

HIGHER EDUCATION POLICIES FOR FEMALE RETENTION IN COMPUTER SCIENCE

1. INTRODUCTION

- Women as pioneers (Ada Lovelace, Grace Hopper)
- Since the 1980s, gender balance has skewed towards men
- In the US, only 20% of CS students are female, whereas 57% of all students are female
- Causes of gender imbalance:
 - negative stereotypes & bias
 - lack of role models
 - difficulty experiencing a sense of belonging
 - low self-esteem about work skills
- Why is it important to solve this problem?
 - coherent & diverse workforce
 - more innovation & growth
 - economic empowerment and social fairness

2. RESEARCH QUESTION

What are the effects of higher education policies aimed at reducing gender bias and stereotypes and how do these policies influence the overall academic and career outcomes for women in CS?

4. RESULTS

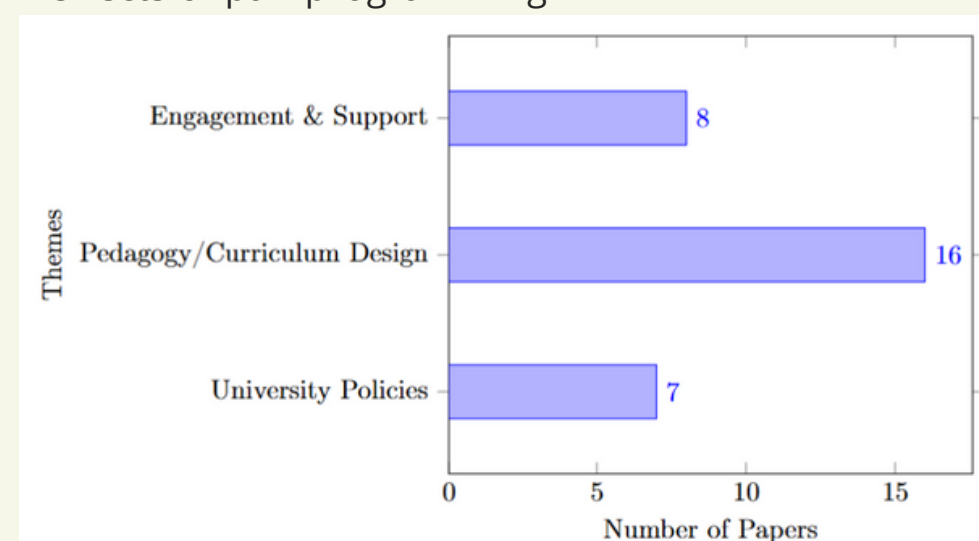
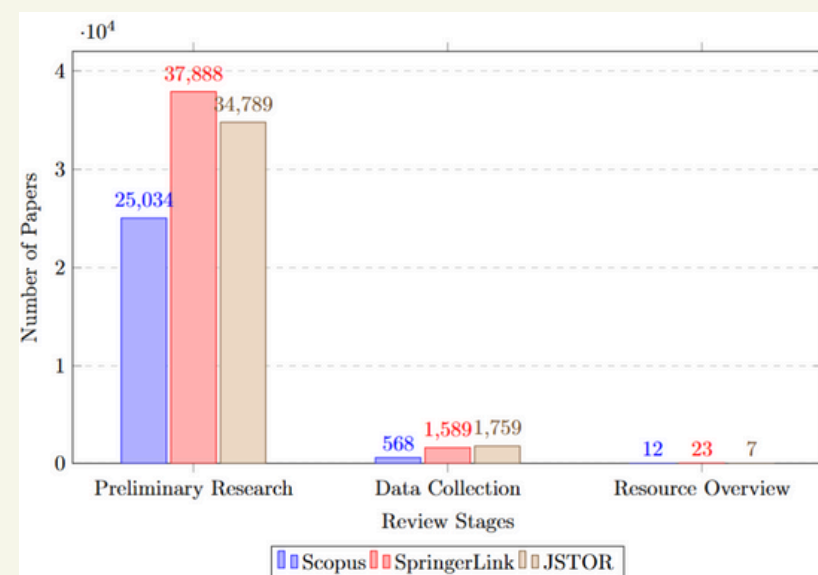
- Hollistic Admissions & Bridge Programs
 - increase from 26% to 50% female students in CS at Carnegie Mellon University 2010-2018
 - CS Kickstart
 - Bridge program
 - Intro courses, meeting faculty, workshops
 - 33% of participants switched to CS
- Anti-discriminatory Policies
 - report procedures
 - support for victims
 - protocols for enforcement
 - importance of familiarize students with these policies
 - study at Purdue University shows decrease in discrimination, microaggression and more inclusivity
- Support Groups & Measures
 - Scholarship programs
 - lower dropout rates
 - 15% dropout for scholar students as opposed to 37% dropout rates for regular students at Middle Tennessee State University
 - higher grades
 - improved retention rates
 - Mentorship programs
 - boosts confidence and self-esteem
 - mentors as role models
 - improved networking
 - reduced stereotype threat
 - improved retention rates
- Introducing Practical Context to Education
 - project-based learning
 - Harvey Mudd College improved gender diversity from 12% to 40% in the period between 2004 and 2011
 - applying material into real-world applications
 - increased relevance and interest towards the material
- Collaborative and Inclusive Learning Environments
 - pair programming
 - classroom-style groups
 - inclusive teaching practices

3. METHODOLOGY

- Preliminary Setup & Research
 - 3 databases
 - valuable insights and starting points
 - initial query words include:
 - stereotypes in CS & STEM
 - gender bias in CS & STEM
 - university policies for gender equality in CS
 - support programs for female students in CS in higher education

- Data Collection
 - implementation of inclusion/exclusion criteria
 - modified query words include:
 - mentorship programs for gender diversity in CS
 - scholarship programs in CS
 - anti-discrimination policies in CS
 - hollistic admission in CS
 - effects of pair programming

- Paper Overview
 - read title
 - read abstract
 - read the whole paper



5. DISCUSSION

- Policies aim to contribute to one or more of the following:
 - creating a sense of belonging
 - decreasing isolation
 - identifying and addressing discrimination
 - having role models to look up
 - guidance/support
 - networking
- Knowledge gaps
 - lack of research outside Europe and the US
 - lack of longitudinal data
- Suggestions for Policymakers
- Adoption Challenges
 - lack of human resources and finances
 - cultural resistance
 - lack of rigorous and measurement of outcomes

6. CONCLUSION & FUTURE WORK

- Policies divided into two parts
 - university policies + support programs and measures
 - curriculum design and pedagogy
- Useful for policymakers
- Further investigation of new and experimental measures
- Link to other social identities such as race, socioeconomic status, disability, etc

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