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## Structuring Cultural Responsiveness

A review of:

Greer, B., Mukhopadhyay, S., Powell, A., and Nelson-Barber, S. (eds.) (2009). *Culturally Responsive Mathematics Education*. (Studies in Mathematical Thinking and Learning series). New York: Routledge. 386 pp. ISBN 978-0-8058-6263-8 (hbk), 978-0-8058-6264-5 (pbk).

On a beach this summer I selected five smooth round stones. I asked my daughter and her friend to use them to make a tower so I could photograph it. Stacking round stones is not easy. The girls could not manage a free-standing tower, so they used their helping hands to hold the tower together. My daughter remarked that we could use our photo manipulation software to cut their hands out of the picture. The girls asked why I wanted this tower. I told them I was reviewing a book whose front cover picture showed such a tower: *Culturally Responsive Mathematics Education*, edited by Brian Greer, Swapna Mukhopadhyay, Arthur Powell, and Sharon Nelson-Barber.

What does this improbable tower of stones have to do with culturally responsive mathematics education? The book's cover image has been manipulated; the context has been cut out of the photo and replaced by a solid green background. Where was this tower built and why? Was it supported by helping hands, subsequently hidden by an artist?

The tower of smooth stones abstracted from its environment reminds me of the kind of mathematics that is developed in many mathematics classrooms. The mathematics is lovely in many ways, structured with concepts and ideas that rest on other concepts and ideas. But we do not always see the humans who build the structure. There are alternatives for arranging stones and for presenting mathematics. For someone with a strong attachment to a tower of stones or to the artifice of mathematics, it may seem that the only reasonable response is to admire. But another might dismantle the tower and explore alternative ways of structuring its parts. The book *Culturally Responsive Mathematics Education* does that; it explores alternatives to what has come to be the norm in mathematics teaching. The book does not construct a single alternative, but rather critiques the norm and gives examples of possibilities that would be more equitable in relation to cultural issues at work in mathematics education. In this review, I first give an overview of the contents of the book. Then I ask: What does the book do? What is responsiveness? How does the book embody cultural responsiveness? To whose needs does the book respond?

### The Book

*Culturally Responsive Mathematics Education* is a 386 page, 15 chapter collection of work that explicitly addresses the context of ethnic diversity in mathematics classrooms in the United States. It has contributions from a range of perspectives, mostly from American educators, and arises from a conference with the same title convened in 2004. The book comprises two principal parts. The first part addresses foundational issues for teaching

mathematics amidst cultural diversity. The second part provides examples of groups and individuals trying to structure culturally responsive mathematics teaching.

In the foreword, Ubiratan D'Ambrosio encourages the reader to restore cultural dignity by embracing difference. The introduction from the editors follows, outlining the structure of the book and presenting some statistics to frame the questions at the heart of the book. The growing proportion of students of color in the USA (soon to make up the majority) and the stable high proportion of white teachers together expose the need to equip white teachers to work better with students unlike themselves. This need is emphasized by the relatively poor performance and participation from most non-white students in a country with already poor overall performance in international comparisons.

The first section of the book focuses on foundational issues. To begin, Frank Swetz shows how the history of mathematics demonstrates that all mathematics is situated in culture. Next, Paul Ernest describes a shift in the philosophy of mathematics as a social and cultural construction. Swapna Mukhopadhyay, Arthur Powell, and Marilyn Frankenstein demonstrate the relevance of ethnomathematics to culturally responsive mathematics education in the context of Eurocentric influences on mathematics. Attention to ethnomathematics continues as Jim Barta and Mary Brenner identify the contributions of anthropology to mathematics. Judit Moschkovich and Sharon Nelson-Barber turn attention to forms of language at work in mathematics classrooms, especially the complexity of bilingual contexts. Eric Gutstein analyses the egalitarian rhetoric of mathematics to show the extent of the politicization of mathematics education in the USA and the way current practices sustain inequities. Finally, Dalton Miller-Jones and Brian Greer consider implications of assessment practices for culturally diverse students.

The second section provides examples of teaching and learning in culturally diverse situations. It begins with Geneva Gay's principles of culturally responsive teaching set in the context of myths that obscure cultural connections within mathematics. In the first example of culturally responsive mathematics education, Danny Bernard Martin and Ebony McGee describe the experience of black people doing mathematics. Next, Bob Moses, Mary Maxwell West, and Frank Davis give an account of the *Algebra Project*, which aims to raise the floor of math literacy by addressing needs of student groups experiencing challenges. Their approach builds on physical experiences relevant to students and thus often involves attention to cultural practices. The next two chapters give examples of ethnomathematical work. First, Jerry Lipka, Evelyn Yanez, Dora Andrew-Ihrke, and Shehenaz Adam describe the *Math in Cultural Context* project among the Yupik people of Alaska. The chapter presents quantitative evidence for the efficacy of the materials produced and describes how the materials were developed in a way that honors community leaders. Second, Ron Eglash describes the centrality of fours in Native American cultures, most notably as a basis for designing items to model stories that connect to the cardinal compass points. The three chapters that close the book are focused outside of public schooling but are connected to it. First, Juli Aguirre gives an account of her approach to leading pre-service and in-service mathematics teachers in a culturally responsive way. Next, Marta Civil and Beatriz Quintos outline their *Math and Parent Partnership in the Southwest* program and describe the experiences of three mothers in their multiple roles. Finally, in the context of college mathematics instruction, Mark Davis, Shandy Hauk, and Paul Latiolais ask how cultural responsiveness might be expressed in models of instruction, from transmissionist to critical praxis models.

## What the Book Might Do

The editors assert that any discussion about culturally responsiveness in mathematics education “must be situated within historical, cultural, social, and political contexts” (p. 3). Accordingly, each reader’s context will influence the effect of this collection of work. For example, my comments will be oriented around my various roles as a mathematics educator.

I first ask what *responsiveness* is. One way to respond to cultural diversity is to ignore it or deny its relevance. I see this passive aggressive response as the norm in mathematics education. Instead, the authors in this book focus on developing education that embodies *good* responses to culture. It would be pretentious for mathematics education to focus on the moral question of what values constitute goodness. It is less pretentious to do what this book does: describe foundational issues of culture in mathematics and give examples of good responses to culture in particular situations. The term *culturally responsive* allows the editors to avoid addressing the underlying moral issue of how one decides what *good* means in mathematics education.

The term *culturally responsive* also seems to be a way around using the increasingly controversial term *ethnomathematics*. The book’s foreword positions ethnomathematics as cultural responsiveness, three of the foundational chapters recognize ethnomathematics as central to cultural responsiveness, and three of the chapters that exemplify cultural responsiveness are strong examples of ethnomathematics, some more explicitly than others. Because the whole book would be taken as ethnomathematics given the scope of ethnomathematics described in Chapter 3, the title might be taken as an intentional act to change the field of mathematics education so that it can attend more to culture without being hung up by critiques of ethnomathematics or by the controversial questioning of the values that underlie formal education.

Secondly, I ask how the book embodies cultural responsiveness. The authors are responding to a particular culture – the set of practices associated with school mathematics teaching. The book thus addresses typical mathematics education practices in formal school settings. The editors’ introduction acknowledges the limitations of the book as addressing contexts in the USA (particularly ethnic groups experiencing low achievement – African American, Hispanic, and Aboriginal). But they claim that the book has value beyond the particular context from which it draws examples. I agree and have thus chosen the book as the textbook for a course for mathematics teachers in training this winter session, though I teach outside the USA.

Education happens in many contexts unrelated to school, including the media, the arts, the home, and various institutions. In each of these contexts, formal and informal educators position and use mathematics in various ways. I encourage mathematics educators to pay more attention to the way mathematics is developed outside of schools in terms of its relation to culture. The principles and examples provided in the book are useful for reflecting on both formal and informal education, just as they are useful both in the USA and elsewhere.

Another way of thinking about how this book responds to the needs of a culture is to ask whom the authors envision as their readers. The editors say that their book addresses the growing trend of teachers’ becoming less and less like their students. Their statistics show that most teachers in the USA are white and that soon most students in the USA will not be white. Thus it seems that this book would be a good resource for white educators facing increasing cultural diversity. However, the book is not very clear about whom the authors envision will face diverse cultures with responsiveness. The void created by this ambiguity could be filled by whatever a reader sees as normative. The underlying assumption is then that school education always

represents the majority culture and that it should be responsive to minority cultures. Positioning education in this way has the potential to marginalize minority cultures by labelling them as different from the norm, as requiring a response from the dominant culture.

The majority culture also demands a response. There are examples of responses to the colonialist culture that is taken to be normative (e.g., Gutstein's chapter). However, with these examples, it is worth considering the diverse individuals who are acting as agents of the education enterprise. Many of the examples of cultural responsiveness in this book come from educators who identify with minority cultural groups. Though no one, whether minority or not, would be expected to adopt without modification the programs or methods exemplified, the process is significantly more complex for teachers and educators who do not have recognizable minority identities. For example, if a white teacher were to lead black students to use mathematics to address social issues in their community, one could expect legitimate questions about whose agenda is being served. (As shown in the chapters by Gutstein and by Martin and McGee, leaders from the dominant culture unabashedly use mathematics to justify their own social decisions.) The same questions about agendas could be asked of a black teacher, but it is fair to assume that these questions would more likely be asked of a white teacher. Thus the book opens up a question for further discussion: What tensions do majority culture educators face as they try to lead minority culture students in doing socially relevant mathematics, and how might these tensions be addressed?

It is also worth asking whose needs the authors intend to address in terms of the reader's role in education. The book seems to fit well in academia, as it bears a number of features of scholarly traditions. The chapters refer extensively to scholarly literature and use vocabulary that positions the authors within particular interpretive traditions and thus might alienate some readers – for example, reference to the *commodification* of black students (p. 214) without explanation of what *commodification* means in this context. However, the book also breaks away from some academic traditions. For example, the book's sensitivity to context is relatively rare in some scholarly traditions. Many of the chapter authors situate themselves by highlighting the importance of their connection to their contexts. A further departure from some academic traditions is related to the general lack of focus on research methodology. The chapters by Lipka and by Civil and Quintos are exceptions, but even these chapters have less focus on methodology than one would expect in a journal article. Other chapters come from research but do not focus on the research aspect of the work. Rather, the focus in the first section of the book is on interpreting scholarly and other literature, while the second section focuses on reporting the exemplar approaches to teaching with cultural responsiveness.

Because each chapter seems to be a synopsis of work already published by its authors, I recommend the book as reading for a seminar course and for mathematics educators who want an overview of work on cultural responsiveness. I strongly recommend the book to mathematics teachers and to graduate students in mathematics education who wish to have an overview of some of the best work on cultural responsiveness and to be directed to related scholarship from these authors and others.

### **Structuring Responsiveness**

*Culturally Responsive Mathematics Education* navigates a challenging space. The questions I raise about the book are inevitable because of the lofty but worthy goal being addressed by the book's authors. I too want to promote responsiveness among educators, but it is difficult to say how that should be done. Any kind of formula or structure for responsiveness has

the danger of drawing attention away from the people to whom educators should be responding. This is a dilemma for educators: Should I be paying attention to this individual in front of me or should I follow the model I have read about? This is the irony of trying to structure a book that encourages responsiveness.

The dominance of a certain kind of culturally-irresponsive mathematics teaching begs discussion. This book provides a good beginning for that discussion. The artificial tower of round stones, like the mathematics that has been portrayed as normative, can be dismantled and restructured. More important than making a different, more perfect structure, is the value of playing with and talking about various possibilities.