

Supporting Middle School Girls' Development of a Science Identity

Janine Bennette, Tucson Electric Power, Vante
4th Grade Science

Introduction:

Women are underrepresented in the science fields in American society, especially engineering and physics. In both of my workplaces, I observed that most of the engineers were men and that women often worked in document management or quality assurance. I observed that my female students were highly capable but overly anxious about being good students and had low confidence in their science abilities. The purpose of my project was to support students in learning about the practices of science while also learning about the masculine social construction of science. I examined how girls' perceived gender roles interacted with the science curriculum that included project based learning (PBL) focusing on critical societal issues.

Findings:

Students did not associate traditionally feminine qualities with being a scientist. Among the most chosen words describing a scientist were *problem-solver*, *open minded*, *collaborative*, *smart*, *patient* and *determined*. This seemed representative of the climate at the middle school where the study was conducted. The least chosen words were *sensitivity*, *ethical*, *emotional*, *caring*. These are more traditionally feminine words which may be an indicator of why girls are hesitant to believe that they are "good" at science. Students automatically associated males with science and females with liberal arts; 57% associated males with science careers as opposed to 20% for females. Overall, girls' self-efficacy was not affected by the introduction of Project Based Learning. Survey data showed that girls felt neutral about their ability in science before and after interventions, even if they believed that they were good students. This indicates that they may not be sure what actually makes a good science student. Observations of their work showed that they became more confident in their abilities during the second project which may be due to more comfort with teacher expectations. Changes in girls' identities in relation to science were based upon their ethnic and academic background. Survey data showed that girls do science because of interest, but that most girls admit that they do their work to "avoid looking stupid". Science identity decreased or stayed the same in white, "gifted" girls whereas it increased with special education and other-than-white populations. Grades of these girls also increased with the addition of PBL whereas the white "gifted" girls' grades decreased or didn't change.

Plan of Action:

Students' attitudes about gender in relation to science are embedded in the idea that more traditionally feminine qualities are not important for science. This societal mindset carries over into girls' science identities. Girls' self-efficacy is tied into societal expectations and general school expectations of good student behavior making it difficult to change their feelings within the school science setting.

Interventions helped to increase the grades and identities in relation to science of at-risk populations of girls thus indicating that this type of classroom climate and PBL can be effective. Therefore, I will continue to instill gender equity and social justice themes in the classroom climate to support girls and underrepresented populations in the development of STEM careers.