

Book review for RME:

Toward equity and social justice in mathematics education, by Tonya Gau Bartell (Editor), Cham, Switzerland, Springer, 2018, 341pp., £87.50 (hardback), ISBN: 9783319929071

This book makes a valuable contribution to the research literature on equity and social justice in mathematics education. It focuses on addressing the needs of marginalised students in school mathematics. The ideas for the book emanate from the 2015 annual meeting of the North American Group of the Psychology of Mathematics Education. Most of the authors are based in universities in the United States and in Canada, which is also where most of the studies and contexts referred to in the book are situated. Whilst clearly influenced by perspectives associated with one part of the World, the authors draw on a diverse range of contexts and offer insights that are of considerable international interest and relevance. It is perhaps not surprising, given its North American focus, that the book focuses primarily on the needs of different racial groups, i.e. black/African American and Latino/a (referred to in places as Latin@) students, and, to a lesser extent, on the marginalisation of female and Indigenous/immigrant students and English Language Learners. Note that the naming of various groups appears to be a matter of some contention and various authors clearly take a different approach on this matter. References to socioeconomic status appear throughout the book. However, this appears to be less of a focus than might be expected by those concerned with issues of equity and social justice based in other parts of the World, for example in many European countries. One notable exception is Rubel, Lim and Hall-Wickert's study (Chapter 10) which builds on Gutstein's (2006) real world projects in encouraging students from a deprived area of New York to explore the two-tiered financial system (i.e. banks and pawn shops) in their local neighbourhood, thus gaining an awareness of differential access to capital whilst at the same time developing mathematical understanding.

There are several major themes running through the book. The first is the emphasis on recognising and challenging racial and gender biases amongst teachers, educators and researchers. The existence of such bias is clearly illustrated in Jackson, Taylor and Buchheister's study (Chapter 16) in which prospective teachers were presented with, and invited to respond to, a classroom vignette involving Eric(a), who was a relatively high-attaining student exhibiting disruptive behaviour. Different participants were presented with one of four almost identical scenarios (chosen at random) in which the only difference was the race and gender assigned to Eric(a): either White male, African American male, white female or African American female. The prospective teachers' responses demonstrated strong racial and gender stereotypes and biases, e.g. they were more likely to express a desire to remove Eric(a) from the classroom, or to suggest adopting culturally relevant practices, when Eric(a) was presented as African American. Berry (Chapter 1) highlights a tendency for lower attainment and participation rates of marginalised groups (such as significant under-representation on advanced mathematics courses) to be blamed on students' own deficiencies rather than the school system itself. This critique of the deficit notion of under-performance, where marginalised learners are viewed as deficient and in need of 'fixing', re-occurs throughout the book. Berry argues that government policies aimed at addressing inequity, driven by a perceived need to make the economy more competitive by increasing participation rates in STEM subjects, merely ensure that marginalised learners are more likely to experience a curriculum based primarily on rote learning, drill and practice and decontextualized activities. They argue that policies promoting equity should not be determined by the narrow interests of those in power to secure greater economic prosperity. Instead they should be driven by concern for the experiences of marginalised learners and a desire to embrace their identities, lived experiences and cultural contexts to connect them meaningfully with the mathematics curriculum.

Various authors in the book consider how sociological, anthropological and critical theories can be used to expose institutionalised racism and gender bias that permeates the field of mathematics education. Battey and Leyva (Chapter 2) highlight how teachers, even those professing a desire for equity, exhibit 'implicit racial attitudes' based on deficit notions of African American students. Unconscious feelings, beliefs and stereotypes cause mathematics teachers to lower cognitive demand, focus more on behaviour and ignore the intellectual contributions of African American students. Many of the book's contributors offer powerful insights into the underlying causes of inequity and injustice in mathematics education. Some present interesting theoretical frameworks, such as Larnell and Bullock's 'socio-spatial framework for urban mathematics education' (Chapter 3), which provide alternative perspectives with the potential to challenge deficit narratives in mathematics education. However, perhaps contrary to what is implied in the title of the book, not all contributors provide strategies for how to move closer to a position of equity and social justice in mathematics education.

LópezLeiva, Herbel-Eisemann and Yolcu (Chapter 5), however, offer something different. They put forward a compelling model for how those in positions of power can speak out and act against inequity and injustice by becoming 'allies' of marginalised groups. They define an 'ally' as a member of the dominant group who works to end the oppression of others through their personal and professional life. There are two essential and inter-related elements of effective 'allywork': developing awareness of self-privilege and taking action. Allies must reach beyond guilt arising from their own positions of power and embrace their responsibility to promote social change. They should build empathy and establish alliances with those who are oppressed, by engaging in cooperative activities that involve sharing experiences and mutual learning, and by engaging in collaborative actions which disrupt systemic privilege. LópezLeiva, Herbel-Eisemann and Yolcu describe how the historically gendered development of relationships between mathematics teacher educators and mathematics teachers has resulted in the former holding a privileged position over the latter. They argue that mathematics teacher educators should work 'with' (rather than 'for') mathematics teachers, as allies, by engaging in collaborative problem-posing and inclusive inquiries into equitable teaching approaches. There are clear parallels here, acknowledged by the authors, between 'allywork' and participatory action research, which involves researchers working 'with' practitioners and "engaging in a 'meta-dialogue' about their goals, actions, and distribution of work" (p.93). Given my own research interests (Wright, 2020), it is perhaps not surprising that I would single out this contribution as a 'must read chapter'.

Adiredja (Chapter 4) offers a simple, yet powerful, proposal for how deficit narratives might be challenged. He argues that focusing solely on students' misconceptions and misunderstandings can reinforce deficit narratives and proposes instead that teachers recognise and build upon what students are doing correct: "Recognizing students as capable learners of mathematics, equipped with difficult kinds of knowledge, and broadening what counts as productive mathematical knowledge are ways that we as educators can engage in the politics of mathematics education." (p.74). This leads nicely into another major theme running through the book, which is the need to recognise and validate students' own cultural, linguistic resources and the 'funds of knowledge' they bring with them to the classroom. Takeuchi (Chapter 8) highlights the potential of building on learners' informal mathematical knowledge (along with that of their families and communities) to facilitate broader mathematical literacy and understanding. Ng (Chapter 11) demonstrates how dynamic touch-screen technology enables bilingual student to draw on their linguistic and non-linguistic resources to participate more fully in discursive learning environments.

Several authors draw on ethnomathematics and 'funds of knowledge' to argue for the inclusion of cultural artefacts and activities in the mathematics curriculum. They highlight how culturally responsive mathematics teaching has the potential to promote more meaningful learning experiences which align more closely with students' lived experiences, whilst contributing to students' understanding of key mathematical concepts. Examples include using Algonquin loom beading, cross-stitching and kangas to develop understanding of algebraic patterns, proportional and geometric reasoning (Beatty, Chapter 7; Naresh and Kasmer, Chapter 18). Culturally responsive pedagogy has the potential to address the alienation of marginalised students by promoting more positive relationships with mathematics whilst challenging Western notions of mathematics as being abstract, neutral and value-free. Andersson and Wagner (Chapter 12) demonstrate clearly the political nature of mathematics by considering the micro-politics of counting: "When we count, we have to decide what counts and what does not count" (p.191). This is apparent in any attempt to count countries: just what counts as a 'country' is a political (and sometimes, as in the case of Palestine, highly contentious) decision. They highlight how disagreement over what is counted, and the complexity of language used in counting, have serious consequences for all of us in interpreting information that is presented in the media, e.g. relating to climate change.

All six chapters in the last of the four sections of the book relate to supporting pre-service teachers in addressing the needs of marginalised students. De Araujo, Smith, I and Sakow (Chapter 14) highlight some of the shortcomings of existing teacher preparation programmes, most of which do not adequately prepare prospective teachers to address the mathematical learning needs of English Language Learners. Harper, Drake, Bartell and Najarro (Chapter 15) describe how the Curriculum Spaces Table, a tool for evaluating and adapting curriculum materials, showed promise in shifting pre-service teachers towards recognising and integrating learners' funds of knowledge and hence developing more equitable teaching practices. Guzman (Chapter 17) proposes the use of concept-mapping tasks to address the need for mathematics teacher educators to support pre-service teachers in developing stronger conceptual links between children's mathematical thinking, their lived experiences and how to assess their understanding of mathematics.

I would agree with the claim made, in the introduction to the series, that the intended audience comprises those in the intersection between researchers and mathematics education leaders. However, I am not convinced that the book meets the stated aim of disseminating research findings that will help leaders make decisions which result in transformations in, and improvements of classroom practice that address issues of equity and social justice. Instead, I would argue that the book's most valuable contribution is the challenge it lays down to those occupying positions of power within the mathematics education community, particularly researchers and teacher educators, to critically reflect on their own views of mathematics and their attitudes (and possible biases) towards marginalised groups. For this reason, I would encourage all colleagues who occupy such positions to read this book. Whilst I believe it is of benefit to an international audience, it should be read with a recognition that it represents a North American perspective on equity and social justice. For this reason, I would urge readers to consider the powerful insights it provides alongside contributions to the research literature on equity and social justice based on different perspectives from around the world, e.g. those found in 'Diversity in Maths Education: Towards inclusive practices' (Bishop, Tan & Barkatsas, 2015) and 'Critical Maths Education: Theory, practice and reality' (Ernest, Sriraman & Ernest, 2016). By encouraging less experienced researchers to work alongside and write collaboratively with more experienced colleagues, the book clearly meets its parallel objective of supporting the production of high-quality research and showcasing new and innovative ideas emanating from early career researchers in universities in the United States and Canada.

Whilst the argument relating to drawing on students' own cultural, linguistic resources and 'funds of knowledge' is a powerful one, I would like to have seen a greater acknowledgement within the book of how this is potentially problematic. Focusing on knowledge that is immediately relevant to everyday life can undoubtedly make the curriculum more meaningful and engaging for marginalised students. However, there is a danger that, by denying them access to powerful knowledge, this can lead to further marginalisation. D'Ambrosio (2006) contends that, whilst there is a need to assign more equal status to different cultural forms of mathematics, excluding learners from academic mathematics is likely to disempower them. Care must be taken when relating mathematics to students' lived experiences as it is possible to restrict opportunities for marginalised students if connections are made only with their backgrounds. Skovsmose (2011) argues that the school mathematics curriculum should also be related to students' 'foregrounds', i.e. real-life experiences that students might encounter in the future that move beyond their current situations. With this caveat, I would recommend to anyone interested in equity and social justice issues in mathematics education that they should read this book.

References:

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