Problem-Based Learning to Improve Girls’ Math Identity

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Background

• While the number of girls and women studying and pursuing STEM careers has increased over the past few decades, women are still under-represented particularly at the upper levels of educational and professional attainment.
• In North Carolina, women earn 58% of total college degrees, but only 42% of STEM degrees.
• Overall, 24% of people in STEM careers are women.
• In the absence of any meaningful biological or innate gender difference, cultural factors account for the difference in representation.

Methods

• GEM encourages young women to explore math at 90 minute, twice monthly workshops from January-April, plus two summer sessions.
• Girls participate in problem based math activities guided by 2-3 mentors.
• Mentors discuss cultural factors known to influence students’ identities including stereotypes and stereotype threat, gender norms, beliefs about intelligence (fixed vs. growth mindset), and self-standards.
• Difference in math ability and mindset following the intervention is assessed through a pre- and post-test.

What Makes GEM Different?

• Problem-based learning: girls work on challenging puzzles in groups to build problem-solving skills and explore math outside of standard school curriculum
• Direct discussion of gender, stereotypes, and identity through Girl Talk! sessions
• Only female mentors: research has shown that having female mentors is essential for girls to continue on a STEM education or career path
• GEM also addresses two important leak points in girls’ STEM paths: middle school and college. In middle school, girls often start losing interest in STEM subjects. In college, women often don’t pursue a STEM degree, and those that do often don’t pursue a STEM career.

Research Timeline

- Pre-Survey: Sep - Dec 2018
- Post Survey: Summer 2019
- Mentor Class: Jan 2019
- Workshops and Ethnographic Fieldwork: May 2019
- Summer Workshop: Summer 2019

Participants and Assessment

• 57 Initial Enrollees - 25% 8th Grade, 39% 7th Grade, 36% 6th Grade
• 52% Lakewood Montessori, 16% Borgden Middle, 16% Durham School of the Arts, 8% Carrington Middle, 4% James E. Shepard IB Magnet School, 4% Central Park Middle

Future Directions

• Focus workshops on improving spatial reasoning skills as it is the only measurable gender disparity
• Develop a scalable workshop model to implement program in other universities, particularly in rural areas

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