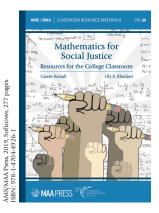# Mathematics for Social Justice

Reviewed by Emille Davie Lawrence

Mathematics for Social Justice:
Resources for the College Classroom
by Gizem Karaali and Lily S. Khadjavi

I think we can all agree that we are currently living in a time of tectonic social and political shifts. Movements like #MeToo and Black Lives Matter have rightfully increased popular awareness of issues of inequity and marginalization. In the immortal words of Bob Dylan, "The times, they are a-changin'." And for good reason. I've noticed some similar shifts in mathematics over the past few years. Not that connecting mathematics and social justice is a new concept, as this book attests by paying homage to Bob Moses's *Radical Equations: Math Literacy and Civil Rights* in its first sentence. But one can also not deny the recent swell in scholarly activity surrounding the subject, which is why *Mathematics for Social Justice: Resources for the College Classroom* is such a timely and important tool.

The cover of the book woos you, with its array of fists of different hues holding pencils in front of a backsplash of mathematical equations. The sheer brilliance of this image, which conjures resistance, unity, and mathematical rigor all at once, should not be lost on anyone. The contents of the book are divided into three parts: an introduction to the book by the authors, five essays that make the case for introducing topics of social justice into the math curriculum, and fourteen course modules that can be adopted into

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a variety of courses with the essays and modules written by math faculty who have experience on the topic. I was happy to see that the authors took the time in the introduction to describe exactly what is meant by "teaching mathematics for social justice": all mathematics instruction that aims to improve human well-being. Who could possibly deny the importance of improved human well-being!? This preemptively thwarts any social justice eye-rolling as well as sets the tone for the book. They also give the reader advice on how to use the text and extend an invitation to reach out to the contributing authors directly.

The first essay is by Kira Hamman, and she is the only contributor who has both an essay and a module in the book. In "Mathematics in Service to Democracy" she outlines how she had an aha moment after seeing people's reaction to social disparities in New Orleans after Hurricane Katrina. She writes that she came to a personal realization that teaching mathematics must be about more than teaching students the chain rule, for example. We have a responsibility to help build an informed, civically engaged society. As a result, she developed courses on mathematics and democracy and quantitative information in the media. She spares all detail of the courses; rather, she stresses the importance of quantitative literacy in the K–16 system. Dave Kung makes a similar case for designing a math class to promote a mindful citizenry in "Math for Social Justice: A Last Math Class for Responsible Citizens." He is guided by the question, "What mathematics do I want the person next to me in the voting booth to understand?" (motivated by an exchange in an Obama-McCain political debate).

My favorite essay is from Victor Piercey. In "Quantitative Ethics," Piercey describes his experiences in developing courses surrounding the moral and societal implications of how we use quantitative information. Piercey writes that in his course he challenges the students to place themselves into the decision-maker role instead of the consumer role by posing *should* questions: Should lenders reveal the implications of continually making only the minimum

payments on credit card debt? Should effective annual interest rates be required by law to be disclosed to consumers? Should environmental impacts to the community be considered when a company opens a store? How should the government intervene in Ponzi schemes? Students learn how questions like these are informed by data analysis and mathematical modeling. This ethical point of view feels to me like a fresh spin on things. Even the term *quantitative ethics* juxtaposes two ideas that I'd never before realized were compatible. Reading his essay gave me that "of course this works" feeling, like eating peanut butter and jelly for the first time.

Of all the essays, Lisa Marano's essay is the one I didn't realize that I needed. She outlines in great detail how she has over the years dealt with student resistance to uncomfortable topics. Since finding dy/dx is pretty noncontroversial, most math professors are unpracticed in dealing with issues in the classroom that stir up emotion. She gives classroom policies, assignment suggestions, and other general management strategies in preparation for "vocal, silent, and absent" resistance from students. Most effective is her use of real-life anecdotes to suggest how to guide students in heated discussions. One powerful example was how she dealt with some students' personal trauma surrounding credit card debt. She explains that as the conversation began to unfold, she scrapped her planned discussion and yielded to the needs of the students. This is a reminder that since emotions can run high when digging in to social issues, being in the moment is key.

Then come the modules. These are prepackaged and ready-to-go lesson plans that can be implemented in the classroom. I was really happy to see such a nice array of topics. There were definitely some usual suspects, such as modules on voting methods and electoral districting. However, the majority of the topics feel cutting-edge and modern, ranging from the graph theory of human trafficking to modeling the rise in acceptance of same-sex relationships. Although on different themes, every module has the same structure. Each starts with an abstract and is then divided into six sections: Mathematical Content, Context/Background, Instructor Preparation, The Module, Additional Thoughts, and an Appendix. Having this uniformity is quite helpful to the reader who wants to compare one module to another. However, I would have also liked to see some note on the intended duration of each module right up front, perhaps in each abstract. Some modules seem more appropriate for just a handful of class meetings, while others could be implemented over the course of an entire academic term. Readers are left to figure this out for themselves. The cherry-picking reader will be happy to know that in the postscript the modules are sorted by mathematical content, such as college algebra, quantitative reasoning, and introductory statistics, and then again by social justice themes, such as finance, environmental justice, and labor. The content of each module is pedagogically thorough.

You will find suggestions for homework assignments, worksheets, group projects, discussion topics, paper topics, final projects, and much more throughout. The book is also full of outside resources like readings, videos, websites, and such to make it easier to expand the modules in different or deeper directions.

The utility of *Mathematics for Social Justice: Resources for the College Classroom* is undeniable. With this book, the editors and contributors have provided the mathematics community a toolkit for challenging students to use mathematics to improve our world from many different angles. I would have liked to see a module focusing on overpolicing and criminal justice, since Khadjavi herself is versed in this topic, but perhaps that will come in the second volume that Karaali and Khadjavi are working on, *Mathematics for Social Justice: Focusing on Quantitative Reasoning and Statistics*. The current volume effectively makes the case that courses that include social justice themes should be a part of the curriculum in every math department in our country. I, for one, am personally energized and excited to implement these ideas at my institution. With this book as a guide, we can not only teach our students how to do math but also how to *use* math for the common good.

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