

## Introduction

Curated Pathways to Innovation (CPI) is a web-based app that curates STEM+C learning programs from different sources and encourages students to pursue these fields.<sup>1</sup>

Women earned roughly half of all awarded bachelor's degrees in 2016, but only 19% of bachelors degrees in computer science.<sup>2</sup> Further, underrepresented minorities (URM) earned only 22% of all science and engineering bachelor's degrees.

The aim of this study was to determine if students using CPI were encouraged to pursue STEM+C and if attitudes differed based on gender or URM status.

## Research Questions

**RQ1.** Will computer science attitudes increase between survey administrations?

**RQ2.** Will gender and underrepresented status in STEM+C moderate the relationship between baseline and pulse computer science attitude scores?

## Methods

1. Confirmatory Factor Analysis to confirm the factor structure of computer science attitudes
2. Paired t-test to determine if there was a change in computer science attitudes mean score between the administration of both surveys
3. Linear Regression with Moderation to examine if gender or URM status in STEM+C moderated the relationship between baseline and pulse computer science attitudes

## Demographics

Total Sample Size:

N = 228

Gender:

Male = 113 (50.7%)

Female = 100 (44.8%)

Other = 10 (4.4%)

Underrepresented Race/Ethnicity in STEM+C

Yes = 187 (84.2%)

No = 35 (15.8%)

## Preliminary Analysis

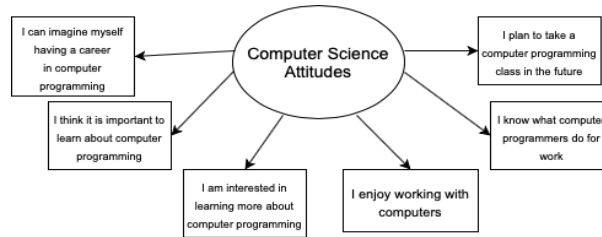


Figure 1: Unidimensional Model of Computer Science Attitude Items

Table 1  
Model Fit Indices for Computer Science Attitudes Items

| Model    | Chi-Square | df    | CFI   | TLI   | RMSEA | SRMR  |
|----------|------------|-------|-------|-------|-------|-------|
| Baseline | 4.779      | 9.000 | 1.000 | 1.000 | 0.000 | 0.037 |
| Pulse11  | 11.286     | 9.000 | 0.994 | 0.991 | 0.035 | 0.054 |

- Model Fit Indices for the Unidimensional Model using the baseline and pulse data support a six item, single factor termed Computer Science Attitudes (Figure 1; Table 1)
- Good model fit for both baseline and pulse items justifies the use of a single composite score for computer science attitudes
- Because a singular factor was supported and item wording stayed constant between the administration of both surveys, a paired t-test was conducted (Table 2).

## Results

Table 2  
Difference in Mean Responses to the Baseline and Pulse Computer Science Attitudes

| Baseline | Pulse | Pulse - Baseline | t-statistic | p-value    |
|----------|-------|------------------|-------------|------------|
| 2.932    | 3.290 | 0.358            | 6.818       | p < 0.001* |

Note: \* is significant at the  $\alpha = 0.05$  level

### Moderation by Gender

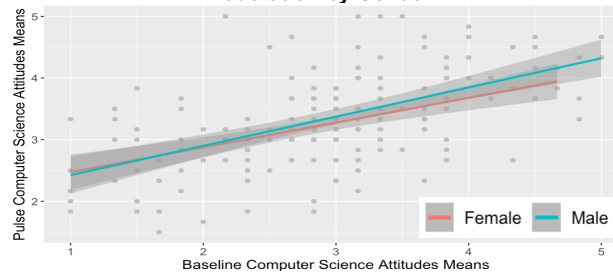


Figure 2: Moderation of Gender on Computer Science Attitudes. Points represent individual means. 95% confidence band for each regression is included.

### Moderation by Underrepresented Minority Status

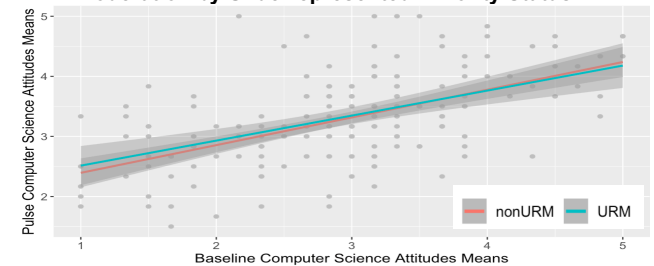


Figure 3: Moderation of Underrepresented Minority Status in STEM+C. Points represent individual means. 95% confidence band for each regression is included.

- With respect to RQ2, we found that there was no significant difference in fit by gender or underrepresented minority status using linear regression. (Figures 2 & 3).

## Conclusions

- There was a positive increase in computer science attitudes between the administration of the baseline and last pulse survey
- This increase was not moderated by either gender or underrepresented race/ethnicity in STEM+C
- These results indicate that CPI is effective at promoting increasing computer science attitudes equally among users, regardless of gender or underrepresented minority status

## References

1. <https://wyca-sv.org/curated-pathways-to-innovation/>
2. National Science Foundation, National Center for Science and Engineering Statistics. 2019. *Women, Minorities, and Persons with Disabilities in Science and Engineering: 2019. Special Report NSF 19-304.*

## Acknowledgements

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