Can we characterize the discrepancies in confidence that exist between male and female students in introductory STEM courses?

Motivation and Goals
- Retention rates of women in STEM majors continue to be relatively low. A key determinant of retention rates is students’ self-efficacy.
- We examine the role of active learning in increasing self-efficacy with the aim of determining whether active learning can increase retention rates of women and minorities in STEM coursework.

Methodology
- Controlled Research Study
  - Conduct randomized controlled experiments on Duke students in three subjects: Statistics, Economics, Engineering taught in two ways (passive: lecture only, active: with clicker questions).
  - Steps:
    1. Pre-lesson survey on confidence and anxiety
    2. Mini-lesson on subject - split participants into active and passive learning environments
    3. Post-lesson survey with same questions on confidence and anxiety
    4. Analyze data.
- Focus Group: Method 1 NVivo
  - Code interview data for confidence using NVivo.
  - Steps:
    1. Interview Duke students in intro STEM classes about their experiences with active and non-active learning
    2. Code interview text for confidence statements. Further subcategorize statements by external and internal attribution.
- Focus Group: Method 2 R Sentiment Analysis
  - Perform sentiment analysis on interview data with R.
  - Steps:
    1. Analyze the same data set in Method 1 using an automated, objective R program.
    2. Perform sentiment analysis on data set.

Results
- Clicker Study

Focus Group: R

Focus Group: NVivo

Future Work
- Finalize data analysis and visualizations.
- Write and publish results.
- Present results at upcoming conferences.