



Advancing Equity and High Quality Mathematics Education with Actions Drawn from Ethnomathematics

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Abstract

This article advocates for the (not yet common) goal of mathematics education to advance peace, harmony, and respect among people and, consequently, to reduce discord. This outcome can be accomplished by utilizing Ethnomathematics, and we offer suggestions for cultivating an Ethnomathematics orientation and employing associated classroom practices.

Discussion And Reflection Enhancement (DARE) Pre-Reading questions:

1. Where have you heard or read the term “ethnomathematics” before reading this article? If so, what does ethnomathematics mean to you and what thoughts do you have about how it connects to the diversity of the students you teach?
2. *Principles and Standards for School Mathematics* (NCTM, 2000) elaborate an Equity Principle: <http://standards.nctm.org/document/chapter2/equity.htm>. What are some inferences you can make for what equity means in the context of mathematics education?
3. Several of the words in the title of this article might have stirred your thinking about social studies, most likely, “equity” and “ethnomathematics.” In that vein, how might mathematics and social studies education be integrated in ways that children might come to value both disciplines as complementary means for uncovering social and cultural inequity and proposing possible solutions to achieve social justice?

“DARE” Post-Reading questions appear at the end of the article. This article (without DARE questions) originally appeared in Fall 2007 *Noticias de TODOS*.

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Let’s implement experiences in mathematics education that advance the aims of creating more peace, harmony, and respect in our world! Striving to achieve that goal has a place in the classroom. That’s the perspective that Ubi D’Ambrosio (2006a, 2006b) has expressed as a critical element of ethnomathematics, an element that can be a foundation for a mathematics education framework that promotes high quality mathematics education for all students, thus advancing the increasingly urgent need for equity in teaching and learning mathematics. Let there be no more students whom our mathematics education teaching, programs, curricula, or leaders, wittingly or unwittingly, marginalize! D’Ambrosio, one of the founders and international leaders of ethnomathematics, urges that mathematics educators organize and lead students for constructing mathematical knowledge based on harmony among individuals, society, and nature.

Harmony in this vein means enacting mathematics education that is more inclusive of all students than is common practice. Hence, this essay advocates for access to equitable and high quality mathematics education for all children, and especially for those whose home language is not the language of the school, for children of poverty, for minority children, for children whose families are mobile, for children who have special needs, and for all other children whom for one reason or another the school experience often marginalizes. And let us

not forget that school mathematics experiences for girls and young women have frequently been seriously lacking. Too often, mathematics education has been an elitist discipline and has had the effect of advantaging some students while disadvantaging others by the exclusivity of the processes, unintentionally or intentionally, by which they encounter mathematics during formal school lessons in the discipline, lessons that have been short on developmental, cultural, or social appropriateness.

Mathematics education can be a contributing experience to the cultivation and nurturing of democratic citizenship and democratic dispositions that value diversity that is a hallmark of a pluralistic society that seeks high quality education for all. Such an outcome of mathematics education would certainly lead to a more harmonious society, perhaps even to a more harmonious world. If a teacher promotes such positive societal outcomes, then using open ended problems, seeking and sharing explanations for solutions, appreciating explanations of others, valuing other’s points of view, and raising conversations in connection with learning and applying mathematics are means to such a socially beneficial outcome (Simmt, 2001).

On the other hand, such approaches as the following are likely to hinder the cultivation and nurturing of good citizenship, democratic dispositions, and inclusiveness: teaching mathematics as a set of facts, skills, and

procedures; teaching mathematics as a fact set that has no utility in the real world - little purpose except for practicing routines for textbook exercises, reading for tests, and preparing for the next year's mathematics course; and teaching mathematics as a discipline in which outcomes are either right or wrong, the adjudication of outcomes resting solely with the teacher as authority (Simmt, 2001). Six categories that A. J. Bishop (1988) formulated are an ethnomathematical context, a set of behaviors, in this case, that are inherently encounters with mathematics that children and others have in their lives. Ethnomathematics impels teachers to be cognizant of the styles and techniques that people, including children, use to make sense of the cultural, social, linguistic, and natural environment in which they live. It also evokes learners' interests in the styles and techniques by which others than themselves come to know the world and enact their lives, as when children discover that a game they play and enjoy, perhaps the top-spinning game Toma-Todo from México, is very similar to a game played by children of another culture, as is true with Dreidel, a top-spinning game in Jewish tradition (Zaslavsky, 1998).

Bishop's (1988) six categories in which mathematics arises naturally in people's lives across cultures, societies, and the linguistic landscape are these: Counting, Measuring, Locating, Designing and Building, Playing, and Explaining. Let's look through the lenses of Bishop's categories at a few examples of encounters with mathematics that arise subtly and unmistakably in the lives of many children:

- Biking to and from school and describing the route, which aligns with *locating* and *explaining*
- Playing Rayuela, a hopscotch game from Colombia, aligns with *playing* and *locating*

- Making miniature furniture with toothpicks and spice drops for *Grandmother's Adobe Dollhouse* (Smith, 1984) aligns with *designing* and *building*
- Buying or trading one sports card for another aligns with *explaining*
- Determining the rate at which water is flowing in the street gutter after a rain aligns with *measuring* and *explaining*

The above examples from children's lives are both mathematical and social behaviors. Teachers who seek, represent, and share examples of mathematics in their own lives are practiced sufficiently to be able skillfully to scaffold their students to do the same. In that way, children learn that mathematics is a discipline of this world, and it is an active, or perhaps more quiet, presence in nearly everything they do. Mathematics lives in social contexts of children and adults, no matter their linguistic, cultural, religious, ethnic, racial, or other personal characteristic, heritage, or way of life.

Children sharing their mathematical encounters with one another engenders respect and appreciation of diversity. Teachers who make use of their knowledge of ways children encounter mathematics are in better position to scaffold the link between more formal mathematics learning experiences of the school and the more informal ways in which children experience mathematics outside the classroom. The answer to the question "When are we ever going to use this stuff?" is "Everybody uses it every day already." And then one day after the rain has stopped, the teacher can say, "Let's hurry outside and see how fast the water in the gutter is flowing." Now that's an authentic, substantive, equitable mathematics, and ethnomathematics, experience that might interest just about every child in the class!

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Discussion And Reflection Enhancement (DARE) Post-Reading Questions

1. What role does mathematics play in socializing students in schools and in the world outside school? The article indicates that traditional teaching of mathematics is often not responsive to selected groups of students such as those whose home language is not the language of the school. Do you agree or disagree with that claim? Why?
2. What are examples of how the teaching of mathematics might contribute to the development and nurturing of democratic dispositions or to might inhibit those dispositions? (By the way, examples of democratic dispositions can be found in the URL for Simmt (2001) in the References above.)
3. How can you use ethnomathematics to help your students perceive, form, maintain, and use connections between everyday informal mathematics students learn outside of school and the more formal mathematics in school? What ethnomathematics do you find in children's play?

“DARE to Reach ALL Students!”

