

## Book Review...

# Diverse Voices Call for Rethinking and Refining Notions of Equity

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Burton, L. (Ed.). (2003). *Which way social justice in mathematics education?* Westport, CT: Praeger. 344 pp. ISBN 1-56750-680-1 (hb). \$69.95.

Editor Leone Burton remarks that the title of this book reflects a “shift in focus from equity to a more inclusive perspective that embraces social justice as a contested area of investigation within mathematics education” (p. xv). What’s interesting is that the question in the title lacks a verb—is the question “which *are* ways to social justice in mathematics education?” Or more tentatively, “which ways *might bring about* social justice in mathematics education?” Or perhaps the focus is more on research, either up to now or in the future: “which ways *have research on* social justice in mathematics education *taken?* Or “which ways *could (should?) research on* social justice in mathematics education *take?*” Each of the thirteen chapters in the volume addresses at least one of those four questions. Overall, this book responds to its title question through diverse voices that call for expanding work on gender issues into broader sociocultural, political, and technological contexts; rethinking and refining key notions such as equity, citizenship, and difference; and considering how to conduct studies that reach beyond school and university boundaries toward families, communities, and policy-makers.

The collection is the third volume in the *International Perspectives on Mathematics Education* series for which Burton has served as series editor.<sup>1</sup> In her introduction she describes the origin of the book in the activities of the International Organization of Women in Mathematics Education (IOWME) at the Ninth International Congress of Mathematics

Education (ICME9) in Tokyo, Japan, in 2000. Perhaps this context explains why approximately half of the chapters focus primarily on gender, while other chapters include issues related to differences in race, class, language, and thinking styles. Burton notes that this book, as the fourth publication of IOWME, “reflects the development of the group’s interests that have evolved over 16 years from a sharp focus on gender issues to its present wider interest in social justice” (p. xiii).

In the introduction Burton also outlines the process by which the book developed. After a general call for papers, an international review panel of mathematics educators reviewed submissions. Chapter authors were then paired to give feedback to each other on their work in order to promote dialogue as well as “cross-referencing possibilities” (p. xv). As perhaps is always the case in an edited book without summary pieces to highlight connections between chapters, the cross-referencing of concepts in this volume could be expanded. Burton does a nice job of drawing some connections in her introduction, but otherwise such resonance is largely left to the reader. Fortunately, as I hope to demonstrate in this review, there is ample opportunity to draw connections between chapters (and also occasionally to wish that an author had heeded another author’s points or ideas!)

### Organization of the Book

The thirteen chapters in the book are organized into three sections. The four chapters in the first section focus on definitional work, conceptual frameworks, and reviews of and recommendations for research, thereby “setting the scene” (p. 1). The authors of this section are from Australia (Brew), Germany (Jungwirth), the United Kingdom (Povey), and the United States (Hart). The second section consists of seven chapters primarily about studies that take place in classrooms and address the question “what does

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social justice mean in classrooms?” (p. 101). The authors of this section are from Australia (Forgasz, Leder, and Thomas; Zevenbergen), Germany (Ferri and Kaiser), Malawi (Chamdimba), the United States and Peru (Secada, Cueto, and Andrade), and the United Kingdom (Mendick; Wiliam). The last section includes two chapters focused specifically on “computers and mathematics learning” (p. 261) with regard to social justice. The authors (Wood, Viskic, and Petocz; Vale) come from Australia and Eastern Europe, but all now practice mathematics education in Australia.

The placement of chapters within this organization is a little puzzling. Wiliam’s illuminating chapter on the construction of statistical differences and its implications is included in the second section on classroom studies, but since it grapples with definitions and conceptual ideas (and is not a classroom study), it might have been better placed in the first more theoretically-oriented section. Brew’s chapter, a study about reasons that mothers return to study mathematics, is included in the first section but seems to fit better in the second, despite the fact that the study does not take place in mathematics classrooms. Support for changing the placement of Brew’s chapter is provided by the position of Mendick’s: Her report of young British men’s choices to study mathematics beyond compulsory schooling is only peripherally located in classrooms and was still placed in the second section.

The other weak organizational aspect of the book is the inclusion of only two chapters in the third section on computers and mathematics learning. One wonders if there were intentions for a more substantial section but some papers did not make the publication deadline. In any case, because both chapters in this section report on studies set in classrooms, it seems that they could have been included in the second section—or that perhaps two sections about studies might have been warranted, one that focused directly on studies in mathematics classrooms and one that included research on mathematics education outside of immediate classroom contexts.

### **Conceptually-Oriented Chapters: What Is Equity? What Is Social Justice?**

Organizational difficulties aside, I focus first on the more conceptually-oriented chapters, which are contained in the first three chapters of the first section of the book as well as in Wiliam’s chapter from the second section. These authors engage in definitional and conceptual work that forms a foundation for research on social justice. All four authors ponder the

nature of equity and justice within different contexts: a typology of gender-sensitive teaching, previous and current research on equity and justice in mathematics education, citizenship education in the United Kingdom, and statistical analyses of gender differences in mathematics education.

Jungwirth describes a typology of gender-sensitive teaching that consists of three types distinguished by modifications made according to gender, the degree to which gender groups are identified and treated as monolithic, and corresponding conceptions of equity. In Type I teaching, teachers are “gender-blind” and make no modifications according to gender since they believe that boys and girls can do math equally well. In Type II teaching, teachers adjust practices based on gender but tend to treat students of a single gender as monolithic (i.e., tend to essentialize.) Jungwirth believes that in the third (and implicitly most advanced) type, the concept of equity “no longer applies...Equity here refers to the individual, with respect to learning arrangements and, somewhat qualified, to outcomes” (p. 16). Teachers engaging in Type III teaching attend to individual differences within gender groups and tailor teaching to individuals.

Although Jungwirth’s typology offers a conceptual framework for examining the equitable implications of teachers’ orientations toward mathematics teaching and mathematics classrooms, her dichotomizing of groups and individuals is problematic. For example, in their attention to individuals, might not Type III teachers create classrooms in which mathematics could be devoid of women, which Jungwirth sees as considerably less evolved than even Type I teaching? The problem seems to be in characterizing equity based on group-individual dichotomies—to adhere too strongly to group identities can result in essentializing, while to focus primarily on the individual can leave out trends and broad characteristics of groups that are important considerations in work toward equity and social justice (cf. Lubienski, 2003).

These issues are reflected in Hart’s review of scholarship on equity and justice in mathematics education over the last 25 years. Her chapter is notable for explicit discussion about different ways researchers have used equity and justice (and equality); for her clearly stated choice to use equity to mean justice; and for her formulation of calls for future research. In particular, she calls for research on pedagogies that contribute to justice; self-study of educators’ own practices; and more research that explores student motivation, socialization, identity, and agency with respect to mathematics. Hart highlights Martin’s

(2000) study on factors contributing to failure and success of African American students in mathematics as an exemplar for future research because of its multilevel framework for analyzing mathematics socialization and identity. Although her points about his work are well taken, the considerable space she gives to this relatively recent study seems odd given her aims to review 25 years of research.

Povey continues Jungwirth's and Hart's definitional work by considering the complex and contested notion of citizenship in relation to social justice and mathematics education. She describes how recent mandates for citizenship education in England reinforce a conservative perspective by focusing on political and legal citizenship (the right to vote, for example), without questioning the nature and character of social citizenship, let alone its connections to "the (mathematics) education of future citizens" (p. 52). Povey believes that for citizenship to be a useful concept in democratizing mathematics classrooms the concept "will have to be more plural, more active, and more concerned with participation in the here and now" (p. 56).

Perhaps the strongest chapter of these four (and one of the strongest in the collection) is Wiliam's on the construction of statistical differences in mathematical assessments. He demonstrates that in gender research in mathematics education, effect sizes of standardized differences between male and female test scores are relatively small, and the variability *within* a gender is greater than *between* genders. Based on this analysis, Wiliam concludes that differences between genders depend on what counts as mathematics on assessments. In particular, what counts as mathematics may be maintained because it supports patriarchal hegemony.

As an implication of his argument, Wiliam proposes "random justice" (p. 202) to produce equity in selection based on test scores. Wiliam calls the percentage of the population that reaches a certain standard (for, say, entrance to medical school) a *recruitment* population. Usually, selecting from a recruitment population (i.e., creating a *selection* population) involves choosing a small top percentage of it. This mode of selection perpetuates selecting more males than females, largely because males show greater variability in their test scores compared to females (males produce more highs and lows.) Wiliam proposes that a random sample of the recruitment population that sustains the gender (or racial, class, etc.) make-up of it is "the only fair way" (p. 204) of creating a selection population. Although this proposal

may seem counterintuitive (and certainly differs from typical U.S. selection processes!), Wiliam makes a compelling argument that is worth reading.

### Chapters on Studies in or Surrounding Mathematics Classrooms

In these chapters—Brew's chapter from the first section as well as the other 8 chapters in the book—the diverse voices in the volume become quite apparent, not only because of the different geographical locations or ethnic heritages of the authors but because of the diverse ways in which the authors focus on issues of social justice in relation to mathematics classrooms and mathematical study. These nine chapters can also be loosely grouped as exemplifying, supporting, informing, or aligning with the more conceptually-oriented chapters.

In particular, two chapters that focus specifically on teaching practices in relation to social justice may exemplify and inform Jungwirth's typology. The authors of these chapters attend to how teachers approach students who belong to disadvantaged groups. Chamdimba, whose research took place in the southern African country of Malawi, studied the year 11 students of a Malawian teacher who agreed to use cooperative learning to potentially promote a "learner-friendly classroom climate" (p. 156) for girls. As a researcher, Chamdimba might exemplify a Type II orientation out of her concerns over Malawian girls' lack of representation and achievement in mathematics and subsequent Malawian women's lack of bargaining power as a group for social and economic resources in the country. Chamdimba's conclusion that female students experienced largely positive effects might help Jungwirth refine her typology so that recognizing students as part of disenfranchised groups and acting on that recognition to address the group is seen as legitimate and useful (i.e., not necessarily less evolved than Type III teaching.) However, Chamdimba's study is also subject to scrutiny over whether a particular classroom structure can bring about improvements in all Malawian females' educational, social, and economic status.

Perhaps a better example of the subtlety involved in the group-individual distinctions with regard to social justice is found in Zevenbergen's study. Zevenbergen used Bourdieu's tools as a frame for understanding teachers' beliefs about students from socially disadvantaged backgrounds in the South-East Queensland region of Australia. Eight of the 9 teachers interviewed expressed views of students as deficient due to poverty and cultural practices. Stretching

Jungwirth's typology beyond gender-sensitivity, the ninth teacher had more of a Type III orientation in her respect for these students as individuals. However, by expressing an understanding of how parents' lack of cultural capital prevented them from challenging the ways in which schools (under)served their children, this teacher did not ignore these students as belonging to a disadvantaged group. This teacher's ability to understand and value students as both individuals and part of a group might allow Jungwirth to amplify and further articulate her typology.

These two chapters and three others exhibit work that aligns with Hart's call for research on pedagogies that contribute to social justice and on one's own teaching in relation to social justice. Vale's two case studies of computer-intensive mathematics learning in two junior secondary mathematics classrooms focus on how teachers' practices with technology impede (but might facilitate) more just classroom environments. Vale's work is complemented by the three university classroom studies presented by Wood, Viskic, and Petocz. In studying their own computer-intensive teaching of differential equations, statistics, and preparatory mathematics classes, these three researchers found positive attitudes toward the use of technology across gender. Finally, Ferri and Kaiser's comparative case study on the styles of mathematical thinking of year 9 and 10 students (ages 15-16) has implications for developing pedagogies that recognize differences other than due to gender, race, or class, and that thereby contribute to justice and diversity in classrooms.

However, Secada, Cueto, and Andrade's large-scale, comprehensive study of the conditions of schooling for fourth and fifth-grade children who speak Aymara, Quechua, and Spanish in Peru may be the strongest example of work toward Hart's recommendation of multilevel frameworks in research on social justice. These researchers intended to create a "policy-relevant study" (p. 106). To do so they articulated their conceptions of equity as distributive social justice (opportunity to learn mathematics is a social good and should not be related to accidents of birth) and socially enlightened self-interest (it is in everyone's interest for everyone to do well so as not to cause great cost to society). In addition, the researchers took as a premise that equity must come with both high quality and equality (i.e., lowering the bar does not foster equity). Thus they contribute to definitional work while formulating "practical" conclusions and recommendations for Peruvian governmental policy.

Finally, the remaining three chapters in the book connect with Povey's chapter in exploring a particular contested and complex concept or relate to Wiliam's work on considering the construction of difference. Brew's study entails rethinking aspects of the complex concept of mothering in the context of mathematical learning of both mothers and their children. By including voices of the children in the study, Brew is able to show the fluid roles of care-taking between studying mothers and their children (e.g., children sometimes acted as carers for their mothers) and "the pivotal role that children can play...in providing not only a consistent motivating factor but also enhancing their mother's intellectual development" (p. 94).

What Povey does for citizenship and Brew does for mothering, Mendick does for masculinity in the context of doing mathematics. In a very strong and thoughtful chapter, she describes stories of three young British men who have opted to study mathematics in their A-levels even though they do not enjoy it. Mendick's smart use of a poststructuralist perspective that deconstructs the classic opposition between structure and agency allows her to argue that taking up mathematics is a way for the men to "do masculinity" in a variety of ways: to prove their intelligence to employers and others as well as to secure a future in labor market. The stories of the three males prompt the question: "why is maths a more powerful proof of ability than other subjects?" (p. 182). To respond, Mendick contrasts the men's stories with young women's stories (part of her larger research project.)

This artful move is not intended to draw dichotomies between how men and women "do maths" differently—Mendick cautions against such simplistic conclusions and notes that some females use mathematics the way these three males do. Instead the contrast allows her to demonstrate and deepen her theorizing of masculinity as a relational configuration of a practice, as well as to argue for more complexity in gender reform work. Thus for her, "maths and gender are mutually constitutive; maths reform work is gender reform work" (p. 184). By examining gender in this way, like Wiliam, she calls into question differences between males and females in relation to mathematics and supports his contention that what counts as mathematics (and, Mendick would add, as masculine and feminine) is the basis for these differences.

Differences between males and females are also the subject of the chapter by Fogasz, Leder, and Thomas. They used a new survey instrument to capture the beliefs of over 800 grade 7–10 Australian students

regarding gender stereotyping of mathematics. Their findings revealed interesting reversals of expected (stereotyped) beliefs. For example, their participants believed that boys are more likely than girls to give up when they find a problem too difficult, and that girls are more likely than boys to like math and find it interesting. However, through an examination of participation rates and achievement levels of male and female grade 12 mathematics students from 1994 to 1999 in Victoria, Australia, the researchers refute recent, media-hyped contentions (see, e.g., Conlin, 2003; Weaver-Hightower, 2003) that males are now disadvantaged in mathematics. Frankly, Fogasz and colleagues might have benefited from Wiliam’s advice on examining effect size—it is hard to know how much significance to give to the differences they found. Nevertheless, their work supports the notion that mathematics may be maintained as a male domain despite certain advances of females.

Overall, I agree with Burton that the chapters in this volume achieve the goal of providing “an introduction for new researchers as well as stimulation for those seeking to develop their thinking in new or unfamiliar directions” (p. xiii). Although the organization is a bit puzzling and some chapters are clearly stronger than others, the book is a useful read for researchers in mathematics education. More important, the diversity of voices—and the connections that readers can draw among this diversity—gives a complex and layered picture of how resources, sociocultural contexts, governmental policy, teacher and student practices, human preferences and expectations, *and researchers’ theorizing and interpretations*, all contribute to “...who does, and who does not, become a learner of mathematics” (p. xviii).

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<sup>1</sup> The first volume was *Multiple Perspectives on Mathematics Teaching and Learning* (2000) edited by Jo Boaler; the second volume was *Researching Mathematics Classrooms: A Critical Examination of Methodology* (2002) edited by Simon Goodchild and Lyn English.