



Writing & Presentations:

*Developing Deeper Thinking and Thoughtful Reflection
in an Accelerated Pre-Statistics Classroom*

Joseph Gerda and Kathy Kubo

June 25, 2015

Math 075 Program Growth (2012-15)

TERM	NUMBER OF SECTIONS (# of students)
Spring 2012- Summer 2012	15 (432)
Fall 2012- Summer 2013	35 (1082)
Fall 2013- Summer 2014	32 (1027)
Fall 2014- Summer 2015	34 (1158)

Organization of Presentation

Assignment scaffolding

- Low Stakes
- Moderately Low Stakes
- Higher Stakes
- High Stakes

Low Stakes: Journals/Reflections

My experience in math, have been a total roller coaster. Past math classes made me feel insignificant. I felt like I couldn't achieve my goals. I was discouraged. That's why I decided to take pal and seriously buckle down and have math everyday. I knew coming in to pal was going to be challenging but I was ready. I take responsibility for the grades I gotten thus far. I know that who I was is not the person I am today. It has been challenging but I seem to love math each day more and more. I feel that Math 075 and 140 pal course has made me see math differently. Its challenging enough but at the same time easy to understand. This is the math I've been looking for, for example relating to life around us. We can actually use these concepts

Intentional Support for Students' Affective Needs

Pedagogical practices are employed to

- reduce students' fear
- increase their willingness to engage with challenging tasks
- make them less likely to sabotage their own classroom success

Low Stakes: Journals/Reflections

At the beginning of the semester

Introduce Carol Dweck's Brainology article
(fixed vs. growth mindsets)

Throughout the semester

Revisit mindsets through related assignments

Low Stakes: Journals/Reflections

For the student reflection you received:

Identify and highlight passages to share with the group, including statements that

- interested you
- surprised you
- expressed the need for activities like these

Sample Assignments

- Brainology: Transforming Students' Motivation to Learn
- Margaret Heffernan (TED): Dare to Disagree
- When to let learners struggle
- Angela Duckworth (TED): Grit
- Susan McGonigal (TED): How to make stress your friend

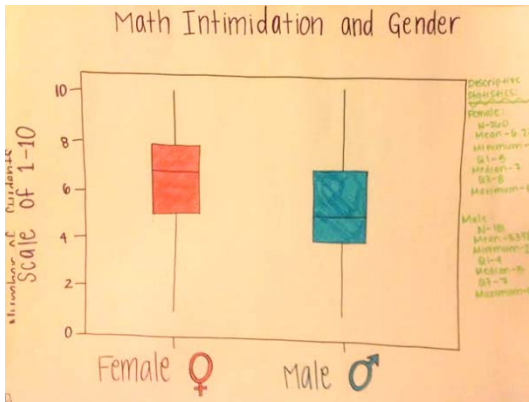
*Moderately Low Stakes:
Poster Sessions*

Poster Sessions

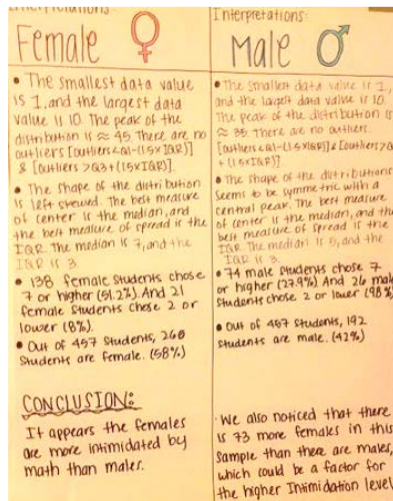
Completed within 1 – 2 class meetings

- Similar to conference poster sessions
- Analyze real data sets
- Answer an open ended question
- Practice and refine presentation skills
- Provide and receive constructive criticism

Poster Sessions



- Divide the class into groups (3 or 4 per group)
- Data analysis and poster preparation time



- Presenter and listener protocol
- Reflection and closure

Auto Safety Posters (Week 4)

You work for an automobile insurance company, and your job is to minimize costs for the company. Your boss has assigned you the task of reviewing recent auto safety records and determining how that information may be relevant to the company.

Data: Vehicle categories, safety ratings (insurance injury loss)

Prepare a poster presentation for your boss that includes:

- appropriate comparative graph(s) and a five-number summary (using Minitab);
- descriptions of the injury ratings for each group of cars;
- a comparison of injury ratings for the three sizes of cars;
- your recommendation to your boss about your company's insurance policies.

Auto Safety Posters

As you watch the video, be prepared to discuss scenes that

- interested you
- surprised you
- demonstrated the value of activities like these

Video: Auto Safety Posters

(5 minutes)

Auto Safety Video Discussion

Poster Sessions: Topics

Cereal Data Analysis (Day 1)

Exploratory Data Analysis: Comparison of one quantitative variable by groups

Linear Regression

Two-way (contingency) tables and stacked bar charts analysis

Higher Stakes: Module Projects

Higher Stakes: Module Projects

Formats

- Written report
- Poster board
- PowerPoint presentation

Individual or group

Some in-class presentations (w/video)

PowerPoint Presentation

- Linear and curvilinear regression
(exponential, quadratic, logarithmic)
- 3 to 5 minutes
- Group of 2+
- Students receive the grading rubric in advance

Grading Module Projects

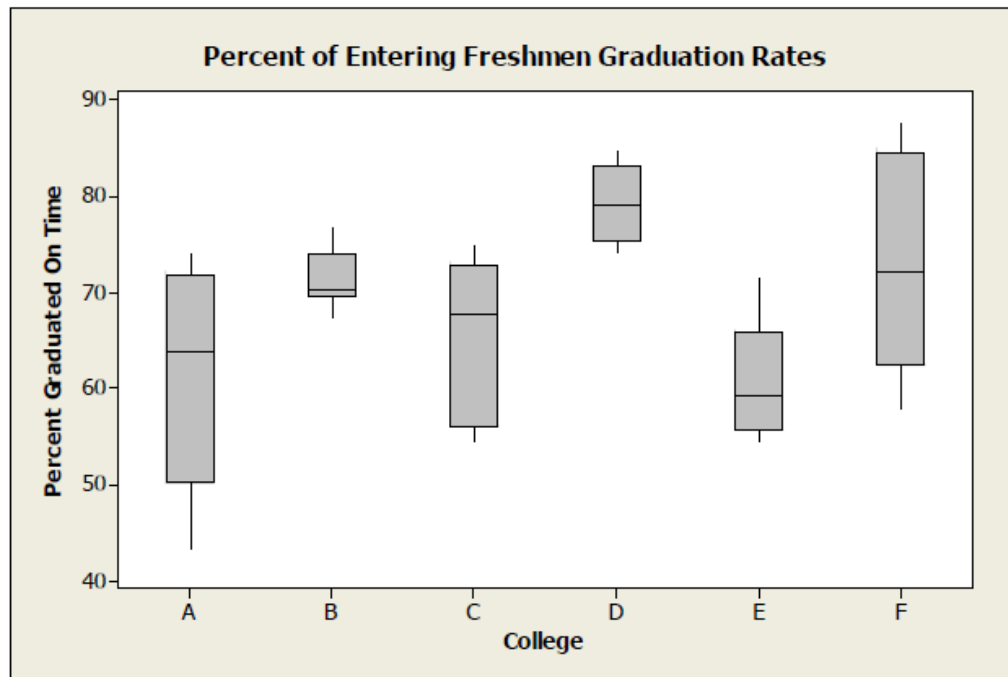
Modules 3 & 4 PowerPoint				
Intro slide				
	Describe data set		2	
	Identify variables w/units		3	
	Why is it important/interesting?		2	
Linear Regression				
	Scatterplot/regression line		1	
	Calculate r, r squared, ADL		3	
	Strength/direction		2	
	Meaning of r, r squared, ADL		3	
	Slope/interpretation		2	
	Y-intercept/interpretation		2	
Exponential Model				
	Scatterplot/regression curve		1	

High Stakes: Exams

High stakes: Exams

(from the 1st exam)

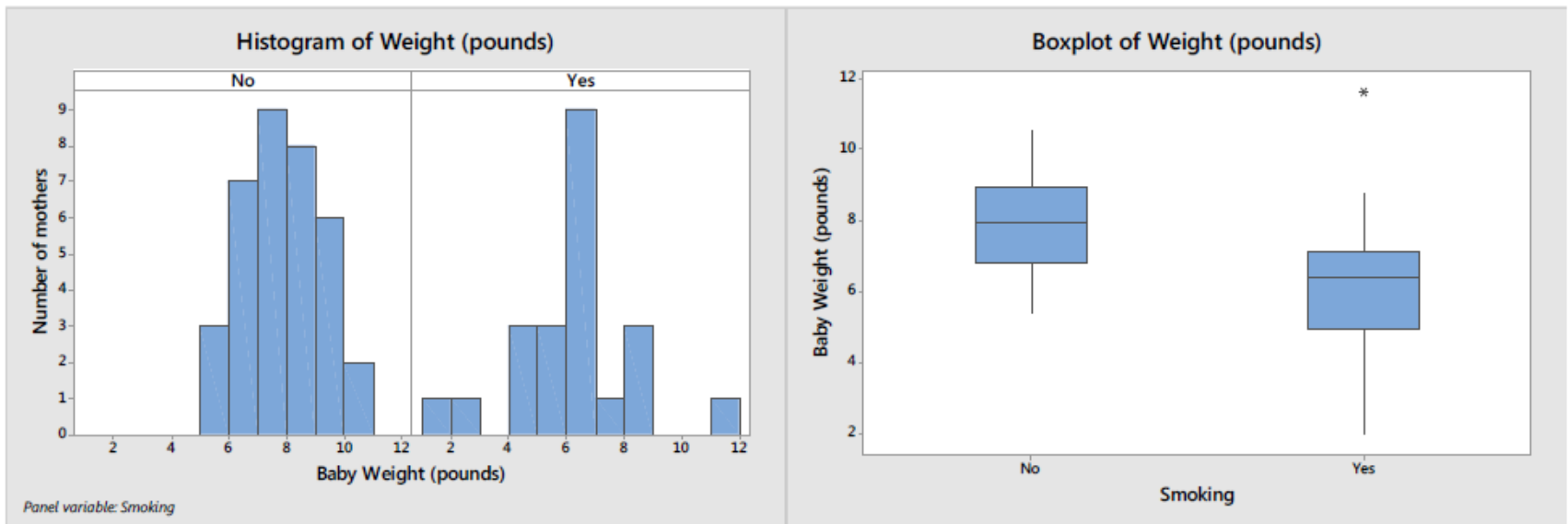
Researchers recorded the percentage of each entering Freshman class that graduated on time for each of six colleges within a major university over a period of several years.



Based on the above data, if you were debating between attending colleges B and F, which one would you choose and why?

High stakes: Exams

(from the final exam)



Descriptive Statistics: Weight (pounds)

Variable	Smoking	N	Mean	StDev	Minimum	Q1	Median	Q3	Maximum	IQR
Weight (pounds)	No	35	7.905	1.317	5.370	6.790	7.960	8.950	10.550	2.160
	Yes	22	6.227	2.088	1.970	4.912	6.410	7.095	11.600	2.182

High stakes: Exams

(from the final exam)

Low birth weight is a recognized problem in the pediatric community since it is associated with many health issues for young children. College students in Kentucky wanted to determine if there is an association between smoking and the weight of newborn children. They collected the following data from a random sample of 57 mothers who were asked if they smoked while they were pregnant.

Based on this data, write an analysis on a separate sheet of paper that responds to the following question:

“Is smoking associated with low birth weight in children?”

High stakes: Exams

Final Essay part 1 -1

Is smoking associated with low birth weight in children? College students in Kentucky gathered a random sample of 57 mothers who were asked if they smoked while they were pregnant. When looking at the graph for a non-smoker, we see that it has a symmetric shape with no outlier. When looking at the smoker graph, we see it has a symmetric shape as well and an outlier placed at about 12 lbs. Next, we look at the center. The non-smoker graph has a center at 7.960 lbs, while the smoker graph has a center of 6.410 lbs.

a central peak and
with a central peak

-2

Lastly, we look at the spread along with the other observation that I noticed. The typical spread seen on the non-smoker graph is from 2-12. The overall spread for a non-smoker is from 5.370 lbs to 10.550 lbs. The typical spread

High stakes: Exams

When comparing the birth weights of children to non-smoking and smoking mothers, the babies that have non-smoking mothers are on average, heavier, and with that, healthier.

The Data took 117 mothers and asked if they smoked or not during their pregnancy and put them into two histograms and two boxplots. When comparing the spread of the histograms we can see that both the non-smoker and smoker graphs are both symmetrical with a central peak. Because they are both symmetrical with a central peak we use the mean with acts as the center. The non-smoking center is 7.905 lbs and the smokers' mean/center is 6.227 lbs. We used the box-plot graphs to show the outliers. The smoking graph had one outlier at 11.600 lbs.

Since we used the mean, for the spread we use the overall range and the standard deviation. For the non-smoking graph, the minimum is 5.370 lbs and the maximum is 10.510 with an overall range of 5.180 lbs, and a standard deviation of 1.317. For the smokers graph, the minimum is 1.970 lbs and a maximum of 11.600 lbs with an overall range of 9.630 lbs. The standard deviation is 2.088 lbs. Another interesting observation

Final Reflection

Based on previous assignments

- Carol Dweck's Brainology
- Margaret Heffernan (TED): Dare to Disagree
- When to let learners struggle
- Angela Duckworth (TED): Grit
- Susan McGonigal (TED): How to make stress your friend

Final Reflection Example

1. How has your attitude towards math changed since Day 1 of this semester?
2. How has your view of hard work, grit and stress changed since Day 1 of this semester?
3. Which of the above materials influenced you the most and why?
4. What did you most enjoy learning from these materials?
5. As a result of these mindset/grit activities, what else have you learned about yourself? How do you think these insights will influence you as you continue to pursue your education and career goals?

More details:

From Self-Sabotaging to Success:

*How to Address Fear and Build
Community in the Math Classroom*

Thursday, June 25 3:15-4:45pm

Room: Newport 1



Contact information

Joseph Gerda

joseph.gerda@canyons.edu

Kathy Kubo

kathy.kubo@canyons.edu

End of Presentation