Post-Semester Report

Click here to toggle on/off the raw code.

Dear Instructor,

Thank you very much for taking part in the Quantitative Reasoning for College Science (QuaRCS) study this semester. Your participation is invaluable to our work. In this report, you will find information describing your students' performance on the post-semester survey, as well as comparisons betwen their pre and post semester assessment data. We hope that this will help you to understand how your students' quantiative skills and attitudes have developed during your course. Please don't hesistate to contact me if you have any quesitons or concerns about your data. ¶

More information about the QuaRCS assessment is available in the two papers cited below. Please consider signing up for our biannual newsletter (http://www.katefollette.com/ql/re-numerate-newsletter) to stay up-to-date on future results of the QuaRCS study and to find out more about our "Re-Numerate" workshop series.

We would be delighted to have you give the assessment again in a future semester, and we hope that you have found these reports valuable.

Best,

Kate Follette (PI)

kfollette@amherst.edu

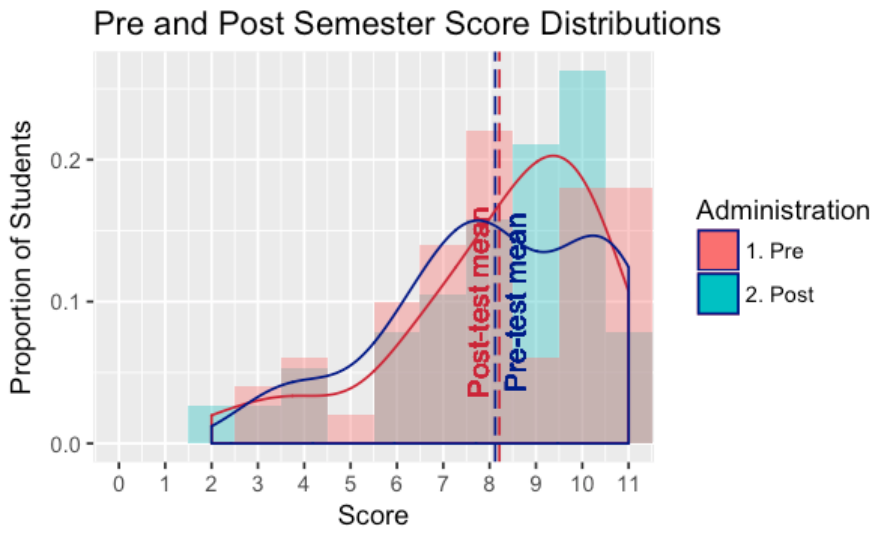
QuaRCS paper references:

Follette, K., Buxner, S., Dokter, E., McCarthy, D., Vezino, B., Brock, L., & Prather, E. (2017). "The Quantitative Reasoning for College Science (QuaRCS) Assessment 2: Demographic, Academic and Attitudinal Variables as Predictors of Quantitative Ability" (http://scholarcommons.usf.edu/numeracy/vol10/iss1/art5/). *Numeracy*, Vol. 10, Iss. 1.

Follette, K. B., McCarthy, D. W., Dokter, E., Buxner, S., & Prather, E. (2015). "The Quantitative Reasoning for College Science (QuaRCS) Assessment, 1: Development and Validation" (http://scholarcommons.usf.edu/numeracy/vol8/iss2/art2/). *Numeracy*, Vol. 8, Iss. 2.

Score Distribution

This graph compares the pre- and post-semester score distribution for your class. The blue and red bars histograms and their corresponding smoothed kernel density curves represent the distributions of your students' pre and post test scores respectively. The dashed lines show average scores on the pre- (red) and post- (blue) assessments. Because fewer students tend to devote effort to the post-semester assessment than the pre- (see Follette et al. 2015), this graph only includes data from students who indicated that they devoted effort to the assessment by answering either "I tried pretty hard" or "I tried my best on all or most of the questions". We find that including the larger proportion of low-effort students in post-semester distributions often produces a false appearance of decreased scores on the post-assessment, and that this comparison of high-effort students is the most accurate pre-post comparison.



The Two Sample t-test conducted below compares pre and post test scores of students who devoted effort to the assessment. The p-value displayed below represents the probability of obtaining a mean difference in scores that is as or more extreme than the one observed in this class if the null hypothesis that there is no difference in pre and post test scores were true. If the p-value reported below is less than 0.05, you can assume that the two samples are statistically significantly different. If the value is above 0.05, the two distributions are statistically the same.

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        Welch Two Sample t-test

data:  prehigh$PRE_SCORE and psthigh$PST_SCORE
t = -0.18752, df = 80.756, p-value = 0.8517
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -1.0510953  0.8700427
sample estimates:
mean of x mean of y
 8.120000  8.210526
```

Summary Statistics

Below is a table describing the number of students in your class who began the survey, the number who completed the entire survey, the number who indicated that they devoted effort to the assessment by answering either "I tried pretty hard" or "I tried my best on all or most of the questions", and the number who identified themselves as STEM majors. You should have seperately recieved a list of names so you may assign credit.

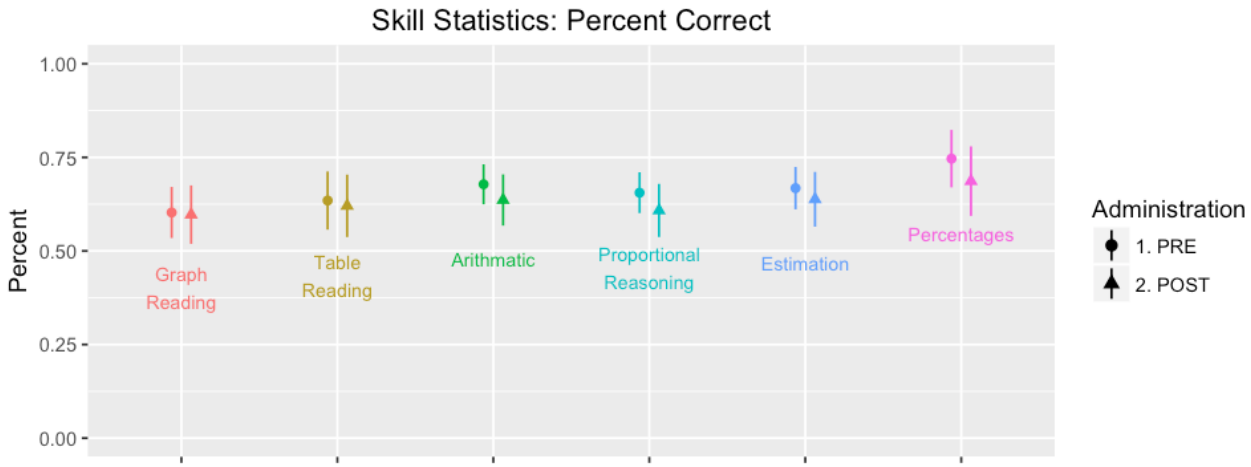
Response	Pre	Post
Students who began assessment	73	68
Students who completed assessment	73	65
Students who reported devoting effort to assessment	50	38
STEM Majors	12	15

	Number	Average score (points)	Average Score (percentage)	Std. Deviation (points)	Confidence Intervals (low, high)
All students	65	7.05	28.2	2.95	(6.33,7.76)
High-effort Students	38	8.21	32.8	2.22	(7.5,8.92)
Low-effort Students	27	5.41	21.6	3.10	(4.24,6.58)

Score by Skill

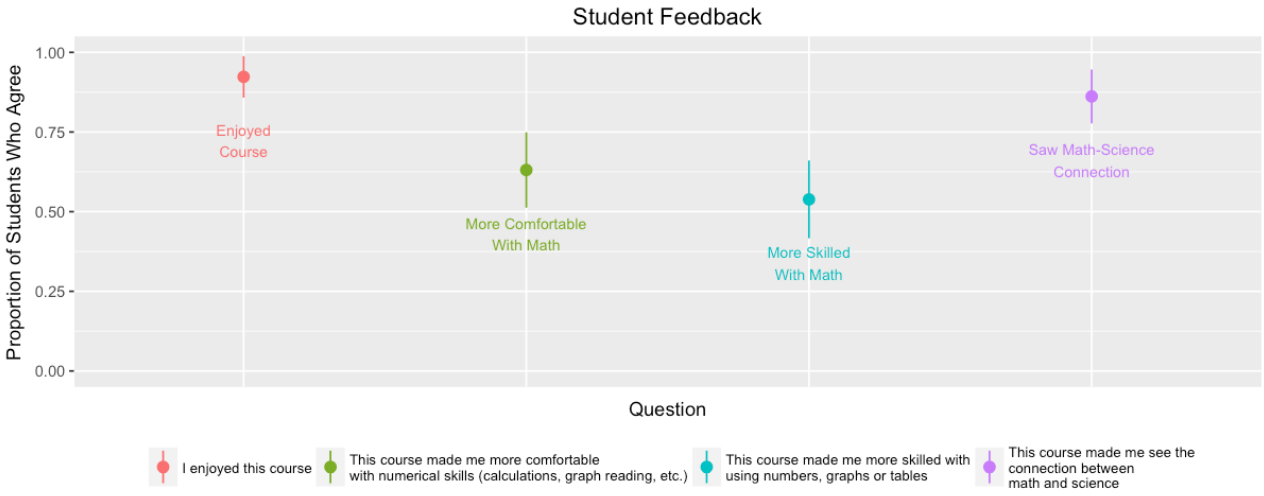
The graph below shows how your students performed (proportion of correctly answered questions) on each of the quantitative skills measured by this version of the QuaRCS for both the pre- and post-semester assessments.

The following skills are ordered by average importance based on a survey of math and science educators, as reported in Follette et al. 2015. In this and all other graphs in this report, error bars represent 95% confidence intervals on the mean for that category.



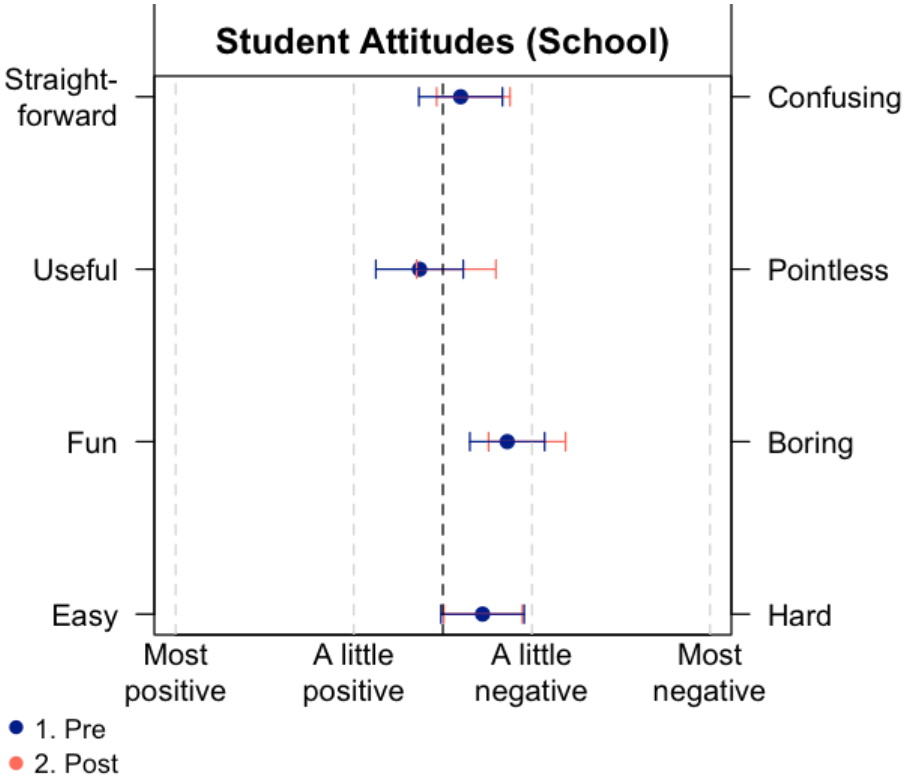
Student Feedback

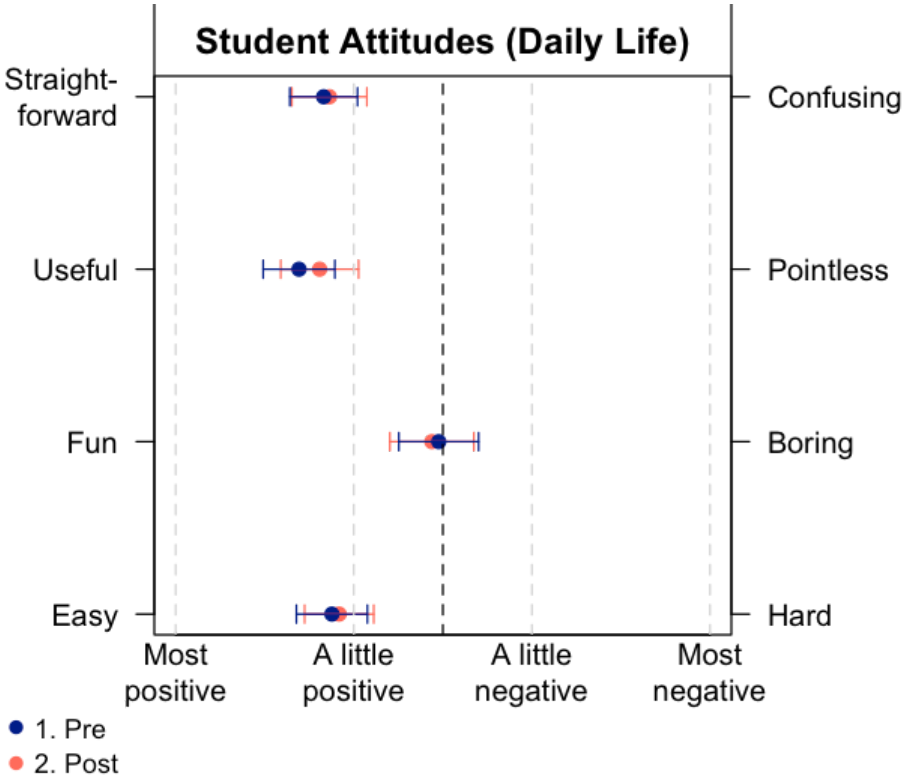
The following graph shows your students' views on strengths of this course. Students were given the four Likert scale items shown in the legend below with answer choice options "strongly agree", "agree", "strongly disagree", and "disagree". For each of the four questions, the "proportion of students who agree" is the proportion of students who selected either "agree" or "strongly agree" for that question.



Attitudes Toward Math

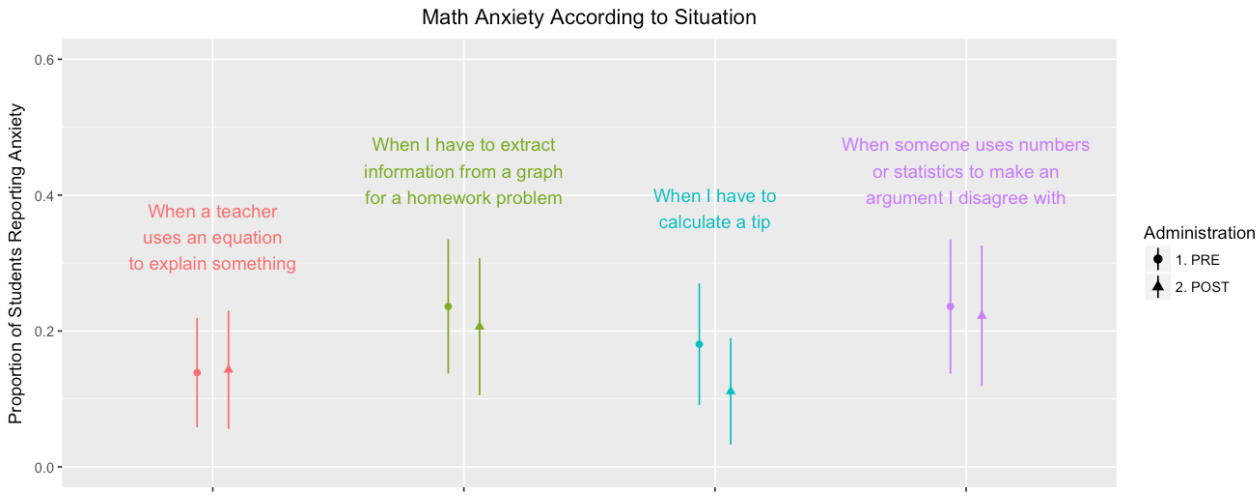
The figures below describe your students' attitudes toward math in academic contexts (top chart) and in daily life (bottom chart). For each context, students were given two opposing adjectives and asked to rate where "doing math" (including doing calculations, reading graphs and tables, and reasoning with numbers) fell between them on a 4 point scale from the positive to the negative adjective of each pair. Students' answers from the pre test are displayed in red while their answers from the post test are in blue.





Math Anxiety

This graph depicts your students' self-reported math anxiety as they reported it on the pre and post tests. Students were asked how anxious the following statements made them on scale from 1-4. Students answering "a fair amount" or "a lot" (3 and 4 on the scale respectively) are considered "math anxious" and this proportion is shown on the y-axis.



Confidence

Students were asked to rate the degree to which they agree with the statements described in the legend below on a four point scale ("strongly disagree", "disagree", "agree", "strongly agree"). The proportion of students who disagree or strongly disagree with each statement is shown on the y-axis.

The syntax for this report was developed by Maggie Shea, Brendan Seto, and Kate Follette