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Quantitative Literacy: Quick History

MILO SCHIELD,
Augsburg College
Director, W. M. Keck Statistical Literacy Project
Vice President, National Numeracy Network
US Rep, International Statistical Literacy Project

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Why Numbers Count 1997



- Numeracy is the new literacy of our age
- The relentless quantification of society continues unabated
- In short an innumerate citizen today is as vulnerable as the illiterate peasant of Gutenberg's time.
- Although the widespread availability of data should enrich public discourse, inevitable over-simplifications and misinterpretations may ultimately cheapen it.
- Innumeracy thus becomes another means of disenfranchisement: by reinforcing the idea that truth is relative and unknowable...

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Math & Democracy 2001



- "In the twenty-first century, literacy and numeracy will become inseparable qualities of an educated person."
- "Although quantitative literacy is a recent and still uncommon addition to the curriculum, its roots in data give it staying power."
- "Numeracy will thrive similarly because it is the natural tool for comprehending information in the computer age."
- "Numeracy is not the same as mathematics, nor is it an alternative to mathematics."

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Quantitative Literacy 2003



"Quantitative Literacy (QL), the ability to use numbers and data analysis in everyday life, is everybody's orphan.

Despite every person's need for QL, in the discipline-dominated K-16 education system in the United States, there is neither an academic home nor an administrative promoter for this critical competency." p. 153 Bernard Madison

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Quantitative Literacy 2003



Numeracy lies at the intersection of statistics, mathematics and democracy.

Like statistics, numeracy is centered on interpretation of data; like mathematics, numeracy builds on arithmetic and logic. But the unique niche filled by numeracy is to support citizens in making decisions informed by evidence."

Numeracy is largely an approach to thinking about issues that employs and enhances both statistics (the science of data) and mathematics (the science of patterns). Yet unlike statistics, which is primarily about uncertainty, numeracy is often about the logic of certainty. And unlike mathematics, which is primarily about the Platonic realm of abstract structures, numeracy often is anchored in data derived from and attached to the empirical world.

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QL: Peer Review 2004



- "QL is anchored in context; the objects of QL are data."
- "Averages, like percentages, are also a source of mysteries."
- "QL is sufficiently sophisticated to warrant inclusion in college study and, more important, that without it students cannot intelligently achieve major goals of college education."
- "Quantitative literacy is not just a set of precollege skills. It is as important, as complex, and as fundamental as the more traditional branches of mathematics."



**Achieving QL
2004**

Literacy includes "prose, document and quantitative literacy."
 "Document literacy refers to reading charts and tables." p. xi.
 "Quantitative literacy refers to interpreting and reasoning with numbers." p. xi
 "The essence of QL is to use mathematical and logical thinking in context." p.47
 QL skills involve "sophisticated reasoning with elementary mathematics rather than elementary reasoning with sophisticated mathematics." p. 9
 "Because of their education and training, most teachers are not prepared for or comfortable with the mathematics required for quantitative literacy." p.47.



**Current Practice in QL
2006**

Current Practices in Quantitative Literacy present a wide sampling of efforts being made on campuses across the country to achieve our common goal of having a quantitatively literate citizenry.

The essays suggest that we have moved forward a long way in our understanding of quantitative literacy and our ability to implement effective programs to teach it.

Read the stories of other institutions who have worked through some of these issues and begin a dialogue on your own campus.



**Calculation vs. Context
2008**

K–12 education is responsible for much of QL, and K–12 teachers need to be able to guide students toward QL.

Although QL should be an aim of education across all subjects in K–12, a large part of the responsibility falls to K–12 mathematics, which includes data analysis, statistics, and probability.

QL education is largely about connecting learning and reasoning in mathematics and other college disciplines' classrooms to contextual situations in the contemporary world.



**Calculation vs. Context
2008**

Is QL part of mathematics or isn't it? If so, why isn't it taught and learned? If not, who should teach it?

QL explorers have moved beyond debates about the definition of QL, not because they reached consensus but because they recognize that development of QL programs is more important (and is also an effective way to clarify definitions).

For a new field like QL—if it even is a "field"—without a major, it appears as if one may need either a miracle or a revolution.



**Calculation vs. Context
2008**

Special thanks are owed to Robert Orrill whose curiosity, persistence, and deceptively simple questions which defied simple answers launched the QL movement that has now spread to multiple disciplines, scores of campuses, and thousands of students.

Education and Democracy: Re-imagining Liberal Learning in America (1998) by **Robert Orrill**

The Condition of American Liberal Education: Pragmatism and a Changing Tradition by **Bruce A. Kimball and Robert Orrill** (1995)

QL is Growing

QL is advancing at US colleges.

- 17% of US four-year colleges offer Q/L (Schield, MAA 2010)

Q/L has two organizations:

- NNN: Without funding or sponsor, NNN has established its place in higher education.
- SIGMAA-QL: Special Interest Group of the MAA on Quantitative Literacy.

Q/L is advancing academically.

- *Numeracy*, NNN's peer-reviewed journal, is in the EBSCO database, *Education Research Complete*.