Capitalizing on Opportunity: Narrowing the Gender Divide in Engineering and Computer Science through Professional Development

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Overview

• Motivation
• Capitalization
• Background
• Social Cognitive Career Theory (SCCT)
• Research Questions
• Progress and Implications
• Future Directions
Motivation

• Though they perform as well as men, women often experience a “chilly climate” in STEM
  • Impersonal
  • Individualistic
  • Non-collaborative

• Women typically leave STEM majors because they perceive them as:
  • Less supportive
  • Filled with challenges

• What happens both inside and out outside of the classrooms matters
Capitalization

• Interchangeable with the term Professional Development

• Examples
  • Participation in professional associations (ACM, NSBE, etc.)
  • Networking
  • Forming study groups
  • Participating in computing/engineering competitions
  • Seeking out mentors
  • Attending job fairs
  • Giving and receiving tutoring
  • Engaging in research
  • Tinkering with technology/programming independently.
Background

• Theoretical basis:
  • engagement in professional development activities and discipline-specific extracurricular activities leads to greater retention in women (and men).

• Theoretical framework:
  • Capitalizing on opportunity
  • Social Cognitive Career Theory (SCCT)
SCCT Model of Capitalization

Person Inputs
- Gender
- Major
- University

Capitalization Outcome Expectations

Capitalization Self-Efficacy

Contextual Inputs
- Supports
- Barriers

Capitalization
- Interests
- Goals
- Actions

Professional Identity
- Persistence in major
- Satisfaction with major
- Career involvement
- Intentions for future capitalization
Research Questions

• RQ 1 – Model Validation
  • What are the antecedents and consequences of capitalizing on professional development opportunities?

• RQ 2 – Longitudinal Assessment
  • How do perceptions of supports/barriers impact capitalization over time?

• RQ 3 – Training Experiment
  • How does early exposure to capitalization opportunities influence student professional identity?
Progress and Implications

• Sharing preliminary results for RQ 1
• Surveyed students via online surveys
  • Participants recruited at the start of fall semester
  • Recruited via e-mail and in-class
  • Surveys distributed at the start and end of the semester
Methodology

• Study Participants:
  • 198 CS or ENGN students from two SE Universities
    • Old Dominion University (PWI)
    • Norfolk State University (HBCU)

• Demographics
  • Age (mean): 20.44 (SD = 4.28)
  • Gender: 3.7% Female
  • Majors: 67.3% ENGN, 32.7% CS
  • Ethnicity: 43.7% White
    34.7% Black
    5.5% Hispanic
    5.5% Asian
Methodology

• Measures:
  • Beginning of fall semester
    • Self-efficacy
    • Outcome expectations
    • Support
    • Barriers
    • Intentions
  • End of fall semester
    • Actions
    • Persistence intentions
    • Major involvement
    • Affective commitment
    • Continuance commitment
Social Cognitive Career Theory (SCCT)
Findings

\[ \chi^2 (972) = 1540.75, \ p < .001, \ CFI = .94, \ SRMR = .09, \ RMSEA = .06. \]
Implications

• Findings suggest that:
  • Creating positive outcome expectations and providing support are levers to increase capitalization.
  • Professional development outside the classroom is a mechanism for improving retention.
Future Directions: Research Questions

• RQ 1 – Model Validation
  • What are the antecedents and consequences of capitalizing on professional development opportunities?

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