Engineering Education K-12: Gender Roles
Analyzing, Understanding, and Overcoming Gender Disparities in Engineering Education

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Research Question
Why are women underrepresented within the engineering fields?

Objective of Research

Gender Roles: Predetermined vs. Societal Influences

- Studies indicate males naturally tend to work alone, argue with their peers more, and begin directly working on projects without any prior planning, while females tend to work together, communicate, and plan before executing projects.
- Women are deterred from math and science fields because they feel as a gender, they are not supposed to participate in those fields nor are they supposed to excel.
- Science and math fields are dominated by men, and are thus associated with male values. To be a good engineer, one must possess inherently “male” qualities.

Current Initiatives

Engineering is Elementary
- A program developed by the Museum of Science in Boston, MA.
- Serves as an introductory program to get children more interested in STEM fields and, improve instructors ability to teach engineering.

Future Worlds
- An interactive cyber learning system that introduces students to the concepts of sustainability.

GoldieBox
- With the goal of introducing girls to the field of engineering and moving away from traditional gender-specific toys, GoldieBox is a construction toy that gives girls an alternative way to play and learn.

Women In Science and Engineering (WISE)
- A program that provides high school females that are interested in the science and engineering fields with the opportunity to work with a nearby university’s professors and students on science and engineering projects.

Solutions

We understand that several factors impact female involvement and presence within the engineering and science fields. We do however believe that the engineering and science curriculum (k-8) may not provide them with equal opportunities.

- Through science curriculum reformation we believe that young female adolescents may see the long lasting benefits and opportunities offered within the engineering field, translating into a greater female participation within engineering.
- These curriculum changes would include introducing environmental science and the concepts of engineering at a younger age.

Creating examples and projects that emphasize the ways that science can improve the world.

- More interactive and outdoor school days. The monotony and confinement of the classroom tends to dissuade both men and women from math, science, and engineering courses. We feel that having the children interacting with the environment and seeing their work have a real impact will greatly increase the students’ interest in not only engineering, but the environment as well.
- More group projects. Girls are often discouraged from engineering fields not because they are ill-equipped to work in the field, but because they lack confidence. We feel that if there were more group projects undertaken at the K-12 level, especially ones where the females take on leadership roles, there would be a resultant boost in confidence, and thus participation in engineering.

Plans for Future Study

- We would like to closer observe how dynamics, psychology, and social aspects may lead to early age discouragement in females.
- Through the development of a environmental education class module we would like to see the affects of single-sex classes.
- Conducting a STEM Camp with children who have not been exposed to the different aspects of the STEM field.

References


Hughes, R. M., Nzewie, B., & Molyneaux, K. J. (2013). The single sex debate for girls in science: A comparison between two informal science programs on middle school students’ stem identity formation. 1-34.