Piloting a new assessment tool for data science education researchers

- Collaborative project with colleagues at Duke, UMN, UC London

Background and context

- Introductory Data Science is both growing and spreading quickly
- There is a need for quality research assessment tools developed and validated for general use across institutions and programs in order to compare and contrast curriculum interventions, pedagogical innovations, etc.

Objectives

- This project has set out to develop a research assessment to measure data science reasoning outcomes for IDS students before and after a first course

Method

- statistics and data science education researchers examined syllabi and resources in use by experienced introductory data science instructors
- drafted and revised an assessment tool
  - 48 candidate items aligned with the core knowledge, skills, and abilities
  - (almost certainly too many for the final assessment)
- conducted structured interviews
  - experienced data science instructors with expertise in statistics education, computer science education, and/or educational measurement.
  - interviews invite both **holistic** feedback (e.g., essential topics for a data science assessment) as well as a **detailed critique** of each item and its contribution

Challenges

- challenge identifying core curriculum for IDS
- always a challenge to balance where to invest in depth vs breadth for a first course… particularly where there is not yet a consensus curriculum
  - everything can feel important
  - anecdotally, wider variability & very ambitious course objectives from those less experienced teaching IDS courses
- seeking insight about best practices for language agnostic assessment of algorithmic thinking (i.e., for data preparation / analysis)
  - e.g., both Python & R are popular tools among data scientists
    * we're concerned that parallel assessment forms invites some psychometric issues
    * what to do about other languages in future?!
    * pseudo-code

Current state of the project

- we think the draft assessment has fared well in our interviews with experienced IDS instructors–i.e., who have taught an undergraduate IDS course multiple times
- interested in additional perspective from CS colleagues with experience teaching IDS courses
- Seeking participants to classroom test
  - assessment can be made available by request to those interested