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POST

GIRLS IN STEM

Changing Our Message

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Editor's Note: This post is part of a series produced by HuffPost's [Girls In STEM](#) Mentorship Program. [Join the community](#) as we discuss issues affecting women in science, technology, engineering and math.

Pink tools. Dolls wearing white lab coats holding beakers. Perfume-making science kits. We often see items of this nature at the forefront of efforts aimed at connecting girls with STEM.

As an informal science educator, a member of a large family, and a mother, I have admittedly purchased and utilized my fair share of these girl-targeted toys and materials over the years. In fact, I recently downloaded and printed [PDFs of female paper dolls](#) with engineering, construction and laboratory clean room outfits for my three-year-old.

The questions these types of items raise for me are not so much related to each item's STEM-based educational value, but rather, "how might we attract girls into science-based experiences without reinforcing stereotypical interests and aesthetic assumptions, while at the same time, tapping into the interests that society has successfully fostered and nurtured?"

The Franklin Institute's 2013 [publication](#): Cascading Influences: Long-term impacts of informal STEM Experiences for Girls, authored by McCreedy and Dierking, offers timely insights on this topic.

This study, funded by the U.S. National Science Foundation, focused on whether girls-only, informal STEM experiences have potential long-term influences on young women's lives, particularly women who have not historically been represented in science. They knew there was short-term evidence that these programs engaged girls and excited them about science. What they wondered though was whether these programs had long-term (5-25+ years) impacts on young women's lives. Did they influence future choices in education, careers, leisure pursuits, or ways of thinking about what science is and who does it?

There was good news and tough news. The good news first -- many women in the sample indicated that STEM plays a significant role in their daily lives -- they either are working in traditional science careers or now engage in science-related careers, interests, and hobbies.

The tough news is that the study showed that there were still tensions around the ways that girls/women think about what counts as science. Unfortunately, a sterile laboratory setting is still the predominant image that comes to mind for many young women when they think about a science career; even young women in this study who were fully engaged in these programs still had many misconceptions about what science is and who does it. If a young girl cannot picture herself in this setting, she may draw conclusions that inhibit her from pursuing a science career, interest or hobby.

Perhaps one of the most powerful findings in this study is that many of the STEM outreach initiatives and resources being designed for girls, though well-intended, might be resulting in outcomes that are entirely opposite to what we hoped to achieve.

The Cascading Influences study states that, "Our society's focus on traditional science careers, inherent in the "pipeline" metaphor, may be discouraging participation in STEM or trivializing other ways of engaging in STEM. These perceptions may prevent or limit girls from valuing the science in their life."

Wow. Just wow. This means a whole new ball game. (Have I mentioned that you can explore amazing physics within a ball game?)

McCreedy and Dierking's research significantly influenced our approach this past summer in the Camp Invention program, as we piloted a free-choice learning-inspired studio module, called Design Studio: Morphed!, featuring personalized invention challenges from National Inventors Hall of Fame Inductees, creative thinking exercises, nature-based design challenges, and a circuitry Tinkering Station.

As noted in the Cascading Influences publication, we observed the power of girls (and boys) making meaningful connections with STEM when it was focused through a different lens, in this case the lens of design. It was interesting to see how and to what degree STEM was utilized in the children's invention process (from eagle-inspired flying shoes to automatic dog walkers) alongside building and exercising skills in creativity, innovation and [entrepreneurship](#).

Some of the girls participating in the program took advantage of the time and available materials to add aesthetic details to their invention prototypes, such as a zebra-striped sleeping mask that also functioned as a mini-television, while others went more for function, such as a simple, rope-based brother trap. One of the key successes of this module seemed to be the equalizing platform of design and invention, within a free-choice environment, to engage with STEM in an authentic manner that was driven by the children's curiosity, passions and need to bring their ideas to life.

I should also share that my previously mentioned three-year-old, the recipient of the STEM-inspired female paper dolls, is my son. As we are hoping to help young girls integrate STEM into their careers and lives, and help them see a variety of pathways to building a relationship with science, we must also concern ourselves with our young boys seeing unlimited potential in girls and their capability to think scientifically, innovate technologically and shape the world through the power of STEM. All in the name of (girls and) science.