

## Quantitative Writing: Communicating Data

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### Outline

- UTSA has developed a plan to enhance student learning, called the Quantitative Literacy Program (QLP)
  - all students take the QLAT
  - courses have integrated QL (Q-courses)
  - eight student learning outcomes developed: EVALUATE
- To assess the effectiveness of the program,
  - all students take the QLAT
  - courses have integrated QL (Q-courses)
  - eight student learning outcomes developed: EVALUATE
- This talk presents the importance of quantitative writing skills in both quantitative-intensive and non-quantitative-intensive courses and provides examples from Q-courses

### Importance of Quantitative Writing

- Students learn how to:
  - Identify a problem
  - Discuss a research question
  - Support the discussion with numerical data
  - Communicate data effectively
  - Interpret quantitative data

### UTSA'S Q-Courses

Core Curriculum Q-Courses		Upper-Division Q-courses
Anthropology	Economics	Architecture
Archeology	History	Communication
Biosciences	Math	Criminal Justice
Contemporary Biology	Political Science	Kinesiology
Economics	Sociology	Sociology
Freshman Composition	Statistics	Special Education
Environmental Science	Technical Writing	

### QLP Communication Outcomes

- **TRANSLATE**
  - Define quantitative terms in a written statement
  - Summarize the main observations represented by the data
  - Transform a verbal statement into a quantitative statement
- **EXPRESS**
  - Describe methods and variables related to data in written statements
  - Report results of quantitative analyses
  - Defend analyses and draw overall conclusions from the data

### UTSA Q-course Assessments

- All Q-courses are required to administer a pre/post test across all sections that must include both quantitative writing outcomes
- All Q-courses are required to give at least one mid-semester assignment

Example: Basic Statistics (before Q)

- Out of the female employees, what proportion were promoted?
- Out of the male employees, what proportion were promoted?

	Promoted	Not Promoted	Total
Males	20	10	30
Females	15	5	20
Total	35	15	50

Example: Basic Statistics (after Q)

Based on the data presented, are males or females more likely to be promoted?

Explain your answer in 1 – 2 sentences using numerical values to support your answer.

	Promoted	Not Promoted	Total
Males	20	10	30
Females	15	5	20
Total	35	15	50

Example: Freshman Composition (before Q)

- Consider possible topics:
  - Carbon trading and its effectiveness
  - Examining Biofuel
  - Taxing Carbon Emissions
- Use the following questions to help develop a focused argument that takes a stance, presents all pertinent support, examines the opposition, and proposes a solution:
  - Who should take responsibility for the effects of climate change?
  - What sources of energy and which environmental practices appear to be the most sustainable?
  - How will our individual choices interconnect to make a powerful social response to the threat of climate change?

Example Continued...

- This 5-7 page essay must utilize at least 5 sources, including the information from the Energy Administration, an essay or more from the text, and sources found through the UTSA library.

Example: Freshman Composition (after Q)

Assignment: Write a classical, causal, or proposal argument that addresses an environmental issue. This argument must be data-driven and include at least one graphic element that illustrates the data. There should be at least 5 sources in this 5-7 page essay.

- Select an argumentative topic with an environmental focus
- Write your claim
- Research the topic you selected
  - Use at least 5 sources
  - One source must be a dataset
    - Find your own data set or use a dataset prepared by the library
    - Collect data to support your claim (**Explore**)
    - Calculate different summaries from the data (**Analyze**)

Example: Freshman Composition (after Q)

- Formulate clear, accurate statements about the data using numerical values
- Create a graphical representation of the data
- Develop your argument utilizing the collected data.
- To incorporate the collected data and created graph, you must
  - Summarize the data represented by the graph
  - Offer an alternate interpretation of the data
  - Argue/defend the conclusions you made about the data, including the specific numerical data for support

### Are students learning how to write?

UTSA's Teaching and Learning Center provides Quick Course Diagnosis (QCD's) to a random selection of Q-courses each semester.

#### FIVE OUTCOMES ADRESSED

- Students are able to define problems and identify solutions in a real world context. (explore)
- Students understand how to summarize, organize, and display data effectively. (visualize)
- Students are able to compute and interpret numerical summaries in a variety of contexts. (analyze)
- Students are able to make correct and meaningful verbal assertions about data. (translate)
- Students are able to write a short summary about data and present it in a report. (express)

### Results of QCD's from 245 sections of 12 Q-courses in Fall 2014 and Spring 2015

- Between 67 and 74% of students surveyed considered 'visualizing data' as the best fulfilled student learning outcome. (Visualize)
- Between 40 and 47% of students considered 'computing and interpreting numerical summaries' as the least fulfilled student learning outcome. (Analyze)

### QCD Results continued...

- The students reported "interpretation of data/charts" and "real world applications" as general strengths of the QLP.
- Areas of improvement identified were the need for "clearer explanations" and more "relevance" of Q component to the class material overall.

\*Courses included in these results are Anthropology, Biology, Criminal Justice, Economics, Environmental Science, History, Kinesiology, Technical Writing, and Freshman Composition.

### Next Steps

- Q-course reports will be generated each semester to analyze the effectiveness of quantitative literacy
- The QLP Team will work with Q-courses to enhance/revise Q-assignments and Pre/Post Test
- Quantitative Literacy will be ingrained into the fabric of the University as the core curriculum adopts Empirical Quantitative Skills

### Questions?

Thank you for your time.