

Assessment of Quantitative Reasoning Across a General Education Curriculum



**STEPHANIE LOPEZ CANO, NANDINI KANNAN
AND ERMINE ORTA**

**DEPARTMENT OF MANAGEMENT SCIENCE AND
STATISTICS
UNIVERSITY OF TEXAS AT SAN ANTONIO
SAN ANTONIO , TX, 78249**

BACKGROUND



- Public universities in Texas have a General Ed Core Curriculum that includes 42 - 48 credit hours distributed across several domains
- Texas Higher Education Coordinating Board requires 3 credit hours in the Math domain (typically a course in College Algebra)
- Institutions may have additional Math/Stat course requirements



University of Texas at San Antonio



- 2nd largest component in the UT-System, 7th in state
- 42 hours in the core: 3 in the Math domain
- Students may choose College Algebra or Basic Statistics (about 2000 vs 500 per semester)
- The Intro Statistics course level: Peck et al, Triola

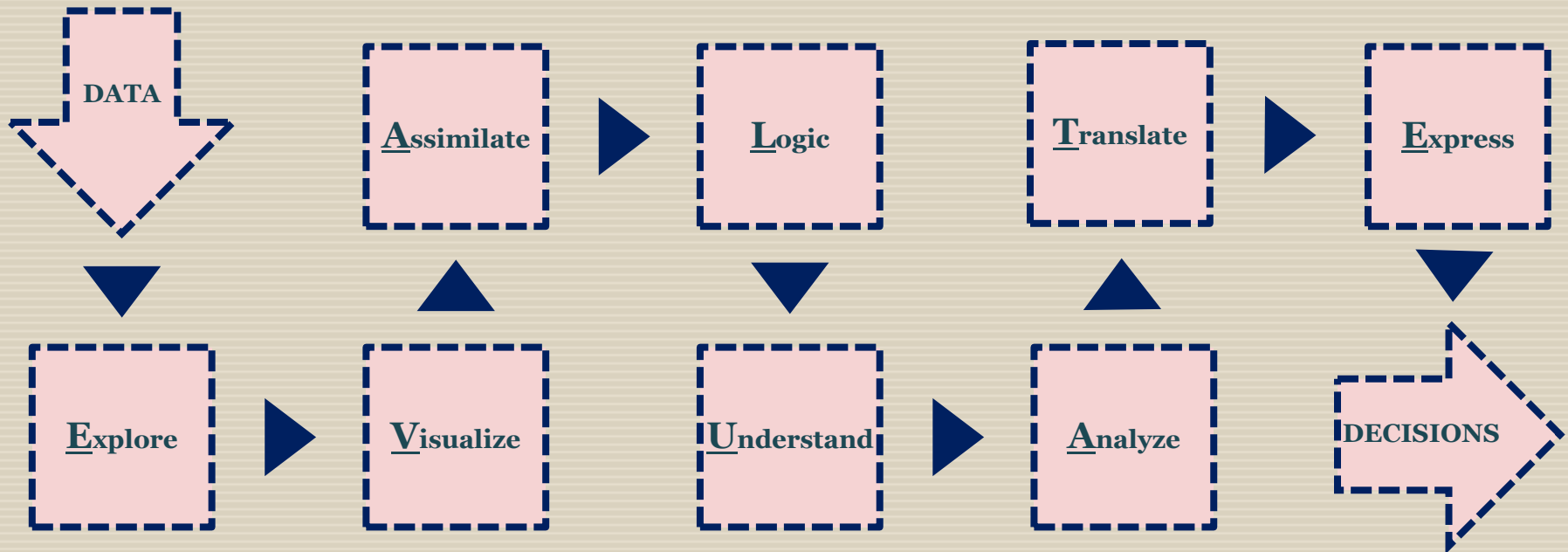
Quality Enhancement Plan



- Quantitative Scholarship: From Literacy to Mastery
- Part of the Southern Association of Colleges and Schools reaccreditation process.
- Enhance the quality of undergraduate education by improving teaching and student learning of quantitative reasoning skills
- Help students to “understand and evaluate data, assess risks and benefits, and make informed decisions in all aspects of their lives”

Student Learning Outcomes

Learning to **EVALUATE**



Assessing Quantitative Reasoning



- An instrument for assessment of quantitative reasoning skills developed
- The Quantitative Literacy Assessment Test (QLAT) will be administered at various stages during the student's program of study
- Pilot Study: QLAT administered to a sample of UTSA entering Freshmen
- QLAT used in a pre-test post-test design in two basic Stat classes

The QLAT



Questions intended to test students' abilities in 4 areas:

1. Reading and interpreting basic graphs, charts, and tables
2. Simple probability calculations
3. Interpreting data and simple data summaries, including the mean, range, standard deviation
4. Understanding sampling and bias

Sample Questions



Probability

Sample Questions



Sampling Bias

Sample Questions

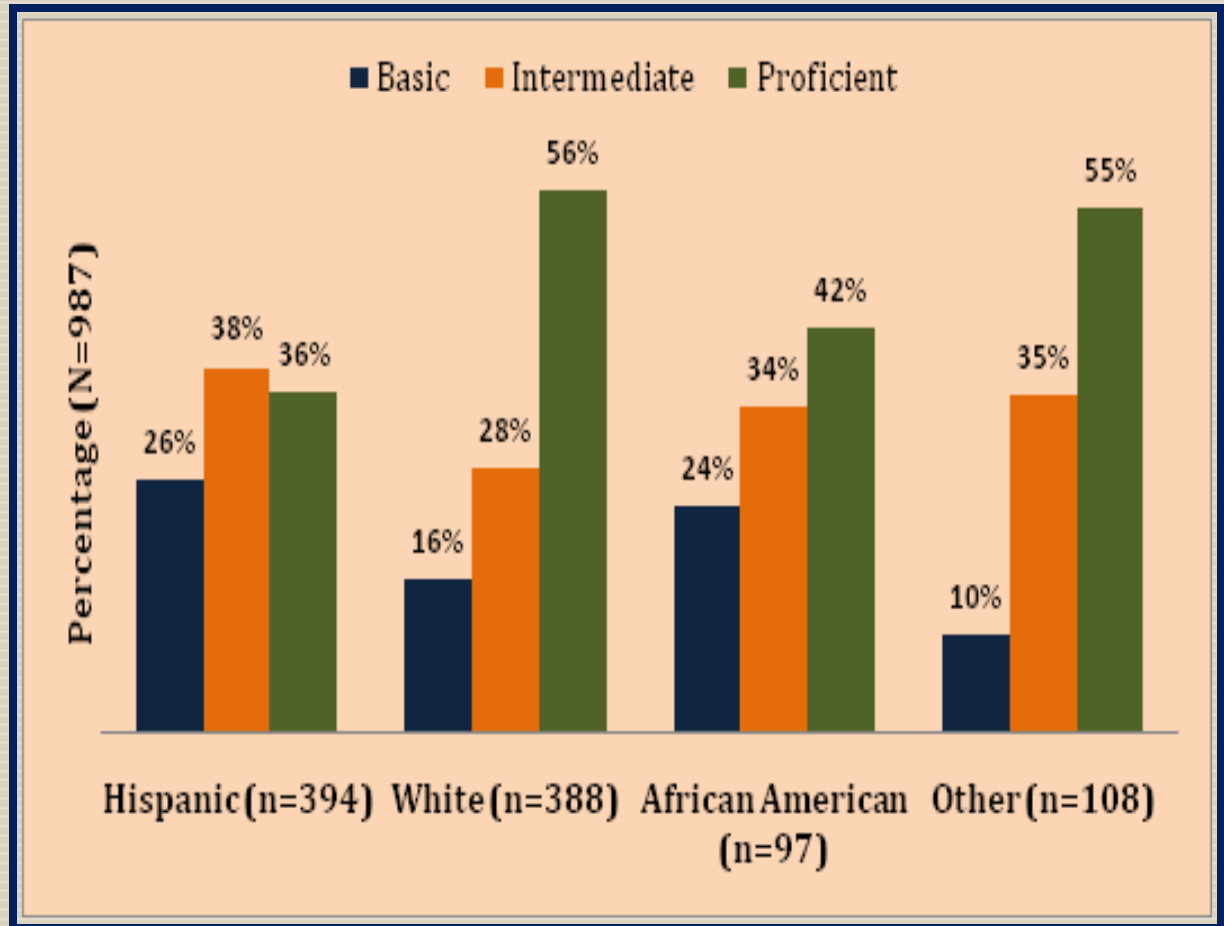


Variability



UTSA Student Population

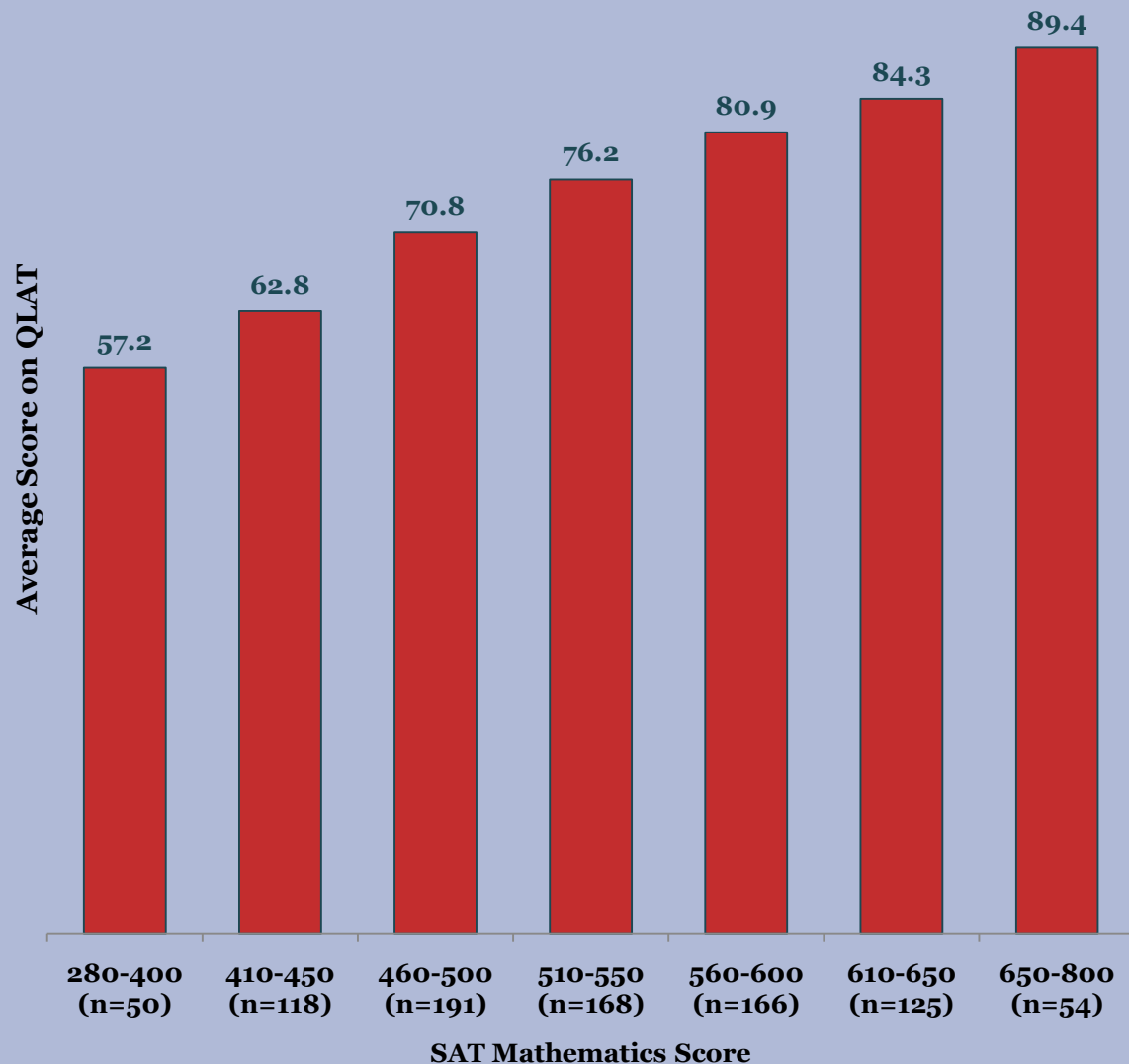
Hispanic	43%
White	37%
African-American	9%
Asian	6%
Other	4%



Results for UTSA Freshmen



QLAT
Score
versus
SAT Math
Score
for
UTSA
Freshmen



Preliminary Results



- 90% could not identify sources of bias or define the population for a study;
- 40% were unable to determine which dataset varied more.
- Approximately 26% of Hispanic and 24% of African-American students scored at or below a basic level of quantitative literacy.

Preliminary Results



In general,

- Students lack fundamental skills in reading, interpretation and critical thinking.
- A majority had difficulty extracting relevant information from word problems.

Pre-Test Post-Test Results



The QLAT was administered to Basic Statistics and Business Statistics classes as a pre- and post- test.

Overall results for 477 students, (percentage correct):

Mean	Std	Min	Max
76.5	14.84	20	100
78.6	15.02	23	100

Pre-Test Post-Test Results



- Instrument split into two parts A and B
- Part A included
 - Graphs, Charts
 - Probability
- Part B included
 - Sampling, Bias
 - Numerical Summaries
- Post-test included Forms A and B: administered in the final week of the semester

Pre-Test Post-Test Results



- Improvement observed across the sections on certain types of problems
- Students struggle with problems that require critical thinking and translation

What's Next?



- Instrument Validation

Current data:

- New Freshman data
- Spring Pre- Post data (in Stat classes)

- Longitudinal Assessment

Thank You...



- For more info contact:
Stephanie.Cano@utsa.edu
- For info about the UTSA QEP:
 - www.utsa.edu/qep/
 - Contact: Nandini.Kannan@utsa.edu