which prepares them to shape society by using mathematics, at the moment and in the future. They come to view mathematics as useful in this process (a dispositional shift), recognize some of its limitations, and also learn that mathematics is but one way to read and write the world. Through understanding and acting in the world—even if their actions are limited by being in school—they also transform themselves (Gutstein, 2016, p. 457).

Gutstein (2016) theorized that RWWM involves two sets of dialectical relationships –one, reading the world (in general) and reading the mathematical word, and two, reading and writing the world with mathematics. That is, learning to unpack one’s sociopolitical reality with mathematics contributes to students being able to act upon reality to transform it both with, and without, mathematics.

One of the videos to be shown and analysed is an example of RWWM. In 2008-2009 Gutstein taught a twelfth grade mathematics class to 21 African-American and Latin@ students in which RWWM was the primary aim. Gutstein and students used mathematics as a lens to study four main thematic units: voter disenfranchisement, displacement forces (deportation and gentrification), AIDS, and criminalization of youth/people of colour. Students explored social issues plaguing their lives, their families, and their communities through the study of mathematics. Students culminated the year by presenting their learnings to their communities. This class took place in a small, non-selective-enrolment, public school born out of a community struggle whose thematic focus as a school was social justice.

AN EXAMPLE OF MATHEMATICS EDUCATION AS A CIVIL RIGHT

Robert Moses has drawn on his experience with the African-American Civil Rights Movement in addressing the constitutional status of children with respect to their public school education in the United States. As a member of the Student Nonviolent Coordinating Committee, he directed efforts to address Mississippi sharecroppers’ exclusion from voting and to gain standing in the National Democratic Party (Moses, Kamii, Swap, & Howard, 1989). After opening up political access, Moses continued to address the issues he found around him, in particular, in the lives of his children, and to “transform them into broader political questions” (Moses, et al., 1989). Given high school algebra’s role as a gatekeeper and its importance in an increasingly technological world, he identified success in algebra as an immediate issue for the children in his community (Moses & Cobb, 2001).

He then worked inside and outside the school to shift the conversation from asking who would get access to higher-level mathematics to asking what would need to be changed in order for all students to have that access. Continuing this shift, and expanding its scope, Moses identified mathematics literacy as strategic in demanding a quality education as a constitutional right (Perry, Moses, Wynne, Cortes, & Delpit, 2010). Founding the Algebra Project in 1982, Moses works nationally to create a grassroots demand for quality education among young people from the underserved lowest quartile of the U.S. population.

In all of these efforts, Moses continues to draw on the grassroots, nonviolent approach of Ella Baker (Moses et al., 1989), often describing it as earned insurgency (Moses, 2016). We identify three key features of this approach. First, racism is a form of violence. Violence can create trauma, erode capability, and undermine development (Herman, 2015). The Algebra Project attends to the conditions of learning and uses safety, empowerment, reconnection, and commonality to *address and manage the trauma of injustice*. Second, *addressing social injustice and developing capabilities are mutual activities*. Justice can open the door, but stepping through requires investing in and exercising capabilities; and developed capabilities are squandered if the door remains closed. In other words, learning mathematics is an essential component of the uprising. Third, *earned insurgency* is about a politics of peace, one that deemphasizes notions of sides and emphasizes inclusion, where all are responsible for addressing injustice. Instead of attacking an enemy, the approach is about earning trust for the work –of the people students, that the movement is serious about the work, of the national government, that the movement ought to be provided with a legal crawlspace, and of the country, that it ought to take a look at itself (Moses, 2016). For the movement, *insurgency is built on truth and trust*.

To teach in the spirit of the Algebra Project requires appreciating that public school education in the United States remains the clearest manifestation of the nation's caste system and that building success in mathematics education is an organizing tool for establishing the right to quality education for meaningful democratic citizenship. Indeed, this is the initial understanding with students –the Algebra Project will support your education as part of your participation in pursuing this common agenda. Students' initial understanding may be nascent, but this is the point of reference for the mathematical work students learn to do. When students detach, act out, or just loose focus, it is this agenda and its urgency that guide the response.

The Secondary Mathematics Laboratory (SML) was a two-week summertime math class for 18 underserved students taught by Moses, with an aim of making skilled, disruptive teaching “visible” to observers.

The curricular design and pedagogical approach are grounded in initial experiences that support students recording of observations in their own words, *people talk*, which they then learn to rewrite as *feature talk*, then represent iconically, and finally as formal symbolic mathematics (Moses & Cobb, 2001). The topical focus was on symbolic notation for, and interpretation of, binomials and trinomials. Students built objects out of materials designed to reflect the mathematical structure of polynomials, manipulated the objects, made observations, developed an understanding of features, and developed iconic and symbolic notations for their observations. Video recordings, lesson plans, and other instructional artifacts from the SML will provide a window into this second political-pedagogical perspective.

AN EMERGING ISSUE AND PLANS FOR THE SESSION

Larnell, Bullock, and Jett (2016) suggest a contrast between Gutstein's and Moses' approaches, as social-justice-as-critical-consciousness and social-justice-as-instrumental-access respectively. Martin and McGee (2009) criticize Moses' approach as focusing on preparation for the job market without promoting critical consciousness. Our initial examination of the two approaches and their classroom enactments suggests that both approaches are concerned with critical consciousness, but that where Gutstein's focuses on knowledge as power (its production and use), Moses' focuses on earned insurgency for a legal guarantee of rights. After presenters briefly frame the session, for each of the two enactments they will contextualize the video and provide significant time for small-group and then whole-group discussion, concluding with a final whole-group discussion and a few concluding remarks.

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