The Hidden Attitude: Students' Perceptions of 'Statistics' Prior to Taking the First Course

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1

Outline

- Background
- About Our Sample
- What are Word Clouds?
- Results
- Conclusion
- Future Work
- Bibliography

2

Background

- 2 semester independent study for Gloria Lehr
- Gal, Ginsburg, Schau (1997) p. 42

"Since almost all of the items on most attitude surveys include the word "statistics," it is important to realize that some high school or would-be college students convey some fuzziness regarding what the term "statistics" might be . . . How this "fuzziness" affects the validity or usefulness of surveys of precollege students is thus a matter for some concern."

- The pre-test of the SATS©
- However, we found little research on students' perception of statistics

3

Pre-Survey

- Given the first day of class, but students who registered late could take survey
- 49 students responded out of the 58 who were on the class list 1st week into course. Response rate 84.5%.
- From course list,

FR	SO	JR	SR
67.2% (39)	22.4% (13)	8.6% (5)	1.7% (1)

4

Previous to this class, what statistics courses have you taken? (Pre)

No Previous course	Yes
85.7% (42)	14.3% (7)

Out of the 7 who have a previous course:
- 3 are retaking this course
- 2 had some type of statistics experience in high school
- 1 took a community college course
- 1 listed Behavioral Statistics course

5

Post-Survey

- Given Week 12, close to exam on probability & sampling distribution.
- Topic being covered at the time of the post-survey was confidence intervals
- 50 students responded out of the 50, but one student did not give consent.
- So n = 49

6

Questions To Be Discussed

- What did you expect to learn in this course? (Pre)
- What did you learn in this course? (Post)
- What is statistics? (Pre)
- Looking back to the beginning of the course, how is this course different than you expected? (Post)
- Is there anything that was covered in this course that you did not know was studied in statistics? (Post)

7

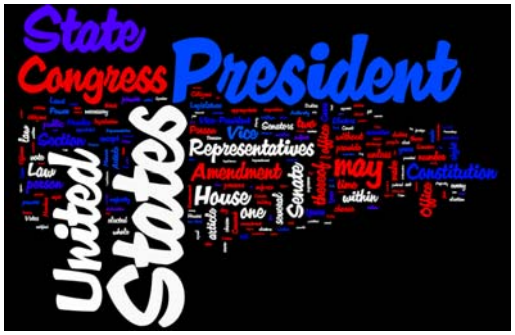
Word Clouds & Wordle

"Wordle is a toy for generating "word clouds" from text that you provide. The clouds give greater prominence to words that appear more frequently in the source text. . . ."

(from homepage of www.wordle.net)

8

Word Cloud of the U.S. Constitution



(from homepage of www.wordle.net)

9

What do you expect to learn in this class?

First Word Cloud after checking for misspelled words

Difficult to find meaning in the chaos

10

General Cleaning Guidelines

- Similar words were changed to one word
  - "formulas" was changed to "equations"
- Words were made to agree
  - "Collecting" or "collects" became "collect"

11

Examples of "Cleaning"

Original Phrase	Classified as
create complex surveys and using the data you collect from the survey to determine different kinds of statistics.	create surveys collect data different~methods
I expect to learn how to compute statistics and how I can use them.	compute how~to~use~statistics

12

So . . . . . what do you expect to learn in "a statistics" class?

Statistics

- Students were comfortable enough with the word "statistics" to answer the question with "statistics"
- 11 students answered question with "statistics" or a phrase such as "Basic statistics concepts
- Phrases with the simple answer of statistics and additional information were classified as "statistics" and the other information.
  - For example, "do statistics which I will use in my major" would be classified as "statistics" and "for~job~or~major"
- In total, there were 20 classifications of "statistics"

13

What do you expect to learn in this class? Pre, Cleaned

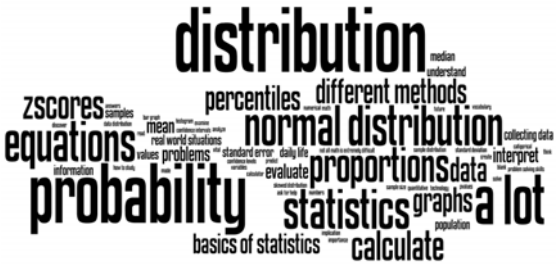
14

All of the Questionable Responses to "What do you expect to learn in this class?

Original Phrase	Classified
differences and relationships of statistics and math.	unknown
how to solve math problems.	how~to~solve~math~problems
How to correctly solve issues.	not~sure
I expect to learn whatever it is the professor has planned.	not~sure
I'm not sure, it's a required course.	not~sure
A lot. I'm sure there are many formulas and things that i will be able to use in my life.	Equations everyday~life

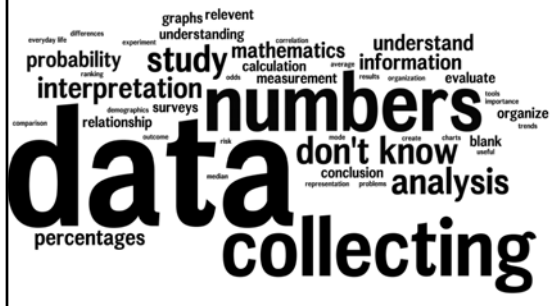
15

What did you learn in this course? Post, cleaned



16

What is Statistics? Pre, cleaned



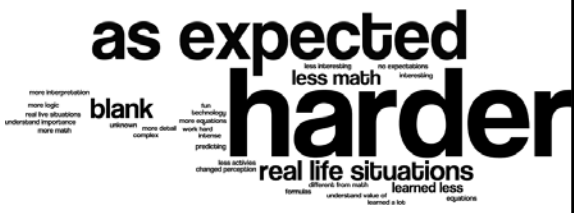
17

Don't Know?

- 4 students answered with a form of "I don't know"
- 1 student replied, "I don't know, I am guessing that it has to do with calculating odds and risks."
- 2 students did not respond
- No student who answered the question gave a wrong response.

18

Looking back, to the beginning of the course, how is this course different than you expected?
Post, cleaned



19

Only one student talked specifically about the topic being different.

> . . . . less interesting than I had originally expected. Thought we would be doing a different type of statistics like batting averages, and so on.

20

Interesting Answers

Many more of these:

> There are more real life situations than other math classes. I didn't think statistics could be used in so many different ways.

> It is more interpretation than math.

> It has a lot more scenario based problems and has more predicting than I had expected.

> I have understood the importance of stats better now.

21

Is there anything that was covered in this course that you did not know was studied in statistics? (Post)

No	Yes	Blank
67.4% (33)	22.5% (11)	10.2% (5)

Those who said yes (and gave a reason)
- –2 implied that there was a lot covered that they didn't know was covered.
- –1 noted equation of line and slope
- –1 noted graphs
- –1 noted measurement of error
- –3 noted proportions

22

Conclusion

- Only a few students, were unsure about what to expect from the class; however, many students simply used the word "statistics" to answer the question which indicates that an attitude survey using "statistics" may not be a problem.
- Students did have a better understanding about statistics after the course.
- About 2/3 of the sample were not surprised at what was covered in the course.

23

Future Work

- Revision of both the pre and post survey
- Need to replicate with other students
- Work on classification guidelines for Word Clouds
- Study the relationship between math attitudes and statistics attitudes prior to course.
- For those few students who are unsure of the meaning of statistics, investigate if this affects their answers on the pre-test of the SATS.

24

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Bibliography

- Feinberg, Jonathan. "Wordle". July 26, 2010 <www.wordle.net>.
- Gal., I., Ginsburg, L., and Schau, C. (1997), "Monitoring Attitudes and Beliefs in Statistics Education," in *The Assessment Challenge in Statistics Education* , eds. I. Gal and J. B. Garfield, Netherlands: IOS Press, 37 - 51.

26