

Book Review...

A Critical Discourse Offered: A Review of *Radical Equations: Math Literacy and Civil Rights*

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Moses, R. P., & Cobb, C. E. (2001). *Radical equations: Math literacy and civil rights*. Boston: Beacon Press. ISBN 0-8070-3126-7

In 1989 the National Council of Teachers of Mathematics (NCTM) listed “Opportunity for all” as one of the “New Societal Goals” for mathematics education (pp. 3-4). By this time Robert P. Moses had already been taking that idea to communities in the form of the Algebra Project, a grassroots education movement he originated and developed to increase black students’ access to algebra as a gateway to the study of advanced mathematics. A historical and active civil rights leader, Moses is an expert at bringing novel ideas to communities even if the ideas seem impossible to implement. He equates rallying support and action from the Mississippi sharecropper for the “one person, one vote” slogan of the Mississippi Summer Project¹ to rallying support and action from students, parents, and school and community leaders for the “If we can teach students algebra in the middle school years, then we should do it” (pp. 91-93) slogan of the Algebra Project.² His justification for this “radical” equation and description of how the lessons learned from Mississippi assisted in the development of the Algebra Project are the central topics of his book *Radical Equations: Math Literacy and Civil Rights* (2001), co-written with journalist Charles E. Cobb Jr.

The purpose of Moses’ personal and compassionate narrative is not to provide tenets of a reform curriculum and research results of its effectiveness for scholarly critique, but to get readers to rally behind the idea that to deny a student access to an advanced mathematics education is in essence to deny them their civil rights, and that to achieve mathematical literacy for all students will take grassroots activism. Thus the intended audience of the book is broader than the readers of academic journals: Moses wants to reach not only mathematics educators with his message, but students, parents, and leaders of schools and communities. In this review, I argue that Moses’ book is an important read for all those involved in mathematics education because of the critical discourse

he provides on two key aspects of reform. In addition, I discuss boundaries of Moses’ approach and limitations that stem from Moses’ lack of questioning in three areas that may be critical to reform efforts.

Through interweaving his personal experience as a civil rights leader, Moses engages the reader with *conscientização*³ in two recurring aspects of reform in mathematics education. The first aspect, the need for reform, is often located in discussions regarding mathematical literacy requirements of the future workforce of the U.S. economy. Arguing the need for reform within this frame of reference is not new; “Mathematically literate workers” (NCTM, 1989, p. 3) was one of the “New Societal Goals” stated in the *Standards*. And like the NCTM and other educational and government organizations that have discussed the issue before and after the release of the *Standards*, Moses presents the need for reform by providing statistical facts about the new high-tech information-age service economy of the United States in which mathematically literate workers are essential.⁴ Furthermore, he identifies an advanced mathematics education as the key to becoming technologically literate in this economy.

Moses provides a critical discourse on this need for reform by not only acknowledging mathematical literacy for all as an “economic necessity” (NCTM, 1989, p. 4), but by communicating that mathematical literacy for all is necessary for the attainment of civil rights. Moses believes history has demonstrated that being denied economic and educational access leads to being denied full citizenship. That is, by examining the U.S. economic and education structures from the post-Civil War period to the twentieth-century, he concludes that poor people and people of color continue to be subjugated to positions of economic disadvantage and unjust schooling practices. As a result, these people are effectively prevented from attaining full citizenship. He equates the oppressive elements of the institution of sharecropping with the unjust schooling practices of the institution of public schools that often provide poor students and students of color with a “sharecroppers education” while they prepare “an elite to run society” (p. 11).

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Moses identifies a specific component of the sharecropper education as the failure to prepare students for advanced mathematical studies in their middle school years, which results in students' lack of opportunity to participate in an advanced mathematics curriculum in their high school years. Moses argues this lack of opportunity most often means students will not develop mathematical literacy. Moses believes mathematical illiteracy will result in limited economic access, and he sees participation in algebra as crucial.⁵ Although Moses admits that there has always been a certain level of cultural acceptance for mathematical illiteracy in the United States, he claims it affects Blacks and other minorities more severely—"making them the designated serfs of the information age just as the people that we [civil rights activists] worked with in the 1960s on the plantations were Mississippi's serfs then" (p. 11).

Moses also creates critical discourse through detail. By explicitly identifying white power structures as oppressors, Blacks and other minorities as being oppressed, and the operation of oppression in denying them economic access and full citizenship, Moses makes explicit the NCTM's statement that "[t]he social injustices of past schooling practices can no longer be tolerated ...[m]athematics has become a critical filter for employment and full participation in our society" (1989, p. 4). That is, Moses specifies injustices in ways that the NCTM cannot (or dares not). Thus he achieves a certain critical power: In light of his words, it becomes more difficult for educators to ignore or brush off inequities such as the continued imbalances in the race of students in advanced mathematics classrooms in the U.S.

Enacting reform in mathematics education is the second aspect of reform for which Moses provides a critical perspective. Based on his experience of developing grassroots organizations that took action against the oppressive U.S. political structures during the 1960s Civil Rights Movement, Moses believes that it will take similar grassroots organization and action in order for Blacks, and other minorities, to implement mathematics education reform within their communities. This belief is also based on his observations of urban and rural school communities that currently implement the reform curriculum of the Algebra Project in their efforts to provide students equal access to an advanced mathematics education. Moses attributes the successful growth of the Algebra Project to the two main tenets borrowed from his experience in the Mississippi Summer Project: "the centrality of families to the work of organizing, and organizing in the context of the community in which one lives and works" (p. 18). He believes that the most important lesson learned from Mississippi is that "it is

getting people at the bottom to make demands, on themselves first, and then on the system, that leads to some of the most important changes" (p. 20). In other words, only after students, followed by parents, and then by school and community leaders, organize and take action against the oppressive elements of schools and schools systems will all children be provided the opportunity to participate in an advanced mathematics education.

To illustrate the power of grassroots organization when implementing reform, in Part I of his book, Moses recounts the story of his involvement in the Civil Rights Movement. This story engages the reader in Moses' personal encounters with such figures as Ella Baker, Martin Luther King Jr., John Lewis, Julian Bond, Medgar Evers, and others. But more importantly, in this section Moses relates his encounters with "ordinary working people", black and white, who through organizing became self-empowered and facilitated change. Moses says that it was these individuals who not only took the lead in challenging white power but also challenged and changed themselves.

Part II of Moses' book chronicles the actual enactment of his mathematics education reform efforts, the development of the Algebra Project. The Project began in 1982 when Moses taught Algebra I to his daughter and three of her classmates because the course was not offered at their Cambridge, Massachusetts public middle school. This initial instruction developed into community and school meetings, initially organized by Moses and then by community members, addressing the need and desire of the students to have the opportunity to enroll in Algebra I at their middle school. Over the past twenty years these meeting have developed into a network of Algebra Project Programs in over twenty cities, serving more than 40,000 children from urban and rural communities throughout the United States. Moses defines the driving force of the Algebra Project as the idea that the ongoing struggle for citizenship and equality is linked to the issue of math and science literacy; he describes the project as "a community organizing project—rather than a traditional program of school reform" (p. 18).

Moses states that the fundamental purpose of the Algebra Project curriculum is to prepare students for an advanced mathematics curriculum in their high school years. The curriculum⁶ outlines five steps in which students participate when presented with a new mathematical idea. The new idea begins with a representative *Physical Event* that is shared by the class. This event is then followed by an *Individual Pictorial Representation/Modeling* and engagement in individual and group *Intuitive Language* about the

physical event. This classroom discourse concludes with the introduction to *Structured Language* and then *Symbolic Representation* to describe the mathematical properties of the event. Throughout these steps students make sense of their own individual mathematical understanding as well as the cumulative mathematical understanding of the class. Moses describes the Algebra Project mathematics classroom as one that encourages interaction, cooperation, and group communities.

Near the end of the book, Moses links the activism of the 1960s to a new activism for young people—an activism that will ensure that all children are provided with the opportunity to enroll in an advanced mathematics education. Because the organizing and demands of the young people were instrumental in creating large-scale change in the 1960s, Moses believes “Movement emerges from Movement” (p. 193). A result of this belief is the emergence of the Young People’s Project (YPP) out of the Algebra Project. The YPP allows students who have benefited from the Algebra Project to contribute by giving back to their community. The task of the YPP is to convince other young people and community members that mathematical literacy “is something they need, that acquiring it is work they should commit to, and that spreading it wherever they can is also their challenge” (p. 182). Moses believes that duplicating the reform strategy of the Civil Rights Movement when enacting mathematics education reform is not a “romantic longing for the past” (p. 17), but is the use of a proven strategy.

It is important for academic readers to understand that Moses’ book has intentional boundaries in keeping with its purpose. For example, Moses limits the discussion regarding foundational details of the Algebra Project curriculum. However, he does provide readers with hints of the philosophical and pedagogical ideas that have motivated the curriculum. Moses refers to experiential learning traditions when he writes, “In other words, in the Algebra Project we are using a version of experiential learning; it starts with where the children are, experiences that they share” (p. 119). He also alludes to constructivism when he states that the “‘social construction of mathematics’ [is when s]tudents learn that math is the creation of people—people working together and depending on one another” (p. 120). And in discussing teacher practices he implicitly critiques a “banking” system of teaching and learning when he suggests that teachers “cannot simply be lecturers attempting to pour knowledge into the heads of students who sit passively like inanimate vessels” (p. 122). Although an informed reader can make inferences about the philosophy upon

which Moses draws, formal references to education scholars and research are not included in the book.

Another boundary of Moses’ book is the limited discussion of empirical evidence that may support the effectiveness of the Algebra Project. Rather than focusing on methodological details and results of research studies, Moses emphasizes the personal stories of students and communities that illustrate the positive effects of reform achieved through the Algebra Project. However, he does summarize a three-year empirical study that involved students from three Alabama elementary schools. Two schools were used as the control group, receiving “traditional” instruction, and one school was used as the experimental group, receiving instruction through the Algebra Project curriculum. At the end of the third year the researchers found that students in the experimental group were outperforming students from both of the control group classrooms on standardized tests.

While these boundaries are arguably necessary for Moses to achieve his purpose, I believe Moses’ book also has limitations—issues that he does not deal with sufficiently and that relate closely to his purpose. In particular, I have identified three questions Moses does not, and perhaps should, address. First, although Moses questions to whom and how mathematics is taught in schools he fails to question the *mathematics* that is taught in schools. Moses discusses mathematics as though the discipline has been inscribed in some “great book”—as a static body of knowledge students must come to know. Does this orientation to mathematics imply that he believes the discipline only needs to be effectively transmitted in some way (though not by lecturing) to all students? In the past few decades, many mathematics educators have anchored their discussions about the discipline of mathematics in constructivism, which honors the individual mathematical knowing of the student. Although the Algebra Project curriculum encourages students’ engagement and discourse in mathematics, it seems that the ultimate goal of the curriculum is to have all students conversant in a static mathematics that resides external to students in school textbooks.

Second, Moses does not question the role that mathematics plays in the schools as a “critical filter” for higher education. Moses argues that all students should have access to a college preparatory curriculum without arguing why an advanced mathematics education is a prerequisite for college. Does the absence of such an argument imply that he is content in positioning mathematics as a filter? Since Gardner’s (1983) work in multiple intelligences, many in education have questioned the over reliance of verbal and mathematical skills in accessing “intelligence.” Even though many in education would agree that

REFERENCES

- Freire, P. (2000/1970). *Pedagogy of the oppressed, 30th anniversary edition*. New York: Continuum.
- Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. New York: Basic Books.
- Moses, R. P., & Cobb, C. E. (2001). *Radical equations: Math literacy and civil rights*. Boston: Beacon Press.
- National Council of Teachers of Mathematics [NCTM]. (1989). *Curriculum and evaluation standards for school mathematics*. Reston, VA: NCTM.

mathematical literacy is necessary for an individual in the U.S. in the 21st century, many educators would also disagree that mathematical literacy should continue to be used as a filter for access to higher education.

Third, Moses does not question the structure of schools. Although he identifies past and current unjust schooling practices that are enacted on poor students and students of color, he does so without critically questioning the structure that enacts these practices. Does this lack of questioning imply that Moses believes schools to be just and democratic structures for middle class white suburban students? Some educators may argue that the unjust and undemocratic practices enacted on some students cannot be corrected within structures that enact questionable democratic schooling practices for all students. In fairness to Moses, I understand that to critically question schools as institutions is often unpopular and may be at cross-purposes to engaging in conversation with leaders of these institutions, one of Moses' central goals. However, I believe students, parents, school and community leaders, and the mathematics education community need to engage regularly in critical conversation that disrupts aspects of how these institutions function in U.S. society.

Despite these limitations, the book is an important read: The value of Moses' critical discourse on reform outweighs the lack of questioning in these areas. Indeed, the limitations may provoke *more* discussion about issues of equity and reform in mathematics education, and thus prove to be assets. In the end, Moses' experiences as a civil rights leader demonstrated to him, and the country, that effective transformation can occur even within a flawed structure if "ordinary working people" organize and take action. Along with Moses I hope that the same can be said of mathematics education in our schools.

¹The objective of the Mississippi Summer Project was the voter registration of African-American citizens in the State of Mississippi during the late 1950s and early 1960s.

² Moses defines *we* as a "complex configurations of individuals; educational institutions of various kinds; local, regional, and national associations and organizations (both governmental and nongovernmental); actual state governments as well as the national political parties, and the executive, legislative, and judicial branches of the national government" (p. 92).

³ In *Pedagogy of the Oppressed* Paulo Freire (2000/1970) defined *conscientização* as "learning to perceive social, political and economic contradictions, and to take action against the oppressive elements of reality" (p. 35).

⁴ For example, the Department of Labor has announced that by the year 2010 all jobs will require significant technical skill.

⁵ Moses believes that the U.S. mathematical community has designated algebra as the starting point for an advanced mathematics education.

⁶The book's appendix provides a detailed example from the Algebra Project curriculum on the addition and subtraction of integers.