The Statistics of Tutoring Statistics in an AB 705 World

Los Angeles Pierce College

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Ice Breaker

Kahoot!

https://kahoot.it

What is AB 705?

Intent of AB 705

"AB 705 was written to ensure that students are not placed into remedial courses that may delay or deter their educational progress ***unless*** *evidence suggests they are highly unlikely to succeed in the college-level course. Assessment instruments and placement policies have serious implications for equity, as students of color are far more likely to be placed into remedial courses; students placed into remediation are much less likely to reach their educational goals."*

– CCCCO.edu

*"Evidence suggests that community colleges are placing **too many** students into remediation and that significantly more students would complete transfer requirements in math and English if enrolled directly in transfer-level English and math courses. Research suggests that when used as the primary criterion for placement, assessment tests tend to under-place students; and a student's high school performance is a much stronger predictor of success in transfer-level courses rather than standardized placement tests."*

– CCCCO.edu

So Now What?

More students will directly place into transfer-level courses.

Non-BSTEM (SLAM) students will have the choice of taking a Statistics course, or an equivalent Statistics pathway, depending on each campus' math sequence under AB 705. Either way, there will be more statistics courses offered than ever before!

Some of these students will need support, in and outside the classroom, in order to be successful.

What do we do as Learning Centers?

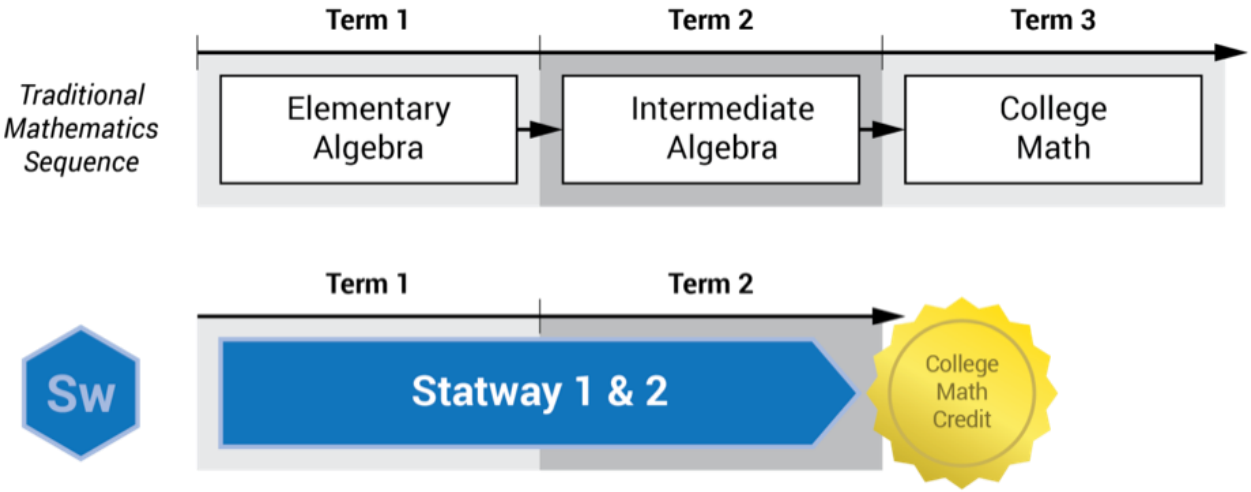
- Ensure communication with English & math departments, as well as others directly affected by AB 705
- Offer more of our services to a wider audience (tutoring, workshops, etc.) - consider satellite tutoring locations
- Make sure tutoring centers continue to be a part of the conversation – offer tutoring and counseling to all students, making them aware of AB 705 and ensuring they are in the right class

What is Statway?

STATWAY

Statway is a two-semester statistics pathway geared towards non-BSTEM (SLAM) majors. It features a basic algebra review and topics covered in an introductory statistics course combined together over a two-semester cohort pathway.

The goal of Statway is for students placed in developmental math to complete their developmental math requirements and a college-level statistics course in only two semesters


Term 1
Term 2
Term 3
Traditional Mathematics Sequence
Elementary Algebra
Intermediate Algebra
College Math
Term 1
Term 2
Sw
Statway 1 & 2
College Math Credit

How do we help?

How do we help?

Tutoring

Statway/Statistics workshops

Posters

Statistics Handouts

Tutoring

- Share our learning/ studying strategies
- Walk through sample problems or examples
- Share resources (videos on YouTube, textbooks, office hours, study groups, library, etc.)
- Focus on helping tutees become independent learners

Statway Workshops

- Summarize lessons
- Work through problems
- Answer questions about lessons

Statway/Statistics Workshops – Spring 2019

Statway A (Math 228A) Workshops – Tuesday, 3:00-4:00 PM at CAS	Statway B (Math 228B) Workshops – Wednesdays, 4:00-5:00 PM at CAS
2/19 – Workshop 1 – Histograms, Measures of Center (SW 2.1 – 2.2)	2/20 – Workshop 10 - Sampling Distribution of Sample Proportions, and Confidence Intervals (SW 7.1-7.2)
2/26 – Workshop 2 – Measures of Center and Spread (SW 2.3-2.4)	2/27 – Workshop 11 - Hypothesis Testing with Sample Proportions (SW 7.3)
3/5 – Workshop 2 – Measures of Center and Spread (SW 2.3-2.4)	3/6 – Workshop 12 - Sampling Distributions of Differences in Proportions, Confidence Intervals (SW 8.1-8.2)
3/12 – Workshop 3 - Scatterplots and Correlation (SW 3.1)	3/13 – Workshop 13 – Hypothesis Testing with Differences in Proportions (SW 8.3)
3/19 – Workshop 4 – Regression (SW 3.2)	3/20 – Workshop 14 – Confidence Intervals with Sample Means, Including Paired and Independent Data (SW 9.1-9.2)
3/26 – Workshop 5 – Lines in General (SW 3.3)	3/27 – Workshop 14 - Confidence Intervals with Means, Including Paired and Independent Samples (SW 9.1-9.2)
4/9 – Workshop 6 – Exponential Modeling (SW mod 4)	4/10 – Workshop 15 – Hypothesis Testing with Means, Including Paired and Independent Samples (SW 9.3-9.4)
4/16 – Workshop 7 – Two-Way Tables (SW mod 5)	4/17 – Workshop 16 – Confidence Intervals and Hypothesis Testing Review (SW Mods 7-9)
4/23 – Workshop 7 – Two-Way Tables (SW mod 5)	4/24 – Workshop 17 – Chi-square Tests for Independence and Homogeneity (SW 11.2-11.3)
4/30 – Workshop 8 – Probability Rules (SW 6.1)	5/1 – Workshop 17 – Chi-square Tests for Independence and Homogeneity (SW 11.2-11.3)
5/7 – Workshop 9 – Normal Distributions (SW 6.2-6.3)	5/8 – Workshop 18 - Algebra Review on Linear Equations
5/14 – Workshop 9 – Normal Distributions (SW 6.2-6.3)	5/15 – Workshop 19 - Algebra Review on Exponentials

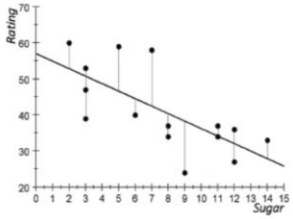
Workshop 4 – Linear Regression (SW topic 3.2)

When a scatterplot shows a linear relationship, we summarize the overall pattern by drawing a line on the scatterplot. So, you can think of a regression line as a summary of the relationship between the explanatory and response variables.

Regression Line: A straight line that describes how a response variable y changes as an explanatory variable x changes. We often use a regression line to predict the value of y for a given value of x.

- AKA: The Least-Squares Regression (LSR) line
- AKA: Line of best fit.

Sugar (grams)	6	8	7	11	11	3	3	12	12	2	14	8	9	5	3
Rating	40	37	58	34	37	39	53	27	36	60	33	34	24	59	47



Because of the scattering of our data about the LSR line, the predicted value will generally not be equal to the Observed y-value. There's error involved.

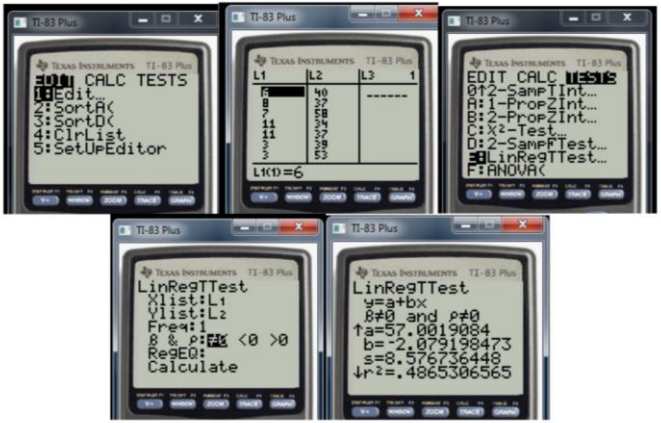
These vertical distances are known as **residuals**.

Residual =
(Observed y - value – Predicted y - value) = $y - \hat{y}$

Observed vs. Predicted Data Values

- **Observed y-value, y**: The y-values in our data set. It is also known as the actual y-values.
  - Usually given to you in the problem
- **Predicted y-value, $\hat{y}$:** The predicted response for any given x value.
  - Usually found from the LRS line by plugging in x

How to get LSR with TI-83/84:



Exercises:

1. Using the equation $\hat{y} = 57.00 - 2.08x$,

(a) What is the predicted rating for a cereal with 0 grams of sugar?

(b) What is the predicted rating for a cereal with 1 gram of sugar?

(c) Fill in the table:

x (grams of sugar)	$\hat{y}$ (predicted rating)
0	
1	
2	
3	

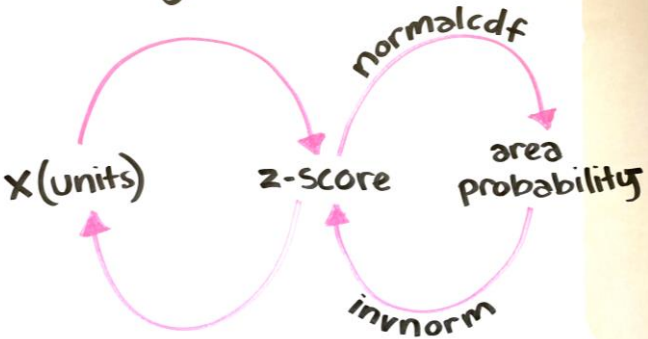
(d) How much do you expect the rating to change every time you add one extra gram of sugar?

Posters

- Summarize and visualize key concepts!

Z-scores

$$z = \frac{x - \mu}{\sigma}$$



$$x = \mu + z\sigma$$

p-value $< \alpha$	p-value $> \alpha$
reject the null	fail to reject the null
support the alternative	<u>DO NOT</u> support the alternative
statistically significant	<u>NOT</u> statistically significant
Type I error	Type II error

Statistics Handout

- Summarize lessons
- Step-by-step examples
- Practice problems

LEVELS OF MEASUREMENT

NOMINAL:
- Names, labels, or categories.
- Data cannot be arranged in order.

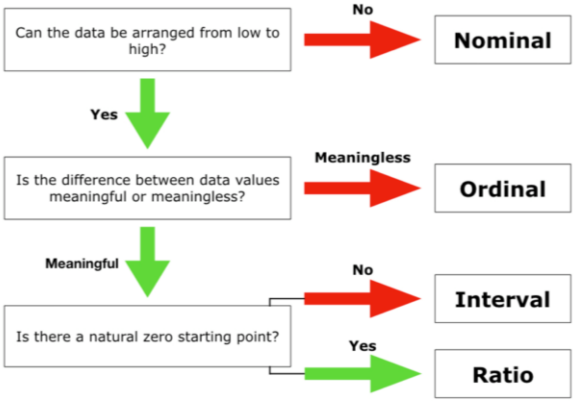
ORDINAL:
- Data can be arranged in order.
- When subtracting data, the results are meaningless.

INTERVAL:
- Data can be arranged in order.
- When subtracting data, the results are meaningful.
- Data does not have a natural zero starting point (Zero of the quantity does not mean none of the quantity exists).

RATIO:
- Data can be arranged in order.
- When subtracting data, the results are meaningful.
- Data does have a natural zero starting point (Zero of the quantity means none of the quantity exists).

HOW TO APPROACH ☺?

Ask yourself the following questions:



Example 1:

For the following determine which of the four levels of measurement is most appropriate.

Temperatures of 70°F, 60°F and 80°F were recorded in San Francisco, California.

Solution:

- Can the data be arranged from low to high?
  Yes, these temperatures can be arranged from coldest to hottest, therefore it cannot be a nominal level of measurement.
- Is the difference between data values meaningful or meaning less?
  I can subtract 60°F from 70°F to see that it is 10°F colder. This makes the difference meaningful, therefore it cannot be an ordinal level of measurement.
- Is there a natural zero starting point?
  If 0°F was recorded in San Francisco this would not mean that there is no heat, therefore it cannot be a ratio level of measurement. The most appropriate level of measurement is interval.

TRY THESE!

For the following determine which of the four levels of measurement is most appropriate.

1. A clothing store only has a few dresses left in size 0, 4, and 7.
2. A biology class is growing lima beans. Every week they are measure the growth of the beans in centimeters.
3. A bag of M&Ms can contain red, orange, yellow, green, blue, and brown colors.
4. Job applications often ask for the person education level (GED, bachelors, masters, doctoral).

KEY: 1. Interval 2. Ratio 3. Nominal 4. Ordinal

Q & A