

Real Data SETs: Student Engagement Techniques for the Advanced Data Analysis Course



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Abstract

We implement instruction for two sections of the advanced data analysis course – the treatment and control sections. The advanced data analysis course, which is taught to graduate and undergraduate students in a computer lab of 40 seats per section, applies statistical inference, visualization, exploratory, and modeling techniques to real world data. The “treatment” section uses Elizabeth Barkley’s *Student Engagement Techniques* (SETs) to improve student learning and class participation. The “control” utilizes the traditional lecture style with no SETs. The same instructor teaches both sections and implements similar formative assessments between both sections. As the Instructor, the objective of the poster is to share my experiences managing the two sections, describe the SETs, and highlight their impact on student learning and engagement within the treatment section from my point of view. In the treatment section, we specifically incorporate a background probe, analytic teams, small group tutorials, poster sessions, and learning logs as SETs. We anticipate that students in the treatment section attain **meta-cognitive**, **self-organizational**, and **collaborative** skills that may not be realized in the control section.

Control Section

- 35 students – 5 G, 30 UG
- 33 statistics majors
- MWF 2:00-2:50 pm
- Computer lab classroom
- 2 hourly graders
- 3 exams
- Weekly individual lab reports
- 3 monthly homework assignments
- Final project – individual presentation with slides

Treatment Section

- 31 students – 31 UG
- 26 statistics majors
- MWF – 3:00-3:50 pm
- Computer lab classroom
- 2 hourly graders
- Weekly learning logs
- 3 exams
- Weekly group reports
- 3 monthly group presentations
- Final project – group presentation with poster

SETs

SET 1 Background Knowledge Probe

- focused questionnaires that
 - *determine* the best starting point for instruction
 - *identify* stronger vs under-prepared students
 - *establish* students own prior knowledge

SET 41 Learning Logs

- series of prompts for students to
 - *reflect* on their learning
 - *recognize* patterns and preferences
 - *diagnose* learning strengths and weaknesses
- sentence starters such as
 - “If I could do it over again, I would do... because...”
 - “I am proud of myself this week because I...”
 - “This week my efforts to learn were very successful (or unsuccessful) because...”

SET 13 Analytic Teams

- collaborative learning technique that
 - *gives* roles and tasks to group members
 - *increases* participation among team members
 - *equalizes* participation between active and less active contributors

SET 15 Small Group Tutorials

- teacher–student sessions that
 - *create* spontaneous feedback on student writing
 - *nurture* students’ intellectual growth
 - *personalize* contact between students and teachers

SET 20 Poster Sessions

- student-created exhibits that
 - *synthesize* course content
 - *promote* creativity and design
 - *inspire* collaboration and knowledge sharing

My Implementation of SETs

Background Knowledge Probe

Categorical data analysis

- Have never heard of this
- Have heard of it, but don’t really know what it means
- Have some idea what this means, but not too clear
- Have a clear idea what this means and can explain it

Reflection Learning Logs

Week 2 – “I am proud of myself this week because I joined STAT 448 and enjoyed thinking through interesting questions regarding the CU Jail Data.”

Week 7 – “One thing I learned this week about how I learn is that by reviewing code ahead of time, I set myself up for an easier time during the group reports”

Week 15 – “This week I made an important breakthrough in my understanding. The thing that helped me was sitting down and studying SAS output with classmates.”

Group Reports & Group Presentations

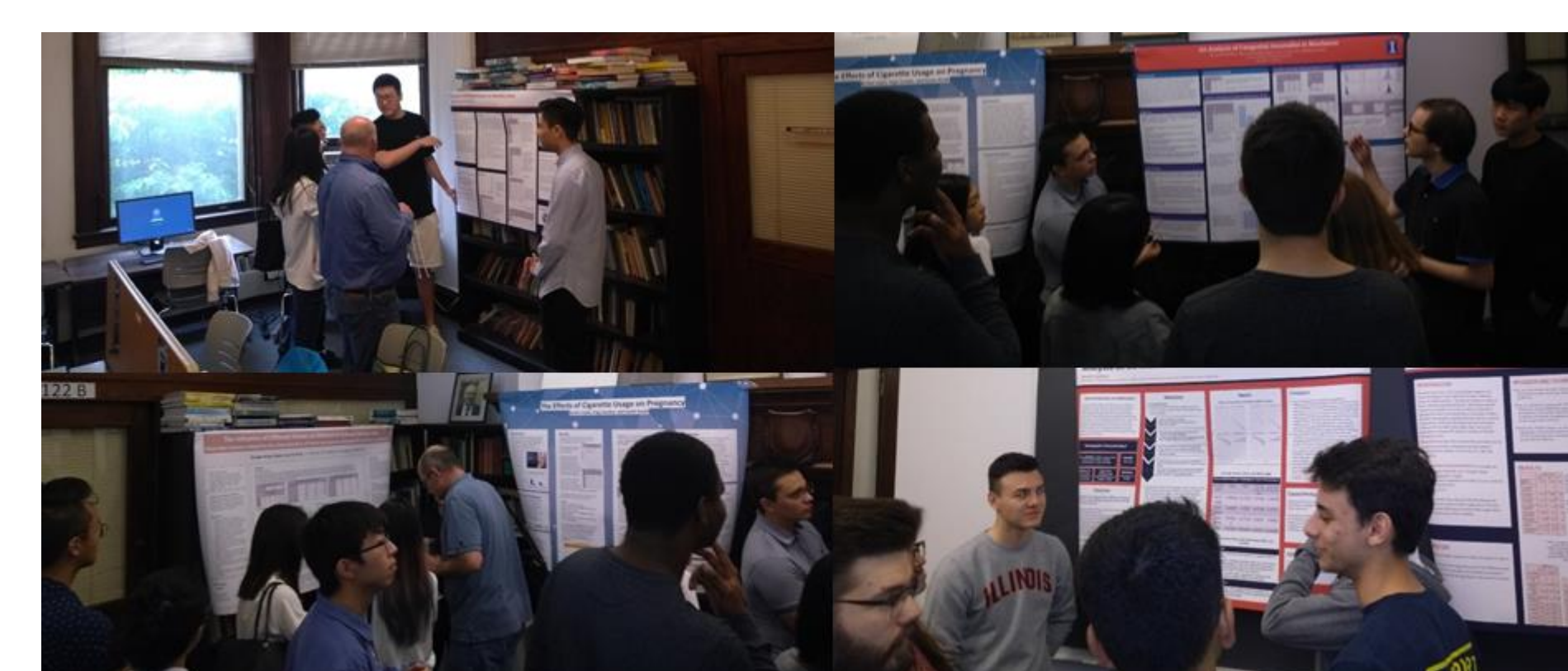
Week 3 Group Report: Asian Dating Data

- Do Asian daters get more matches than other races and ethnicities?
- Based on a model, what factors seem the most advantageous for getting a match?
- Now it’s your turn. Propose a question and describe what you will need to do to retrieve an answer.

Group Report Revisions

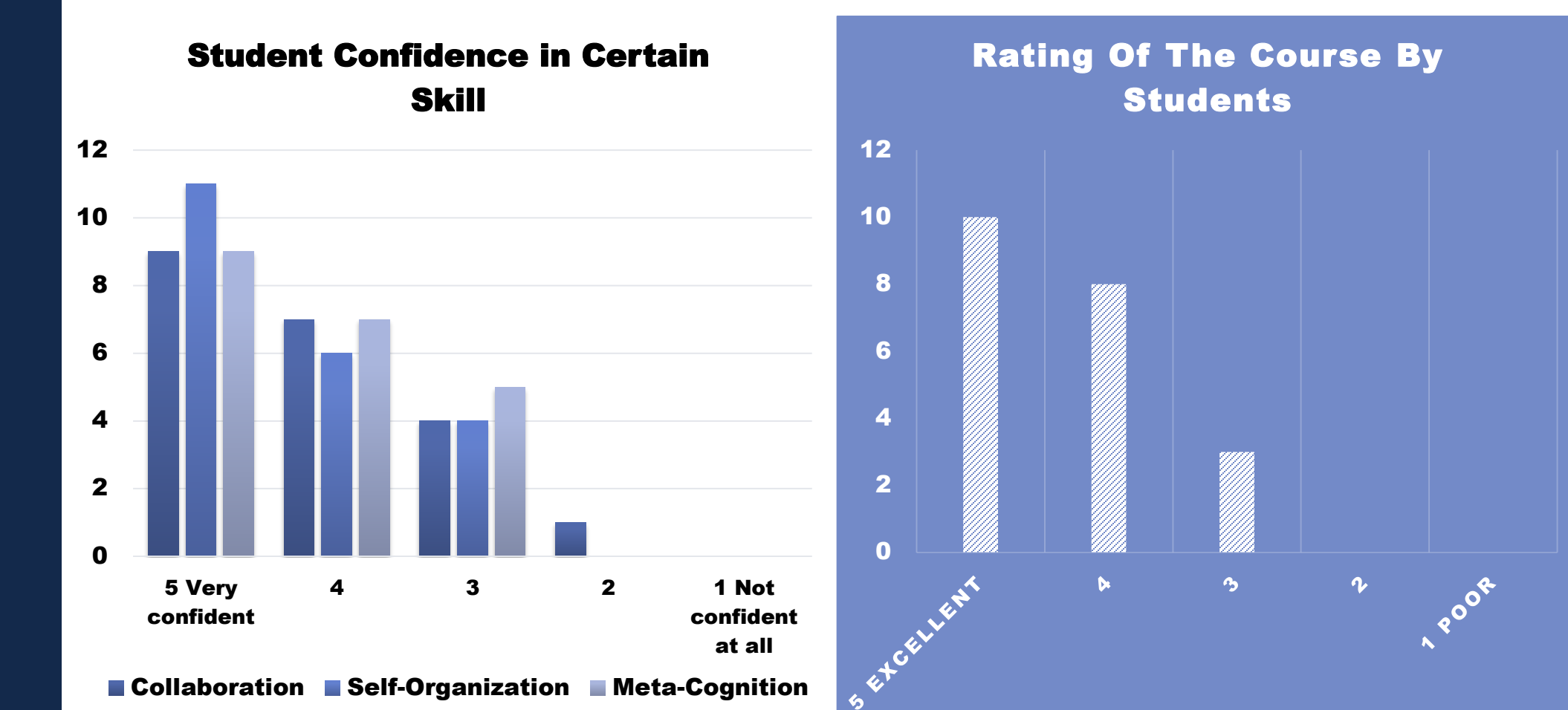
Groups get 1 week after the original due date to submit revised reports for half of the points they missed originally. They revise only after receiving feedback in the tutorial. The tutorial sessions are my office hours.

Final Poster Presentation

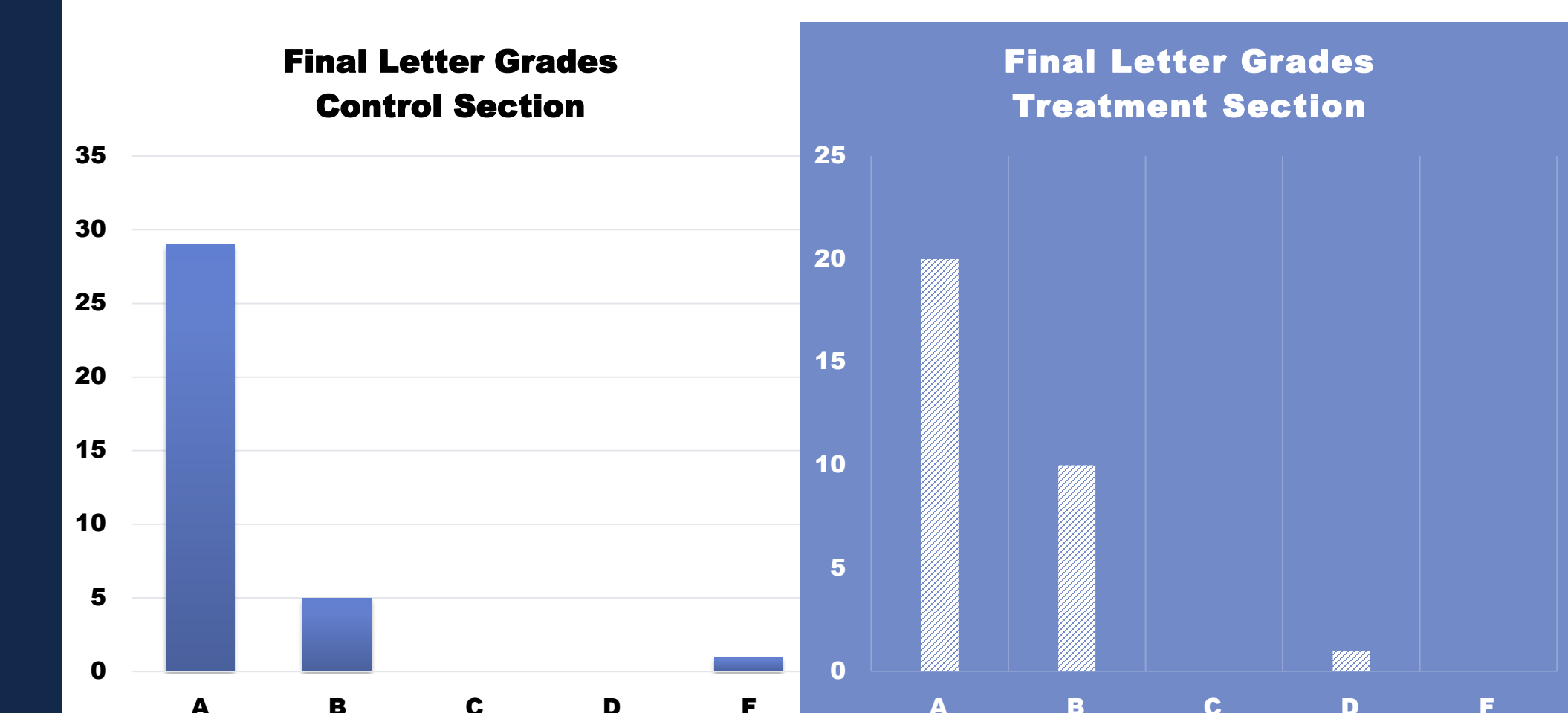


Takeaways

- In treatment section, student confidence at the mid-semester point was mostly present and feedback about the course was mostly positive.



- Student performance was good overall, perhaps more realistic in treatment section.



- Two different preparations for the same course is challenging and tedious.
- Grading time for control section is 5 times longer than the treatment section per grader per bi-weekly period
- For me, the learning logs and small group tutorials had the biggest impact.
- Teaching the course again
 - I do want to incorporate SETs – learning logs, small group tutorials, analytic teams.
 - I’d like to explore a check-in (continuous management) system with the learning logs.

Acknowledgements

The idea of SETs and their definitions come from Barkley, Elizabeth F. “Student Engagement Techniques: A Handbook for college faculty” (2009)