Rhetorical numbers: a case for quantitative writing in the composition classroom

For decades, writing across the curriculum (WAC) advocates have maintained that teaching effective writing is everyone's responsibility. Although these efforts have been far from problem-free, it is now common today to see writing assignments in math and science classes in middle, high school, and college. Major journals in math and science education, such as Journal of Research in Science Teaching and Journal of Engineering Education routinely carry weighty research articles investigating different approaches to integrating writing instruction with technical subject matter. Disciplines such as business and engineering hire writing experts who tailor their instruction to that discipline's content. While there is certainly resistance to these efforts in some quarters, we are seeing change in how writing is taught and perceived in disciplines that in the past considered writing to be "not my problem."

This success of WAC has caught the attention of a parallel, nascent movement that goes by a variety of names, including math across the curriculum, numeracy, quantitative reasoning, mathematical literacy, and (my preference) quantitative literacy. In the K-12 and adult education sectors, such movements have sought to liberate quantitative literacy from traditional mathematics education by stressing reasoning in real-world communicative contexts. Here, math
and science educators such as Lynn Steen and John Allen Paulos as well as journalists such as Gina Kolata have been active. In the UK, well-known literacy scholars such as Brian Street have been attempting to blur the boundaries between verbal literacies and numeracies, treating both as intertwined skills citizens need to be functionally literate in a society. At the higher education level, initiatives such as Carleton University's QuIRK (Quantitative Inquiry, Reasoning, and Knowledge) have begun to look at how quantitative reasoning and writing across the curriculum initiatives could be merged under the general rubric of argument or rhetoric. Here composition scholars such as John Bean and Carolyn Rutz as well as prominent faculty in other disciplines, such as Neil Lutsky and Robert Abelson, have been active pioneers.

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In short, I argue that composition needs to develop instructional materials and, perhaps more importantly, provide instructor training that will help us teach quantitative argument alongside the other rhetorical skills and literacies we already foster. Such a change would fit with

- our commitment to democracy and literacy: In today's world, a fully literate citizen needs a facility with making and distinguishing good from bad quantitative arguments. Nearly everyone in this culture will at some point want to better understand cost/benefits arguments about public expenditures, evaluate the clinical results of a new drug or treatment, or weigh the marginal risks of purchasing a possibly contaminated bag of spinach against the certain nutritional benefits of a diet of fresh, leafy greens. Such personal decisions are saturated in a quantitative rhetoric in which the verbal and the quantitative are tightly interwoven.
• our commitment to rhetoric: Quantitative argument (including statistics, charts, and numbers) is saturated with rhetoric. We need to move beyond epistemologies that limit rhetoric to something one does with words and extend our rhetorical principles to numerical arguments and their visual representations.

• our commitment to the university: We claim to prepare students for writing in all disciplines, but tend to narrowly focus on writing in the humanities. Even readers and textbooks specifically advertised as "writing across the curriculum" texts often fail to include substantive examples of quantitative argument.

This essay proceeds by examining how textbooks and other instructional material in our field currently treat quantitative argument. I contend that such materials ironically tend to reinforce, rather than dispel, naïve, popular views that venerate numbers as hard "facts" in contrast to the "mere rhetoric" of verbal argumentation. Next, I show how statistical arguments can be analyzed rhetorically not only through their appeals to ethos, pathos and logos, but also through their use of the canons of invention and arrangement. In the final section, I outline some simple assignments that illustrate how quantitative reasoning can easily be incorporated into our current writing curriculum and call for more training of our instructors and writing center tutors that will prepare them to teach quantitative argument.

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Statistical expression and arguments of definition

In addition to recognizing rhetorical appeals in statistical expressions, we also need to train students to uncover the often contestable definitions that make these expressions possible.
In his very readable book, *Mathsemantics*, the business statistician Edward MacNeal describes how issues of naming and definition are central to mathematical discussions. He opens the book by providing an example that he used on a test given to prospective market-research applicants:

What is 2 apples plus 5 oranges? Traditional mathematics education has taught us that apples and oranges are two different categories that cannot be added together. However, MacNeal contends that in many real-world situations, the correct answer is "seven fruit." He writes

> Whether you can add two things together depends on what they're called…The accounting department has to add apples, oranges, and pomegranates every day…The question is not whether we can add different things, but how we can add them in clear and useful ways. That gets us into meanings, into semantics, with both feet. (6)

In other words, language plays an important role in creating statistics—and questioning statistical data often involves challenging the definitions on which the statistics rest.

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Works Cited


