

Many Women Work, Wealthy People Have More Money, and Other Important Things I've Learned from Reading Student Papers

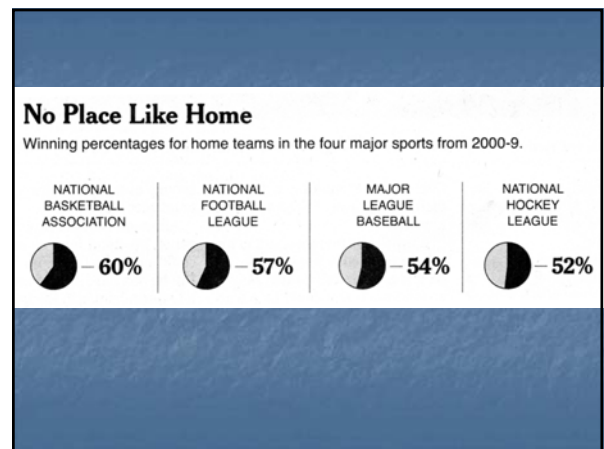
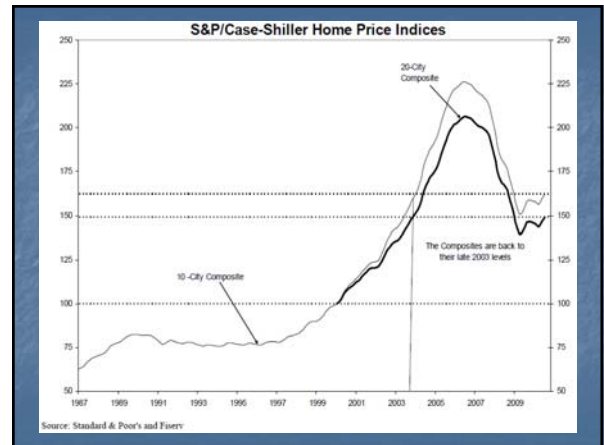
Nathan D. Grawe
Carleton College

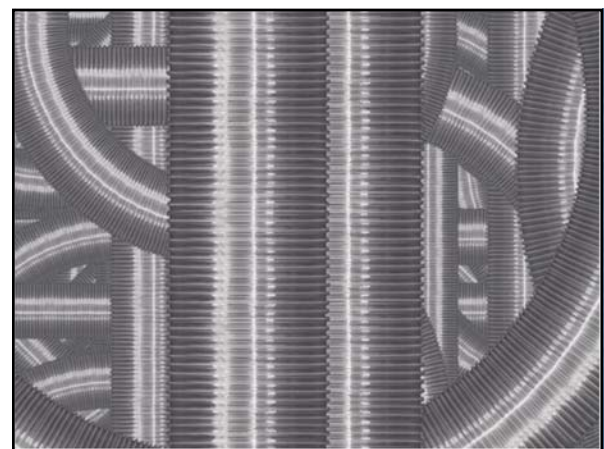
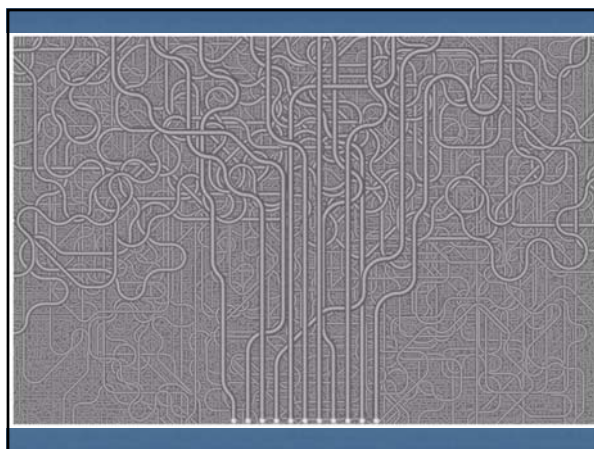
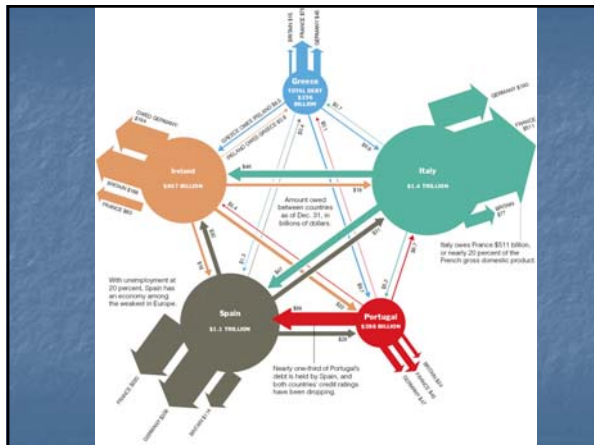
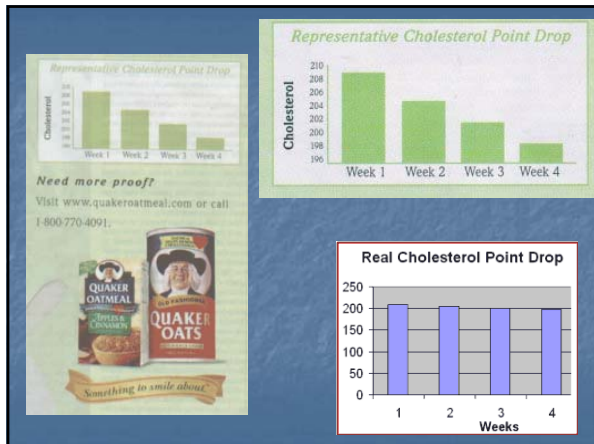
With support from the US Department of Education's Fund for the Improvement of Post-Secondary Education, the National Science Foundation, and the WM Keck Foundation.

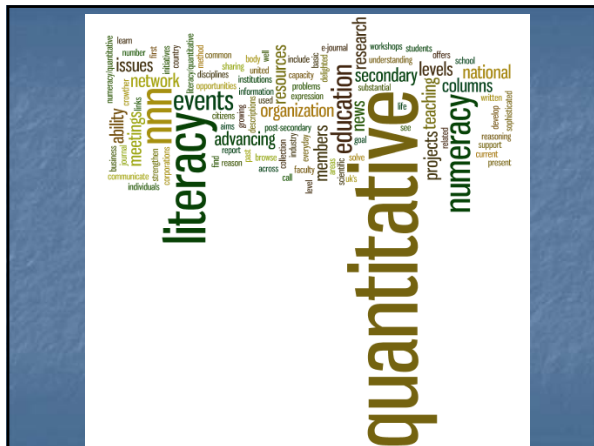
The 21st Century: A World Awash in Numbers

"The world of the twenty-first century is a world awash in numbers."

-Lynn Steen in *The Case for Quantitative Literacy*







What is QR? (OuIRK's Take)

The habit of mind to consider the power and limitations of quantitative evidence in the evaluation, construction, and communication of arguments in public, professional, and personal life.

What is QR?

Four facets of QR:

- 1) **QR requires a *basic skill set***
 - Arithmetic, including percentages, graphs
 - Estimation
 - Elementary probability and statistics
 - Basic geometry of measurement (volume, area, perimeter)
 - Elementary growth patterns: linear (constant quantity per unit time) and exponential (constant percentage change per unit time).

What is QR?

Four facets of QR:

- 1) QR requires a *basic skill set*
- 2) **QR demands *application in context***

"The test of numeracy, as of any literacy, is whether a person naturally uses appropriate skills in many different contexts"

-Lynn Steen (2001)

What is QR?

Four facets of QR:

- 1) QR requires a *basic skill set*
- 2) QR demands *application in context*
- 3) **QR involves *argument***

What is QR?

"The content of our thoughts and the depths of our understanding are dependent on the tools we bring to the task. *What* we think is intertwined with *how* we think. And the ability to think in terms of quantitative data...is indispensable for understanding our modern world....We write, after all, to figure out what we think. And we ask our students to write so that they will learn how to think."

-Michael Burke
"A Mathematician's Proposal"

What is QR?

Four facets of QR:

- 1) QR requires a *basic skill set*
- 2) QR demands *application in context*
- 3) **QR involves argument**

"Numbers [are] the principal language of public argument."

-BBC Program *More or Less*

What is QR?

Four facets of QR:

- 1) QR requires a *basic skill set*
- 2) QR demands *application in context*
- 3) **QR involves argument**

"Deploying numbers skillfully is as important to communication as deploying verbs."

-Max Frankel, *The New York Times Magazine*

What is QR?

Four facets of QR:

- 1) QR requires a *basic skill set*
- 2) QR demands *application in context*
- 3) QR involves *argument*
- 4) **QR is a habit of mind**

"[QR] is not a discipline but a way of thinking...."

-Lynn Steen
Achieving Quantitative Literacy

What do the numbers show?

Weasel-Words Rip My Flesh! Spotting a bogus trend story on Page One of today's *New York Times*.

By Jack Shafer
Posted Tuesday, Sept. 20, 2005, at 6:38 PM ET

How many "many's" are too many for one news story?

Like its fellow weasel-words *some, few, often, seems, likely, more*—many serves writers who haven't found the data to support their argument. A light splash of weasel-words in a news story is acceptable if only because journalism is not an exact science and deadlines must be observed. But when a reporter pours a whole jug of weasel-words into a piece, as Louise Story does on Page One of today's (Sept. 20) *New York Times* in "Many Women at Elite Colleges Set Career Path to Motherhood," she needlessly exposes one of the trade's best-kept secrets for all to see. She deserves a week in the stockades.

What do the numbers show?

At Yale and other top colleges, women are being groomed to take their place in an ever more diverse professional elite. It is almost taken for granted that, just as they make up half the students at these institutions, they will move into leadership roles on an equal basis with their male classmates.

There is just one problem with this scenario: many of these women say that is not what they want.

Many women at the nation's most elite colleges say they have already decided that they will put aside their careers in favor of raising children. Though some of these students are not planning to have children and some hope to have a family and work full time, many others, like Ms. Liu, say they will happily play a traditional female role, with motherhood their main commitment.

How representative is that?

How to Beat the Big Energy Chill

Sponsored By
Kodak

This winter's soaring heating bills will be a painful reminder that we're living in an age of expensive energy. But there's an upside: the business case for renewable sources of energy is warming up quickly.

NEWSWEEK
Updated: 2:30 PM ET Oct 16, 2007

Gina and Ron Martin's home in Mentor, Ohio, is just plain big. It has six bedrooms, five and a half bathrooms, a cavernous basement, a spacious patio and a pool in the backyard. But the last thing the self-employed housing contractors suspected when they bought their dream house in 2004 was just how big the heating bills were going to be. Last winter their utility bills averaged \$400 a month. Although the price of heating oil has inched down in the past two weeks, the Martins are anticipating bills of \$700 a month this winter. They expect the price of energy to keep rising—and many experts agree with them. Once their three teenage kids leave for college, the couple plans to downsize. "We loved this house, now we hate this house," Gina says. "We are a hardworking middle-class family that is freaking out about a gas bill. Something is very wrong with that picture."



Compared to What?

- 53% of fatalities
- 43% of the days
- 55% of the driving

Compared to what?

The misperceptions cut both ways. Critics often glibly describe Wal-Mart as just another big, greedy corporation. If you took the company's total profit from 2004 (\$10.3 billion) and gave every dollar to Wal-Mart's employees (1.6 million), you would distribute about \$6,400 per employee.

Microsoft had an even larger 2005 profit of \$12.3 billion. But Microsoft has just one twenty-sixth the number of employees as Wal-Mart—its profits come to \$200,000 per employee, or thirty times those at Wal-Mart.

More to the point, perhaps, for its hourly employees, Wal-Mart's total profit comes to \$3 an hour over a typical year. So although there may be some dispute about whether the average Wal-Mart store associate earns \$8 an hour or \$9 an hour, Wal-Mart could not afford to pay those people \$12 an hour. There isn't enough money—at least not without raising prices.

How was the variable operationalized?

Who is in the measurement sample?

GET QUOTES Finance Search Monday, March 29, 2010

The Myth of the \$18,000 Wedding

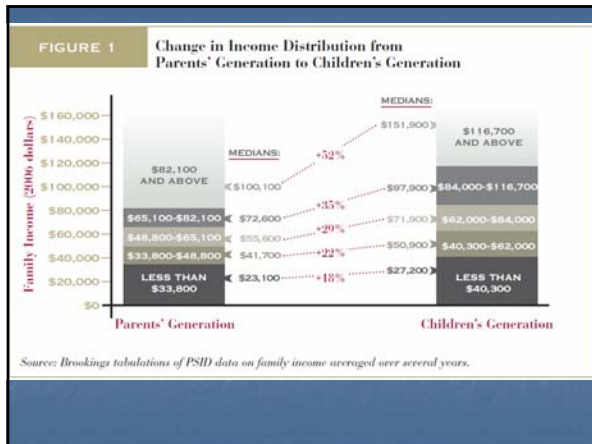
by Laura Rowley
Wednesday, February 24, 2010

The Wall Street Journal had an interesting piece recently looking at what brides and bridegrooms would save if they invested the money spent on their weddings, rather than blowing it on a one-day affair.

The author suggests that couples who lay out the median cost of a wedding — nearly \$18,000 in 2009 — are actually missing out on \$90,000 to \$200,000 in wealth accumulation over a lifetime. (He notes the average bride is 26 years old, so the money would have roughly 40 years to grow.)

Considering the lost opportunity cost of a lavish wedding is excellent advice — except the basis of the calculation is based only on a subset of all the weddings each year. The almost \$18,000 "average" comes from TheKnot.com, a bridal Web site. According to spokesperson Melissa Bauer, the survey company Decipher polled 21,000 U.S. couples who married in 2009. All of them had registered, or "opted in," to one of a network of wedding-related sites operated by TheKnot. In other words, the sample is biased toward people who plan big weddings.





Is the outcome statistically significant?

abc NEWS

Do Libras Live Longer?

Lee Dye Takes a Hard Look at a Massive Study That Claims a Connection Between Astrological Signs and Health.

Feb. 21, 2007 —

Peter Austin wasn't a bit surprised when he found evidence of what appears to be a strong link between specific astrological signs and life-threatening medical problems. Is it possible that our health is really determined by the zodiac, or the sign under which each of us was born?

Well, no, despite the fact that Austin's research seems to prove that a Taurus is more likely to suffer a broken neck, a Pisces more likely to have heart failure, and a Virgo more likely to vomit during pregnancy. I'm a Gemini, so I should be drunk right now, because the study, which encompassed the health records of more than 10 million Canadians, shows that a Gemini is very likely to suffer from alcohol dependency.

That's precisely what Austin expected to find, but he says it's all rubbish.

What's the Effect Size?

JAMA[®]
The Journal of the American Medical Association

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Vol. 300 No. 4, July 23/30, 2008

Original Contribution

Sildenafil Treatment of Women With Antidepressant-Associated Sexual Dysfunction

A Randomized Controlled Trial

H. George Nurnberg, MD; Paula L. Hensley, MD; Julia R. Heiman, PhD; Harry A. Croft, MD; Charles DeBattista, MD; Susan Paine, MPH

JAMA. 2008;300(4):395-404.

What's the Effect Size?

Results In an intention-to-treat analysis, women treated with sildenafil had a mean Clinical Global Impression-sexual function score of 1.9 (95% confidence interval [CI], 1.6-2.3) compared with those taking placebo (1.1; 95% CI, 0.8-1.5), with a mean end point difference of 0.8 (95% CI, 0.6-1.0; $P = .001$).

Assigning baseline values carried forward to the 22% of patients who prematurely discontinued resulted in a mean end point in the sexual function score of 1.5 (95% CI, 1.1-1.9) among women taking sildenafil compared with 0.9 (95% CI, 0.6-1.3) among women taking placebo with a mean end point difference of 0.6 (95% CI, 0.3-0.8; $P = .03$). Baseline endocrine levels were within normal limits and did not differ between

What's the research design (correlational or experimental)?

Fact: Those who work with computers earn 15-20% more than others.

"Thus, computer training may, at least in the short run, be a profitable investment for public and private job training programs."

What's the research design (correlational or experimental)?

Other interesting returns:

- Calculator = 12.8%
- Telephone = 11.4%
- Pencil/Pen = 11.2%
- Work while sitting = 10.1%

What's the research design (correlational or experimental)?



Situating QR in the Context of Writing

"...sophisticated reasoning with elementary mathematics more than elementary reasoning with sophisticated mathematics."

-Lynn Steen

Achieving Quantitative Literacy

Examples from Student Work

Central Use:

Use of numbers to address a central question, issue, or theme

Peripheral Use:

Use of numbers to provide useful detail, enrich descriptions, present background, or establish frames of reference

Examples from Student Work

The importance of the periphery:

"Even for works that are not inherently quantitative, one or two numeric facts can help convey the importance or context of your topic."

-Jane Miller

The Chicago Guide to Writing About Numbers

Examples from Student Work

Please read excerpts 1 & 2.

Which typifies uses of quantitative evidence you would like to see in your students' work?

Examples from Student Work

Please read excerpts 3 (a and b) 4.

Which typifies uses of quantitative evidence you would like to see in your students' work? Work like that in category 3 or in category 4?

Examples from Student Work

Alternative:

"Understanding the effects of day care on child development is increasingly important as labor force participation among married women with children, ages 25-34, increased from 28% in 1960 to 68% in 2005. In fact, the number of working women with children nearly tripled during those 45 years from 8.1 million to 26.2 million."

Examples from Student Writing

Excerpt #3



\$192 billion
1/65th of GNP



\$60 billion
1/230th of GNP

What QuIRK Has Learned

1. There is ample opportunity to teach QR in the current curriculum

25% of papers are centrally related to QR
+21% of papers are peripherally related
~half of all papers are QR relevant

What QuIRK Has Learned

2. QR is relevant to papers written in the Arts, Literature, and Humanities

~30% of these papers are QR relevant

What QuIRK Has Learned

"[N]umeracy is not something mastered in a single course....Thus quantitative material needs to permeate the curriculum, not only in the sciences but also in the social sciences and, in appropriate cases, in the humanities, so that students have opportunities to practice their skills and see how useful they can be in understanding a wide range of problems."
-Derek Bok (2006)

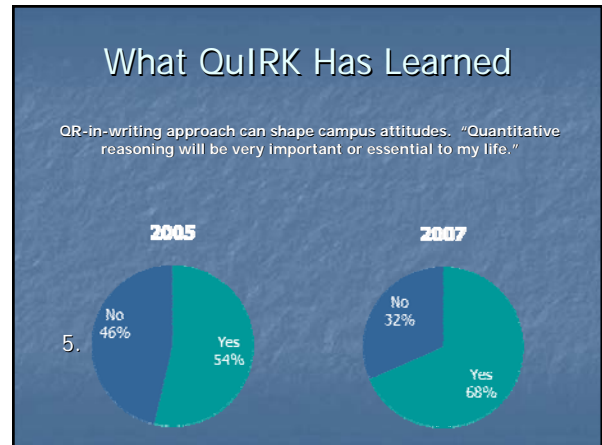
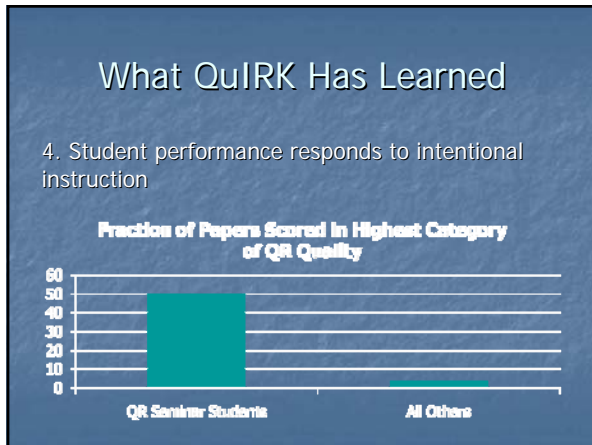
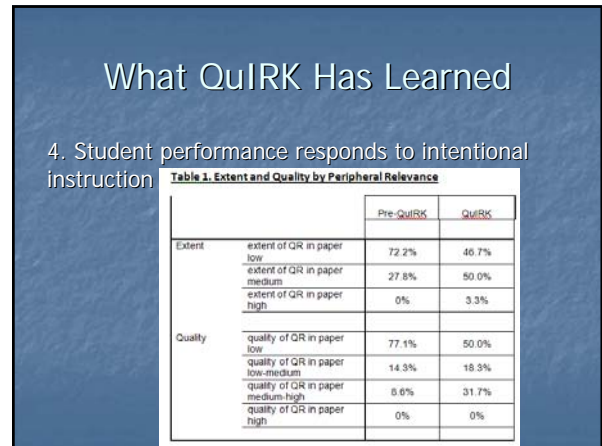
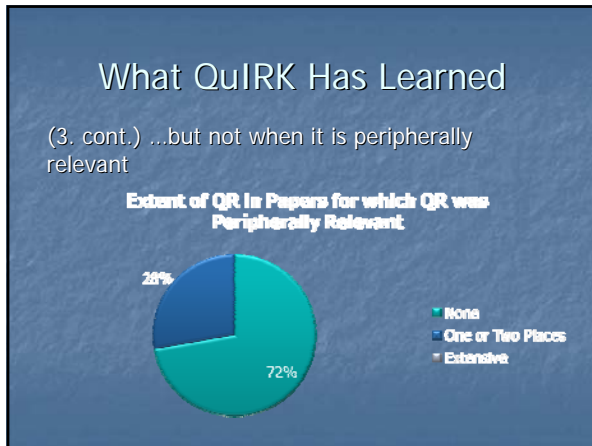
"...authentic and enduring learning...can rarely succeed one course at a time."
-Lee Shulman (1997)

What QuIRK Has Learned

3. Before QuIRK, students generally used QR when it is centrally relevant...

Extent of QR in Papers for which QR was Centrally Relevant





Curricular Implications

"The interdisciplinary and contextual nature of [QR] cries out for a cross cutting approach."

-Lynn Steen
Achieving Quantitative Literacy

Curricular Implications

"If [QR] remains the responsibility solely of mathematics departments—especially if it is caged into a single course such as 'Math for Liberal Arts'—students will continue to see [QR] as something that happens only in the mathematics classroom."

-Lynn Steen
Achieving Quantitative Literacy

Curricular Implications

Carleton's New Curriculum:
Quantitative Reasoning Encounter

Curricular Implications

Carleton College
Quirk
Carleton Quantitative Inquiry, Reasoning, & Knowledge Initiative

Curricular Materials

- [Writing About Numbers We Should Know](#) (part of Examples)
- [Exploring Economic Inequality with Data](#) (part of Examples)
- [Guidedread Goal Files: Writing a Lab Report in the Form of a Scientific Paper](#) (part of Examples)
- [The Role of Audience in Quantitative Writing](#) (part of Examples)

Curricular Implications

THE NATIONAL NUMERACY NETWORK

Examples

Results 1 - 10 of 48 matches

Writing about Numbers We Should Know (part of Examples)

This opening assignment for an introductory quantitative reasoning course asks students to write about "Numbers We Should Know". Its goal is to help students begin to think quantitatively, evaluate the sources of quantitative information critically, and write using numbers precisely and thoughtfully.

Exploring Economic Inequality with Data (part of Examples)

This set of assignments exposes students to data which can be used to analyze economic inequality in international and historical context. Then students are asked to generate a thesis-driven argument drawing supporting evidence from one or more of the data sources.

Guidedread Goal Files: Writing a Lab Report in the Form of a Scientific Paper (part of Examples)

Students collect protein electrophoresis data comparing goldenrod gall flies, analyze class data, and write a lab report in the format of a scientific paper.

The Role of Audience in Quantitative Writing (part of Examples)

This workshop entails the reading of a highly quantitative article, summarizing it for a different audience, and reflecting upon what choices and opportunities audience presents for quantitative writers.

Curricular Implications

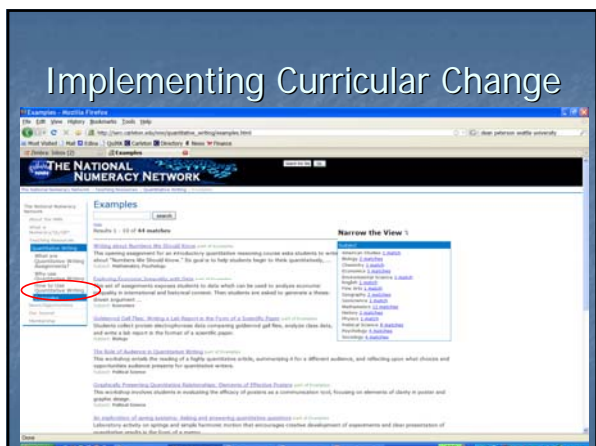
Subject	Matches
American Studies	1 match
Anthropology	1 match
Biology	2 matches
Chemistry	1 match
Classics	1 match
Economics	10 matches
English	2 matches
Environmental Science	1 match
Fine Arts	1 match
Geography	2 matches
Geoscience	2 matches
History	2 matches
Languages	2 matches
Mathematics	12 matches
Physics	1 match
Political Science	10 matches
Psychology	5 matches
Sociology	4 matches

Curricular Implications

- French culture
"Students choose one of the cultural topics they analyzed in class (e.g. education, art, social integration, immigration, socio-economic status, communication, spatial boundaries, language variation, social networks) after viewing three current films.... By integrating socio-economic data analysis and the study of the movie, students evaluate the worth of the fiction as a faithful or distorted mirror of its society."

Curricular Implications

- Classics 100
"...a close reading of an extended passage of Pausanias' *Description of Greece*. In it he records in great detail an inventory of all the statues of athletes (nearly 200) that he observed in the Sanctuary of Zeus at Olympia...."



Closing Thought

"...Now everyone can obtain and consider data about the risks of medication, voting patterns in a locality, projections for the federal budget surplus, and an almost endless array of other concerns.... If individuals lack the ability to think numerically they cannot fully participate in civic life, thereby bringing into question the very basis of government of, by, and for the people."
-Robert Orrill
"Mathematics, Numeracy, and Democracy"