Implementation and Evaluation of Technical Interview Preparation Activities in a Data Structures and Algorithms Course

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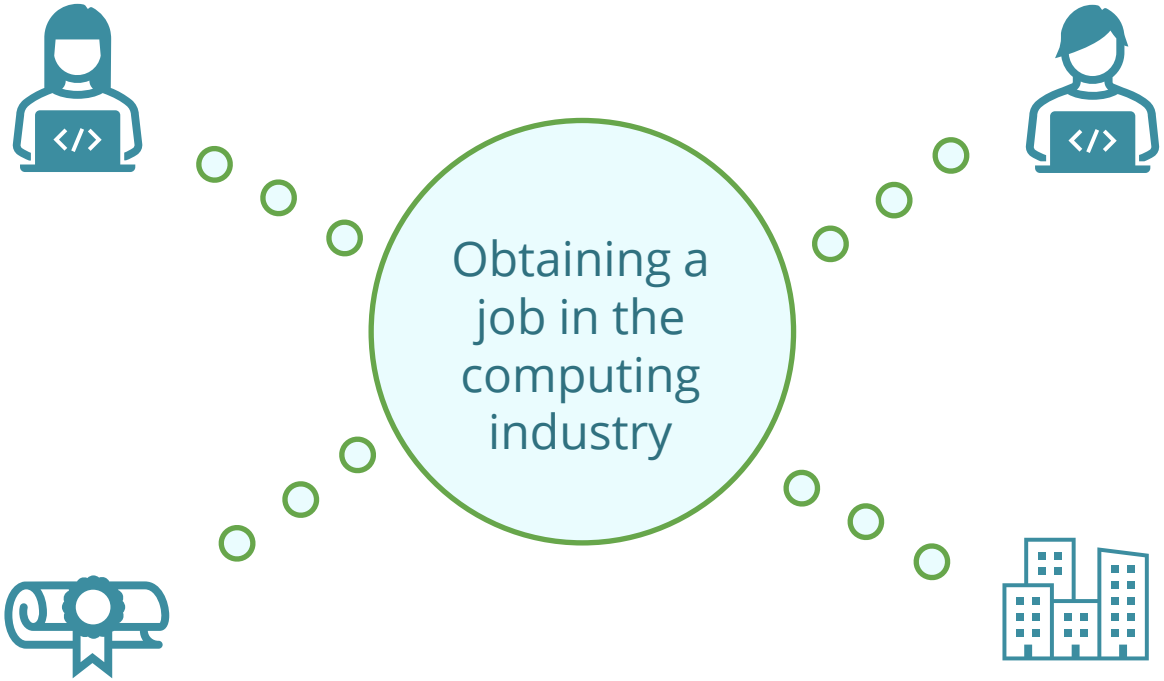
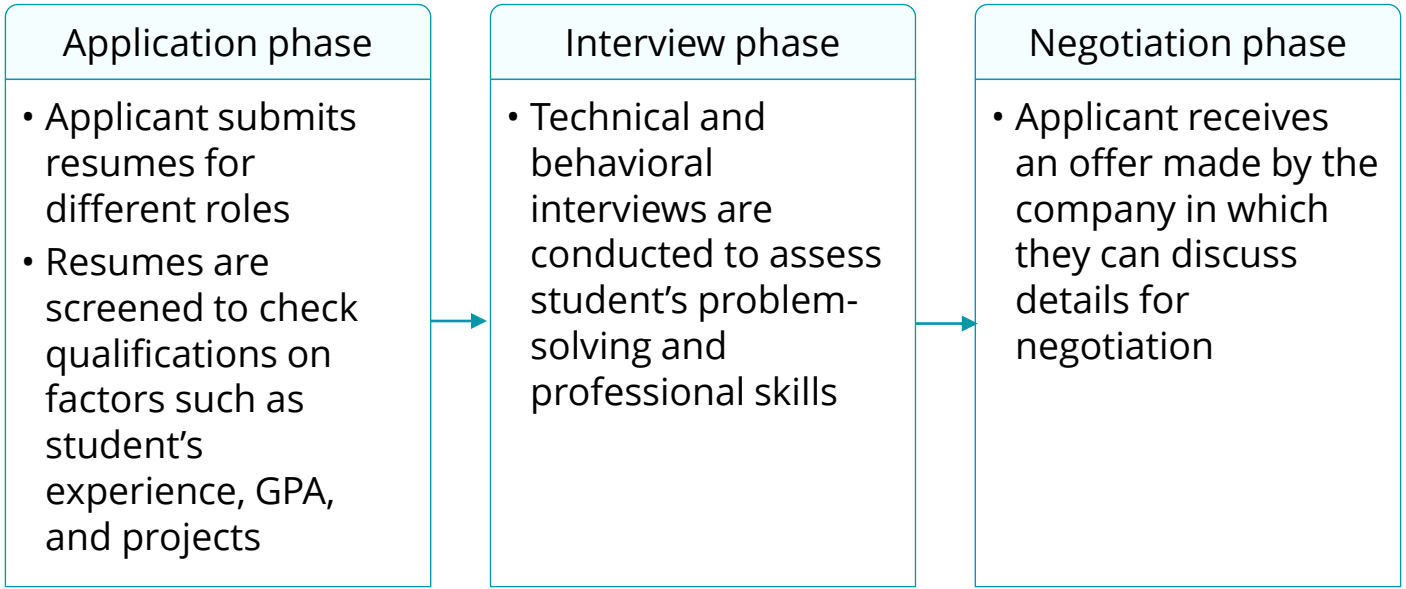
Motivation



Process of Recruitment



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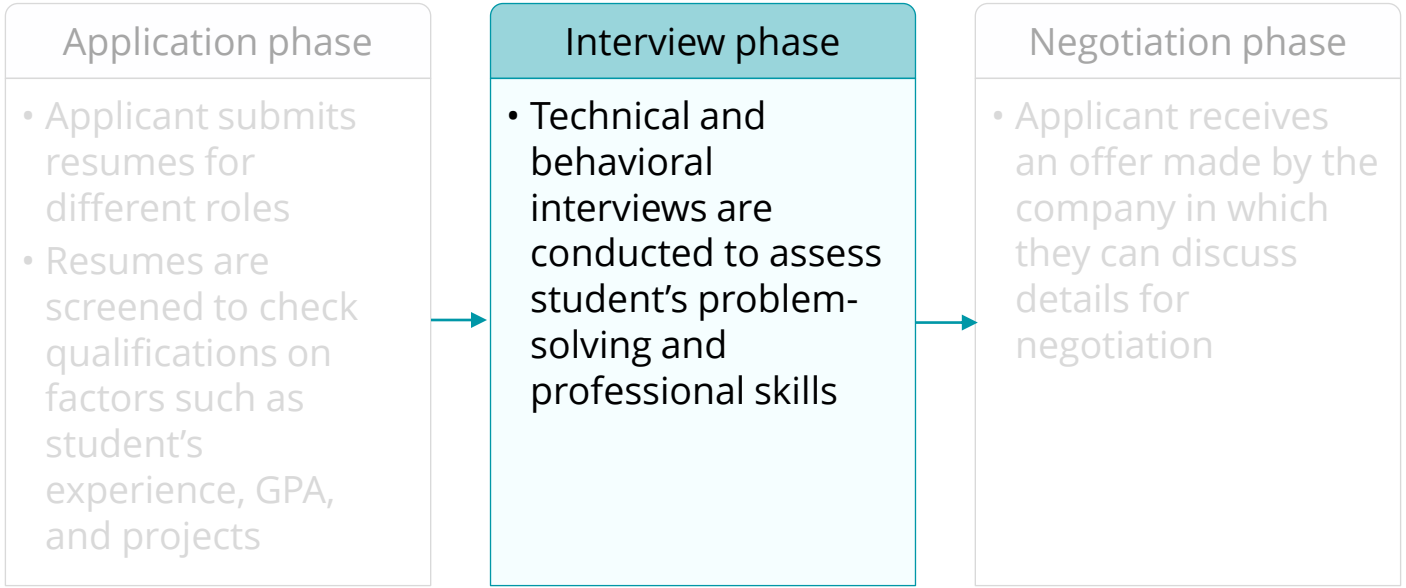


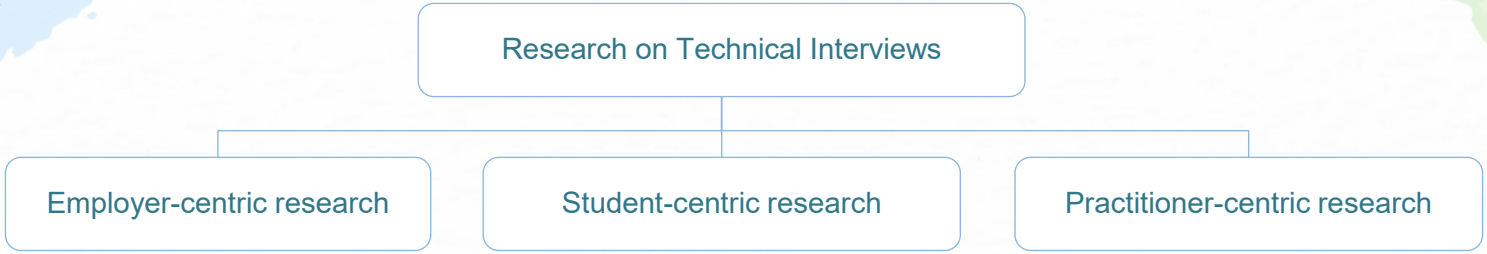
Debilitating Factors that Were Taken Into Consideration

Limited time and access to resources outside of curriculum

Inadequate preparation causing anxiety and stress

Lack of exposure and experience in technical interview setting

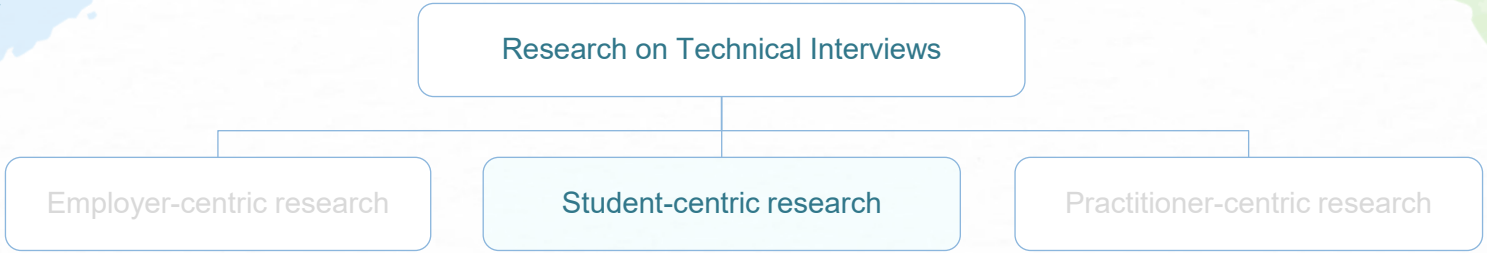
Prior Work


Research on Technical Interviews
Employer-centric research
Student-centric research
Practitioner-centric research

Prior Work

- Structure and expectations in a technical interview
- Interviewers placed importance on interpersonal skills as much as problem-solving abilities (Ford et al., 2017)

Prior Work



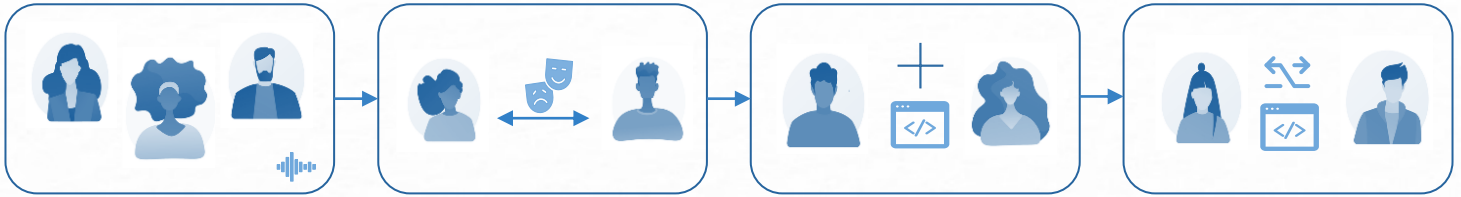
- Technical interview participation and factors that influence success
- Findings of African American students' participation in technical interviews showed that anxiety decreased as they partook in more interviews (Hall and Gosha, 2018)

Prior Work

- Designing interventions for interview preparation
- Introduction of coding exercises that resemble technical interview questions in a CS2 course in the form of individual programming assignments (Urness, 2017)

Background of Study

- Purpose: help students prepare for technical interviews
- Intervention introduced in a Data Structures and Algorithms course at the University of Florida in Fall 2020



Panel on Internship Application Process, Experiences, and Strategies (45 minutes)
Week 5

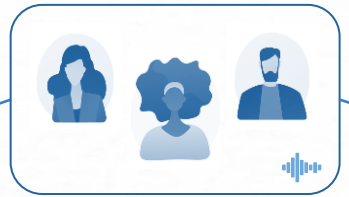
Role Play on Technical Interviews by Teaching Assistants (50 minutes)
Week 6

Interview 1: Self-selected pairs
Topic - Trees or Heaps
Week 8

Interview 2: Random pairs
Topic – Sets and Maps or Graphs
Week 13

- Increase students' confidence levels by the end of the semester for technical interview preparation

Creating a Solution with Hire Thy Gator Activities



Panel on Internship Application Process, Experiences, and Strategies

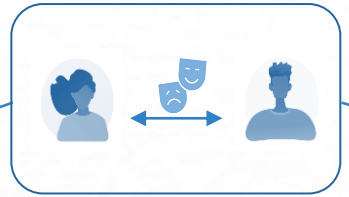
Week 5

4 undergraduate TAs with internship experience and DSA course instructor

Discussed technical interview process, previous internship experiences, and strategies used by TAs for securing an internship

Goal: Create awareness of the significance of internships among students and the steps taken for recruitment

Creating a Solution with Hire Thy Gator Activities



Role Play on Technical Interviews by Teaching Assistants

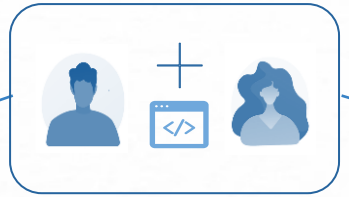
Week 6

TAs did a practical demonstration of a technical interview

Showcased problem-solving approach, importance of asking questions and communicating ideas with interviewer

Goal: Allow students to reflect on the live practice run-through and provide constructive feedback

Creating a Solution with Hire Thy Gator Activities



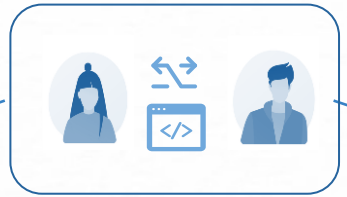
Interview 1: Self-selected pairs
Topic - Trees or Heaps
Week 8

Students paired up with a peer of their choice to act as interviewers and interviewees to conduct a mock interview

Assignments were given corresponding to role assigned to student for responsibilities and duties to carry out during mock interview

Goal: Gain exposure to the roles of acting as an interviewer and interviewee in a comfortable setting by choosing their partner for their first mock interview

Creating a Solution with Hire Thy Gator Activities



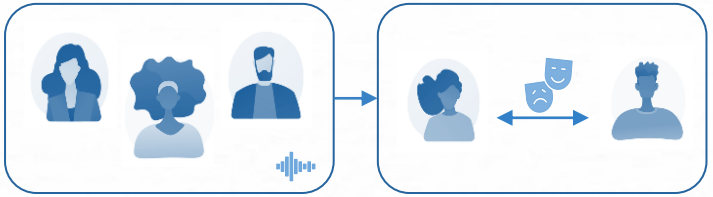
Interview 2: Random pairs
Topic – Sets and Maps or Graphs
Week 13

Students were randomly paired together to play the roles of interviewer and interviewee

Similar to the first mock interview, the randomly paired students carried out their tasks corresponding to their roles for the interview

Goal: More authentic experience and increase social interaction along with strengthening technical interview skills

Time Requirements



Panel on Internship Application Process, Experiences, and Strategies (45 minutes)
Week 5

Role Play on Technical Interviews by Teaching Assistants (50 minutes)
Week 6

1 to 2 hours

2 to 4 hours

3-6 hours

Evaluation

Design

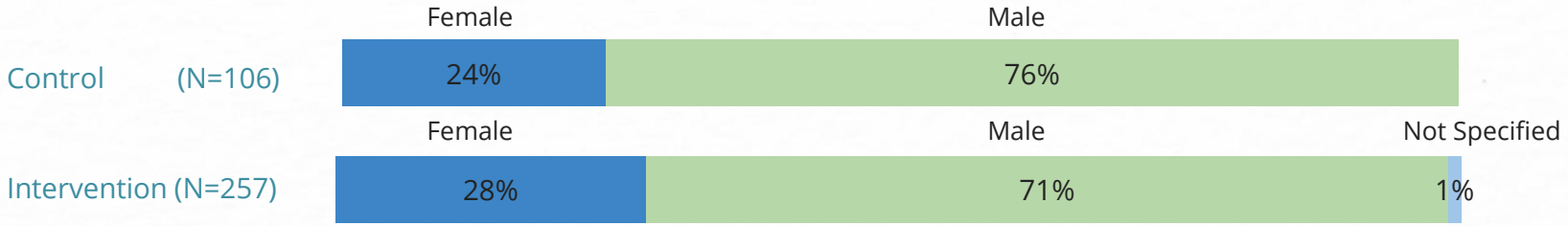
- Retrospective pre-post survey
- Helps in understanding key takeaways from students' inputs on partaking in technical interview exercises and changes in confidence levels
- Provided to students at end of control and intervention semesters
  - Control group: Summer 2020
  - Intervention group: Fall 2020
  - The course structure for the two groups was similar with the exception of introduction of technical interview exercises and minor changes in grading structure
- Research question
  - How does participation in technical interview preparation activities influence students' confidence levels for programming in a technical interview?

Study participation

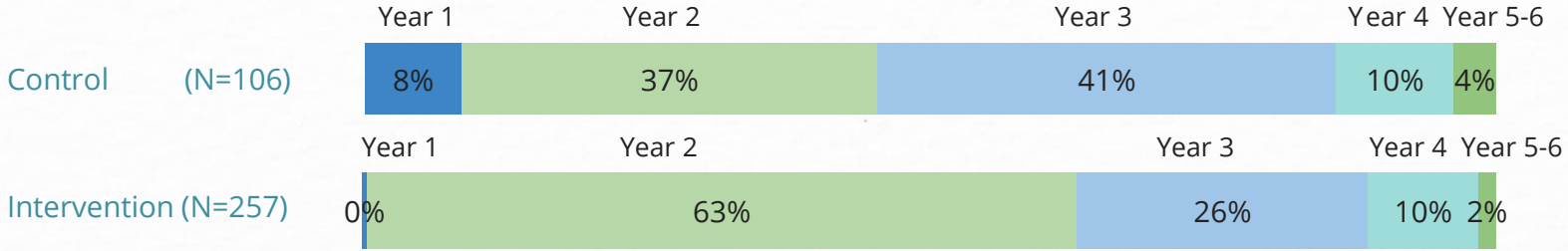
- Summer 2020 (Control): 115 out of 143 students consented (80.4%) and N = 106 after excluding missing data
- Fall 2020 (Intervention): 279 out of 345 students consented (80.9%) and N = 257 after excluding missing data

Demographics

Gender



Academic Standing



Evaluation

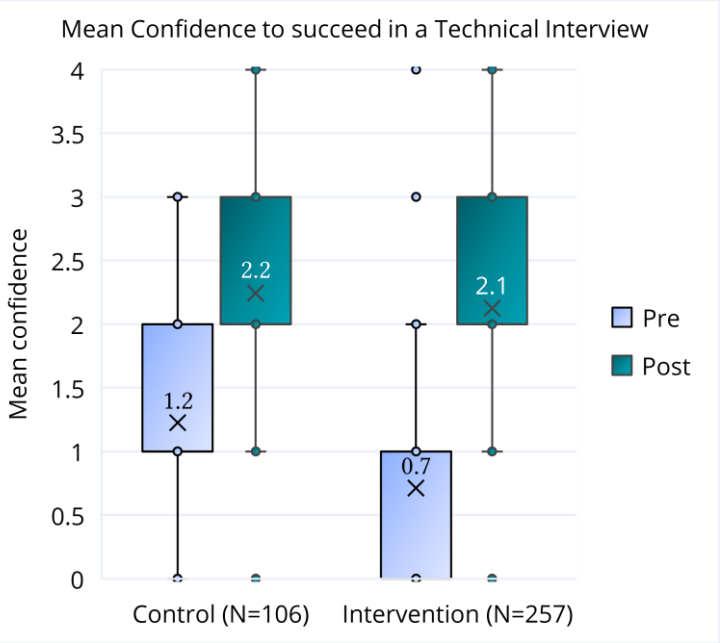
	Survey questions	Analysis
Qualitative	- Did you find the activity valuable?	- Coded using Inductive content analysis
Quantitative	- How confident were you with your ability to program in programming interviews before the starting of this course? - How confident are you with your ability to program in programming interviews at the end of this course? - 5-point ordinal scale questions - Not confident (0) – Extremely confident (4)	- Mann-Whitney U Test evaluate differences in mean confidence pre- and post-data - Average normalized confidence gain, <g> = <% Post> - <% Pre> / 100% - <% Pre>

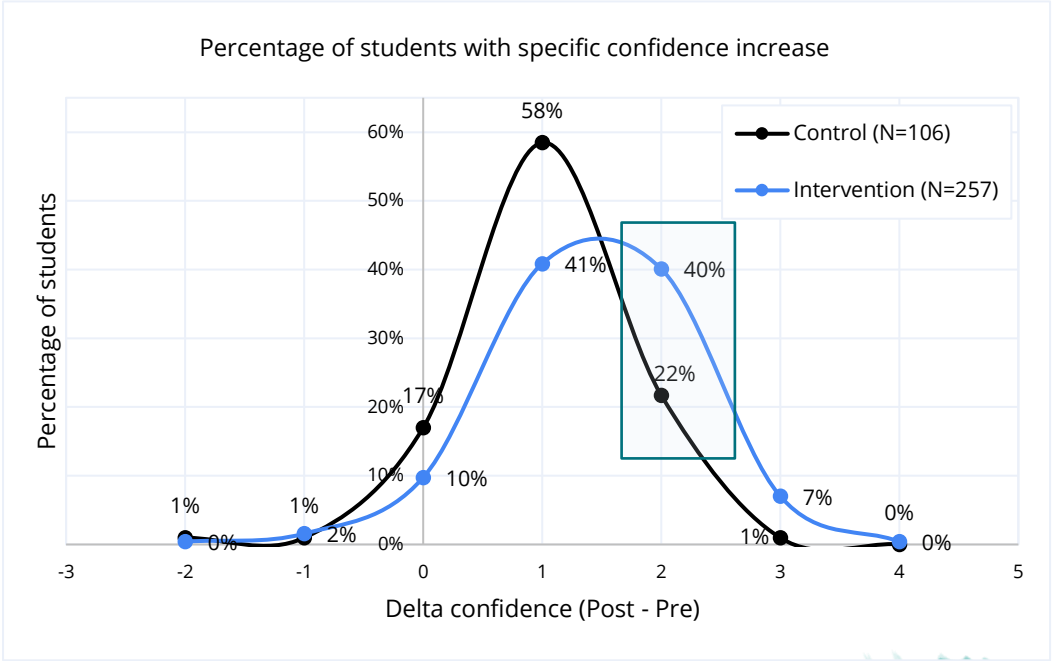
Student Experiences

"...the [interview] exercises were important in getting familiarised with the programming interview process. This [was] especially true for people like [them] who had never done a live programming interview before".

"I liked them and they revealed things I need to work on before I do another technical interview".

Results





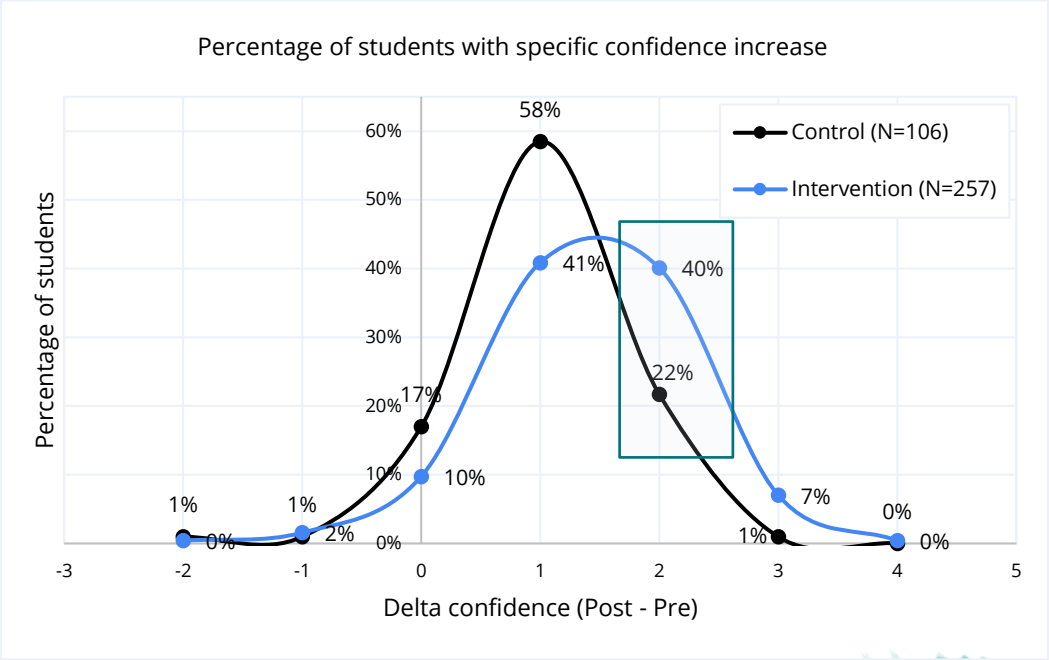
Average normalized confidence gain: Control = 0.36 | Intervention = 0.42

Takeaways

↑ Confidence gain

\+ Student reflections

suggest our activities can positively impacting students in preparing for technical interviews



Lessons Learned

1. Pairing facilitation

- Problem
  - Lack of communication and scheduling issues with assigned partner
  - Reported by approximately 15-20% of students in the course
- Solution
  - Assigned a new partner who faced a similar issue
- Reflection
  - Should provide two deadlines for each interview activity
    - Communicate with partner and schedule times for interviews
    - Conduct the interviews and submit deliverables

2. Alternate assignment

- 4% of students did not participate in activities due to social anxiety, lack of interest in CS jobs, or lack of time
- Given alternate coding problems to replace HTG exercises

Discussion and Conclusion

- Technical Interview Activities:
  - Receive exposure to technical interview setting
  - Reduced interview anxiety
  - Reflect on strengths and weaknesses for improvement
  - Increased confidence levels

- Students liked the environment in which the activities were incorporated as measures were taken to scaffold social anxiety

- Recommend other instructors to implement technical interview preparation activities in their classes, especially in DSA courses with overlapping content

Questions

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Instructor Resources