

## **Encouraging Girls in Science**

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### **Abstract**

In this article, the authors comment on the issue of differences between the genders and science education. The literature is limited on gender and science education. When examining the studies that concern girls' interest in science and how they develop, four different ideals according to Brotman and Moore (2008) are emphasized: equity and access, curriculum and pedagogy, the nature and culture of science, and identity. These provide a coherent picture of the four different kinds of approaches happening in our schools (Brotman & Moore, 2008). In this article, the authors recognize how girls progress over time in the area of science. The authors used varied research methods to gather new information that can be utilized towards helping boys and girls consider their educational choices, especially in the area of science (Huebner, 2009).

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### **Gender Stereotypes**

Studies have shown an equity and access theme when examining the literature pertaining to girls' engagement in science. For example, gender differences can be somewhat complex to detect because girls and boys reacts differently to how society reacts to them (Sadker & Zittleman, 2005). It is not an issue that most educators address in the classroom. As the different genders are stereotyped, the expectation of boys are to “act out” and explore, girls are expected to be more conforming and to stay well behaved. In the area of science inquiry methods,

researchers have shown that the achievement gap in science between boys and girls is disappearing (Sadker & Zittleman, 2005).

### **Science and Confidence**

Studies have shown that in early sex socialization girls, are taught to be complimentary to others, and girls seem to work harder to have a better outcome in school than those of male gender (Kulm, 2009). This is partly the reason girls receive better report-card grades than boys. It has been found that teachers appreciate and work better with students who follow directions and comply and complete the tasks at hand (Brotman & Moore, 2008). Consequently, girls receive higher grades. The higher grades carry a cost to girls by being singled out and isolating them which can enhance a negative behavior, and eventually lead to lower self-esteem and less confidence – especially in science. There are more than one-third of students in 3rd–12th grades who reported that "people think that the most important thing for girls is to get married and have children" (De Welde, Laursen, & Thiry, 2006, p. 132.).

### **Conforming to School Norms**

It has been proven that in the early social experiences, girls have proven they are equal or a slight bit ahead of boys on most standardized tests (Kulm, 2009). Late in early adolescence and early teenage years, girls start contributing less in the classroom as compared to boys. Girls seem to be more inhibited to participate and contribute in the classroom (Heilbrunner, 2000). In fact, by the time girls reach high school, they have fallen behind boy's in most testing that is standardized, such as the SAT, ACT, MCAT, LSAT, and GRE (Brotman & Moore, 2008).

Girls test scores drop significantly from their early years in school through secondary education and into their higher education. After high school, studies have shown that girls are less active or engaged in classroom instruction, compared to boys who seem to be more engaged (Sadker & Zittleman, 2005). It has been further shown that girls' grades are less significant as a reward than following and conforming to rules such as being quiet and conforming to school norms. Most girls who are learning in science perform better in an inquiry based instruction and assessment (Shaw & Nagashima, 2009).

### **Males Dominate - Girls Have Few Role Models in Science**

Males have dominated the pages of history. Males are noted more in school textbooks than females (Huebner, 2009). In most textbooks used in schools, males are consistently included five times more than females. Girls have very few role models from history and females to look to for guidance. Even in small children's books, males are represented twice as much as females.

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### **Girls Think Science Difficult**

Young elementary girls tend to think that science is too difficult for them and they show little interest in science. More interestingly is that parents believe science is better suited to boys, and not girls, as a subject matter concentration. This translates into why boys being in a science related field in the future job market (Vanmali & Abell, 2009).

### **No Interest in Pursuing a Career in Science**

Enrollment for girls in most high school and college math and science courses has increased dramatically in the past few years. Girls dominate in the areas of biology, chemistry, algebra, and pre-calculus courses. It is unfortunate that the interest between girls and science and math still have such a large gap (Vanmali & Abell, 2009). In a survey by the Society of Women Engineers, it was found that 75 % of American girls have no interest in pursuing a career in science, math, or technology (Heilbronner, 2009). The question that should be asked is “Why?” Many girls believe that science is a cold and impersonal subject with little interest or purpose to their everyday lives future. They are lacking the connection or importance of science in the world (Olson & Mokhtari, 2010).

### **Schools Face Challenges**

Schools face the challenges of producing highly qualified scientists. Educators must use effective teaching strategies that serve to boost an interest and excitement for both sexes in the area of math and science. The continuous issues of equity and access, curriculum and pedagogy, the nature and culture of science, and how it identifies with the issue of gender differences towards girls plagues the future of female’s interest and involvement in the fields of science.

### **Developing Girls in Science**

In America’s history, educators have striven to help all students achieve to their highest potential. Our system of government is based on individual rights and civic responsibilities. At the present time, pedagogy and curriculum has not been successfully developed and implemented with female social abilities in mind. Society’s expectations and development of girls in science has not been taken into full consideration in designing the curriculum for science. Society looked at science and math as predominately male driven subjects. Girls were associated with Literature and the fine arts. The nature of science was thought to be more of a male’s brain type subject. It was thought that males, exclusively, had the ability to think critically and interpret data (Huebner, 2009).

### Conclusion and Recommendations

In conclusion, the education of science pertaining to girls is thought to be lack of self-confidence, which is thought to be the primary issue that translates into a lack interest and abilities starting the elementary or middle years. Studies indicate the lack of confidence is a direct correlation to the lower achievement and test scores overall. It was not found that boys were consistently better in the science testing, but the overall concept is that boys are meant to do well in science. The promotion of self- concept and self- efficacy is a key indicator to higher achievement, even when comparing girls test scores to those of the boys. Researchers confirm there is a lack of self-confidence which shows up in a lack of interest in science that ultimately has girls drop out of science classes. The attitude that science is a “boy’s subject” prevails.

A young girl’s education in science is important. Science is related to many fields of study that will enable the next generation of young woman to strive for a better future. We must start when girls are young by encouraging their interests and exposing them to the wonders of science. Many people criticize the current strategies in which the education systems address the flaws and misconceptions of girls in science, in other words, girls in a masculine subject. Whether we intend to or not, society has established the concepts. Society must change to benefit the next generation of females.

Finally, there are serious issues in the presentation, language, and conceptions of science, especially for girls. It may be more practical to discover the prominent issues or symptoms and address them first to correct the past gender gap in the education of girls in science; such as the presentation, gender stereotyping, and lack of interest due to self-confidence. With enough concentration and belief in the reality of the gender gap, it will be reduced and eventually eliminated to a distant memory in the near future.

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