

Professional Book Review

Jorgensen, R., Sullivan, P., Grootenboer, P., Niesche, R., Lerman, S., & Boaler, J. (2011). *Maths in the Kimberley: Reforming mathematics in remote Indigenous communities*. Queensland, Australia: Griffith Institute for Educational Research. 176 pp., ISBN: 978-1-921760-32-7

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The Indigenous language of Nyikina contains 34 distinct terms for direction and location (p. 58). They have no words for “right” and “left.” A 10-year-old Indigenous Australian can navigate 20 miles of wilderness without a compass or provisions. Despite the fact that Indigenous youth bring a unique, and largely untapped, wealth of skills and knowledge to the math classroom, only 22% complete grade 12, and the passing rates on the national mathematics assessments are as low as 35% (p. 41). In *Maths in the Kimberley: Reforming Mathematics in Remote Indigenous Communities*, Jorgensen et al. explore reform strategies for improving Indigenous student

achievement in mathematics.

The researchers assert that mathematics education in Australia has historically advantaged certain cultural groups and marginalized others and that the textbooks, curriculum, national assessments, and pedagogical practices are biased against the Indigenous population. This compilation of 15 papers, written in the period from 2008 to 2010, emerged from a three-year case study of six community schools in the remote Fitzroy River region. The researchers collaborated with the Association of Independent Schools of Western Australia to explore equitable pedagogies that maintain the rigor of traditional math teaching standards and simultaneously incorporate the language and culture of the Indigenous population.

This seminal collection of papers serves to update industry partners, schools, and communities on the progress of the project. A secondary potential is to inform the math curriculum for English Language Learners (ELLs). Robyn Jorgensen, the primary author, is known for her expertise in redressing issues of inequality in participation, access, and success in mathematics learning among culturally and linguistically diverse students. Contributing authors are Peter Sullivan, Peter Grootenboer, Richard Niesche, Stephen Lerman, and Jo Boaler. The authors’ collective areas of expertise include math education, equity, math teacher professional development, curriculum leadership, and social justice. This book is organized primarily chronologically, but the authors divide it into two sections. The first section addresses theory and pedagogy, and the second provides an analysis of the data from the project.

The works of Pierre Bourdieu, who pioneered conceptual constructs for investigating systemic social inequities, form the essence of the conceptual framework for the project. Boaler's, Lotan's, and Cohen's corpus of work provides much of the blueprint for the design of the pedagogy of equity. Boaler is known for her work with reform mathematics and equity, both in the United Kingdom and the United States (Boaler, 2006). Lotan and Cohen's work with complex instruction (Cohen & Lotan, 1997) involves small group interactions, roles, and accountability.

The first section of the book is rich with Bourdieu-isms such as "habitus" and "scholastic mortality." Habitus is the set of dispositions, schema, knowledge, and skills that students internalize early in life due to enculturation. It is the incongruity between the habitus of Indigenous students and the knowledge valued in the traditional math curriculum that creates scholastic mortality. Often theories of social philosophy are left to moulder on the pages of books in libraries, but they breathe life into *Maths in Kimberley*. An example is when Jorgensen says that "much of the teaching of school mathematics can be seen as an act of symbolic violence when undertaken in many contexts—Indigenous, working class, and so on" (p.14). The authors contend that math teachers, by undervaluing the habitus students bring to the classroom rather than capitalizing on this wealth of cultural knowledge and skills, unwittingly perpetuate the cycle of a persistent underclass. It is not that teachers directly cause the academic disparity, but they fail to interrupt the structural inequity systemically rooted in the social institution of the dominant culture.

Also in the first section of the book, the authors detail an equitable pedagogy for addressing this habitus disjoint. Questioning is a key feature in every math classroom. Unlike the adults that Indigenous youth encounter outside of school, the teacher asks questions to which she already knows the answer—to prompt students to think. The expectation is that students will make an earnest attempt to demonstrate their correct understanding of the problem. In the Kimberley schools, however, students respond to teacher questions by percolating like popcorn, shouting out seemingly random answers in rapid succession, apparently in an attempt to help the teacher figure out the problem (p. 53). A teacher who is unaware of the social heritage of these students might interpret their behavior as willful disobedience. The authors use the equitable pedagogies model to bridge these gaps in habitus. Their model emphasizes multiple representations, entry points, and pathways; use of home language; high levels of interactivity, reporting back to the teacher; and student roles within a group.

The second half of the book is concerned with analyzing the data. On pages 143 through 160, the researchers evaluate the three-year program, examine growth in teachers over the three-year period, and identify areas that need improvement. Sullivan and Niesche find that Indigenous students involved in the project scored high on intellectual quality metrics like meta-language and higher-order thinking; however, despite the fact that group interactions and use of home language were emphasized repeatedly, these were two areas that needed improvement (p.143). Jorgensen and Niesche draw on interviews collected

across the project for the entire three years to explore effective leadership (p.161). They find that principals in the six community schools of Fitzoy River region face a unique set of challenges: the high number of early career teachers, limited access to resources, high turnover rates among staff, and complex relationships with the local communities.

The research model in the *Maths in Kimberley* project possesses distinct strengths. First, the researchers do not reduce equity to a paradigm that states how well the population in question achieves compared to the dominant culture, as in Black-White. In *Maths* they incorporate features of student cultural heritage into the pedagogical model and do not allow the paradigm to degrade to a deficit model. Second, they do not distill the linguistically, geographically, and culturally diverse population, such as is contained in the African American culture, to one homogenous racial designation, such as "Blacks." Instead they recognize and value the variation of language and culture within the Indigenous population. One manifestation of this is the fact that they encourage the use of a variety of home languages in the classroom. A third asset of their research model is that their conceptual framework is based on the simple premise that *all* students deserve the economic opportunities that a good education delivers. Furthermore, to accomplish this, math teaching should cultivate high standards of and reverence for traditional math knowledge while also honoring the cultural and social capital of the students.

References

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- Cohen, E., & Lotan, R. (1997). *Working for equity in heterogeneous classrooms*. New York: Teachers College Press.