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The Problems of Contemporariness and Voice:
Review of Literacy & Mathematics: A
Contemporary Approach to Quantitative Literacy
by Jay P. Abramson and Matthew A. Isom (2005)

Gizem Karaali
Pomona College

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The Problems of Contemporariness and Voice: Review of *Literacy & Mathematics: A Contemporary Approach to Quantitative Literacy* by Jay P. Abramson and Matthew A. Isom (2005)

Abstract

Jay P. Abramson and Matthew A. Isom. *Literacy & Mathematics: A Contemporary Approach to Quantitative Literacy*. (Dubuque IA: Kendell Hunt Publishing Co., 2005). 297 pp. ISBN 0-7575-2165-7.

The book under review covers the traditional content of a typical mathematical literacy text. After a brief overview of the book contents, the review then focuses on two specific challenges that QL textbooks have to meet: the timeliness of the contexts used and the subjective author voice that inevitably colors any contextualized discussion. Both issues noticeably arise in the text reviewed. Nonetheless instructors may find it a helpful resource.

Keywords

quantitative literacy, mathematical literacy

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Cover Page Footnote

Gizem Karaali is associate professor of mathematics at Pomona College. Her scholarly interests include representation theory, algebraic combinatorics, humanistic mathematics, pedagogy, and quantitative literacy. Karaali is a founding editor of the *Journal of Humanistic Mathematics* and associate editor of the *Mathematical Intelligencer*. She is actively involved with the SIGMAA-QL and has served on its executive committee for several years. She is an associate editor of *Numeracy*.

When I was asked to review *Literacy & Mathematics: A Contemporary Approach to Quantitative Literacy* by Jay P. Abramson and Matthew A. Isom for *Numeracy*, I was delighted. I have been studying quantitative literacy (QL) textbooks for a while, hoping to help further the critical study of the conceptual content of QL. In a recent paper (Karaali et al. 2016), my coauthors and I have explored the question via a study of several related terms in the literature and policy statements. Textbooks offer us another opportunity to understand more clearly the curricular domain and boundaries of QL.

Content of the Book

To this end, let us first begin with an outline of the curricular content of the text. In terms of content, the text is not revolutionary. We begin with Number Sense in Chapter 1, where the student is immediately immersed into the world of very large and very small numbers. Next comes Chapter 2 on Probability. Here students learn about fundamental concepts such as independence, conditional probability, Bayes theorem and expected values. This content then rather smoothly transitions into Statistics in Chapter 3, where the concepts of causation, correlation, measures of central tendency, and standard deviation are introduced. Chapter 4, titled Rates of Change, basically explores linear and exponential models. In Chapter 5 we move into Finance and explore interest rates, annuities, and mortgage payments. Chapter 6 is on Geometry, and starts with page after page of basic terms and their definitions that should mostly be a review of K-12 geometry, sprinkled with some fun examples on the Empire State Building and the Eiffel Tower. This chapter is also where we are taught how to calculate pool capacity, by drawing the shape of the pool on a rectangular grid and approximating it via the number of grid squares involved. A short review of trigonometry and right triangles is also included. The text ends with a seventh chapter, on Logic, where students are exposed to the difference between inductive and deductive logic, as well as some basic ideas of symbolic logic, quantifiers, connectives, truth tables and so on. A two-page section on logical fallacies finishes the contents of the book, except for a friendly and yet high-minded epilogue of one page.

QL vs. Mathematical Literacy

In Karaali et al. (2016), my coauthors and I observed that most of the definitions for mathematical literacy that we reviewed incorporated geometry and logic, as both are fundamental to mathematics as a discipline. However, more often than not, neither geometry nor logic seemed to fit within the context of QL, given the

various definitions of QL we were working with. Therefore we argued there that geometry and logic could be viewed as features distinguishing QL from mathematical literacy. Here in this QL text they are both included. Is this an anomaly or a disproof of our earlier argument?

I believe that neither is the case. The authors of this text seem to intentionally use the two terms (mathematical literacy and quantitative literacy) interchangeably; as they write in the Preface: “The sole goal of this book is for the student to develop the mathematical tools to be **mathematically literate in our numerate world**” [boldface in the original]. Together with this, the title of the book indicates that Abramson and Isom see quantitative literacy as the “application of basic mathematics to more fully understand the world around us.” Thus, the boundaries between QL and mathematical literacy get blurred, and of course logic and geometry must make their appearances because they are part of our mathematical toolbox to understand our world.

Contemporary? Not So Much

Ample examples pepper the text. This feature is very helpful to the reader, as the concepts come to life through the concrete examples. However, it connects directly to the first problem I see with this book. Published in 2006, the book in its examples shows its age.

Today’s college students do not recall the 2000 election. They may or may not have heard of Hurricane Katrina. The percentage of people who approve of the death penalty has changed from their quoted 2003 number (69%) to 61% in October 2015.¹ Surely the age of the universe has only grown insignificantly in the last decade, and the distance between the Earth and the moon does not need to be updated. However, most of the statistics used in the text need updates, and I doubt that students can be expected to do that on their own. I believe that the contemporariness of the examples is crucial to making this kind of text work.

One thing that separates QL from mathematics is its immediacy, the direct and urgent relevance of now. In comparison, mathematics is timeless in this sense. Though created in historical, social, and cultural contexts and taught in today’s classrooms, mathematics remains mostly independent of what happened yesterday in the stock market, on reality TV, or at the Democratic convention.² QL, on the other hand, cannot remain detached. QL has to dip into the news of the day; QL has to get involved with what is vitally important today.

¹ <http://www.gallup.com/poll/1606/death-penalty.aspx>

² One might wish to distinguish between what might be called *mathematics-as-text* and *mathematics-as-practice*. We will not need the distinction here but plan to explore it in relation to quantitative literacy elsewhere.

This reality poses some challenges to writing a QL textbook or developing a complete QL curriculum. Authors could choose to replicate the timeless nature of mathematics texts. They could develop the mathematical content within context, knowing (and possibly openly acknowledging) that the specifics of the context will be outdated soon after publishing, and yet the ideas and tools developed will remain the same. Then the instructor could systematically supplement the examples and the concrete contexts with contemporary materials. To an extent, I think the Mathematical Association of America's book by Bolker and Mast (2016) fits into this approach. The text under review here, too, could fit into this genre, if the adopting instructor is willing to update the outdated statistics in the text. Come to think of it, if instructors teach their students how to do this updating themselves, and encourage them to do so in other contexts too, then a course taught through this text could be a success.

The above option clearly imposes additional work on the part of the instructor. However, experienced instructors in most disciplines tend to update their teaching on a regular basis. The QL instructor would be doing more of that, more regularly.

Alternatively, the text could itself be in flux. An online compendium of essays, contexts, examples, worked-out exercises, and other instructor and student resources could conceivably be created by a conglomerate of instructors who are interested in and capable of sharing, archiving, and regularly updating such a collection. This solution would in fact be ideal, as individual instructors would be free to adopt and adapt whatever they find useful or relevant to their specific institutional context.

Finally, another question I'd like to pose here is an essential one: Just why do we want to have QL texts? Is QL a stand-alone discipline that demands its own courses, instructors, and textbooks? Or should QL emphasize pedagogical methodologies and eventual outcomes that approach it from a multitude of disciplines? There is no doubt that QL is a vital learning outcome. On the other hand, whether QL should be taught through a stand-alone course or not is perhaps less clear. Some believe and some doubt that the mathematics classroom is a very good context for QL education; in that discussion, I side with the believers. But I also believe that classrooms in astronomy, ecology, economics, geology, psychology, and sociology, among many others, make great contexts for QL as well. In the same way that college students are expected to read and write effectively not only in their English courses but also across a wide spectrum of disciplines, QL education must be a team effort. Of course, many institutions are indeed implementing this very idea and spreading the QL burden/wealth across disciplines. But then why should there be QL textbooks at all?

Authorial Voice and Audience

My second concern about the text also involves style. The authors are not reluctant to express their views. As a proponent of the subjective author voice, I rejoiced when I first observed this feature. However as I read further into the text, I became progressively uneasy. Some of the topics the authors discuss are quite sensitive; let me offer you abortion rights, climate change, and immigration as three of them. The authors bulldoze their way into many of the moral and ethical debates of our time and are unafraid to let their opinion come through. With no doubt, I will comfortably bet that any careful reader will be able to find some authorial perspective in this book to be offended by.

Now that is nothing to be upset about, one can say. The opinionated voices of the authors, together with a hint of disdain for the numerately inferior, are not unique in the genre of books written to popularize the notion of numeracy; one can offer John Allen Paulos' *Innumeracy* (Paulos 1988) as a successful example. However, Paulos writes for the general reader. His readers decided to buy his book to get themselves shamed into numeracy or to enjoy bashing the less fortunate. Do we really want to approach our students this way, too?³

Currently writing an opinionated piece myself, I know well several reasons why authors may choose to do so. However, when our audience consists of students, in particular students who typically come into a QL course with some trepidation, do we want to come across as opinionated know-it-alls? Now I do not mean to imply that Abramson and Isom are opinionated know-it-alls; I do not know them, and reading their text for the past few weeks, I think I would probably enjoy chatting with them if we happened to meet in a professional venue. Furthermore, the introductory voice of the authors in the Preface is personable and welcoming, as it urges the reader to "read with a sense of intrigue and a splash of indignation." I only worry that the tone in the rest of the text might inspire, for the typical student, more of the latter than the former.

The above is directly related to another natural challenge for the QL author. A QL text, assuming it needs to exist, should present a diverse selection of statistics, which are often open to interpretation. A QL text should be immersed in the today and now, and all the controversies that inhabit our time. How then is

³ Even for a general audience, the friendly guide-on-the-side tone might work well. Joe Mazur in his last book, Mazur (2016), takes this approach and, I believe, succeeds in reaching his audience without offending anyone. Bennett (2013), an older favorite of mine, also achieves the same. However, *Innumeracy* is undeniably an excellent book, not the least because Paulos skillfully inserts into his writing some humor and a hint of sorrowful compassion. His audience reads him as a mathematician disappointed in seeing that we have not been able to reach our audience. I think that this mostly if not completely erases the possibly negative implications of the detectable disdain in his prose (cf. Grawe 2015).

the author to remain objective or at least sensitive to the repercussions of subjectivity? This is clearly tough, and I do not have answers; thankfully I am not writing a QL book.

Some Minor Points

Above, I have raised two significant issues with Abramson and Isom's book *Literacy & Mathematics: A Contemporary Approach to Quantitative Literacy*. I could also go into some nitpicking. For instance, I would venture to guess that the copyeditors must have been on vacation. Indeed it is quite easy to locate several typos; surely the authors meant to say "pedal" as opposed to "peddle" on page 78, and "prospective" as opposed to "perspective" on page 145, for instance.

More substantively, there were occasionally numeracy problems. For instance, I was confused by how the incarceration rate for black adult men in 2001 was 4848 per 100,000 on the display on page 72 and became 7226 per 100,000 on page 73. Of course, both are disturbing numbers, but the point that was being made needed the precision, or at least the consistency, of the numbers involved. I also found the presentation of dependent and independent events on page 79 somewhat misleading.

Some mildly feminist musings: One of the contexts introduced early on was "finding a mate" on page 89. The relevant discussion mainly considers how men can "meet women." Then with the inclusion of top ten jobs for women on page 94, the authors continue with a gendered presentation. One can of course state correctly that the authors are "only presenting the facts," but which facts one chooses to present color one's presentation. It is possibly true that college students are interested in finding life partners, but perhaps one should not go as far as simplifying the problem into one about "meeting women." Some readers may chuckle in passing about the male-centric perspective, but others may not be so amused.

A final point I will bicker about here is the figure on page 150 of the normal curve. The lines representing one standard deviation around the mean are not symmetrically drawn, even though the text claims (correctly) that they should be. Students studying the figure more carefully than the text would learn that the cutoff on one side would be higher.

All's Well That Ends Well: Final Words

It seems that I have almost incessantly complained. But all in all, I did enjoy my reading of the book. I liked many of the examples, in particular the one on page 95 about the athlete whose professionalism implies independence of consecutive free throws. I loved the discussion on pages 59–60 of the coincidences about

December 5 and Hugh Williams. I also appreciated the quirky and yet optimistic final paragraph. Abramson and Isom have written a stimulating text; it makes me think that their classroom must be a fun place to be. I would not assign it as a text for a course I teach, but the diverse contexts it brings up make it a handy resource for an instructor who is looking to improvise or enrich an already extant QL course.

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