How language and parental educational achievement impacts computer science self-perceptions in 4th - 12th grade students

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Curated Pathways to Innovation

- Curated Pathways to Innovation (CPI) is a web-based app that guides and motivates students as they select activities which engage them in the possibility of pursuing a STEM+ career.
- The app is specifically designed to set women and underrepresented minorities on a path towards STEM careers.
- This research aims to help better engage students into computer science activities by looking at demographic features as an indicator for children’s computer science self-perceptions and ability.

Methods

Measures

Primary Language spoken
- Question: “What is the first language you learned to speak? Please type in your answer
- Response option
  - Written response
- Response Code: English (1), Spanish (2) Other (3)

Parental Educational Achievement
- Question: “What is the highest level of education attained by your mother female guardian”
- Response Option
  - Maternal college education
  - Less than high school”, “Some high school”, and “High school diploma”, “Some college/university”, “Associate degrees (2 years)”, “Bachelors degree (4 years)”, “Masters degree”, “Doctorate/Pi/PhD/MD/”
- Response Code: “Less than high school”, “Some high school”, and “High school diploma” coded = no college education
- Responses “Some college/university,” “Associate degree (2 years),” “Bachelors degree (4 years),” “Masters degree,” and “Doctorate/Pi/PhD/MD/” coded = having college education

Self-perceptions of Computer Programming Ability
- Question
  - Self-perception scale (alpha = 0.92) with seven questions, including the following: “I am good at working with computers”
  - “I believed I could have a successful career in computer programming”
  - “I can imagine myself having a career in computer programming”
  - “I enjoy working with computers”
  - “I plan to take a computer programming class in the future”
  - “I wish I had more opportunities to learn how to program computers”
  - “It is important for me to get better at working with computers”
- Response option
  - Likert scale
  - 1 = “Strongly Disagree”
  - 2 = “Disagree”
  - 3 = “Neither Agree nor Disagree”
  - 4 = “Agree”
  - 5 = “Strongly Agree”

Analysis

- One variable t-test to help determine significance of all variables
- Exploratory factor analysis on the self perception measure to determine the number of factors that fit the model
- A 2-way analysis of variance test (ANOVA) determined the variance of each factor to establish independence and provide evidence of a different mean between the groups.
- Reliability was measured by calculating the Cronbach’s alpha to indicate internal consistency and item relation in the self-perceptions scale
- Main and interaction effect helped determine how parental education and language impact computer science self-perceptions
- A Tukey posthoc test was conducted to view the significance of each measure

Acknowledgments and References

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