

WHITE PAPER

Women and Minorities in STEM Careers Advancing our World

by Celeste Baine

The Millennial generation or Generation Y, born between 1976-1995 or 1988-2001 depending on the source, are the most diverse generation in history and make up 26% of the population. This generation is less white and browner than any generation in our past. The size and diversity of this generation are important indicators of the demographics of our future workforce. However, to maintain a technologically dependent society, we need to recruit the Millennials into Science, Technology, Mathematics and Engineering (STEM) careers. Unfortunately, statistics show that young women and underrepresented minorities are not entering STEM careers. As a result, we are losing the battle for the hearts and minds of an critical segment of the population that can affect technological change and advancement.

Technological innovation is at its finest when the products and services created meet the needs to society. By promoting a healthy and diverse STEM workforce that better reflects the demographics of the population, we will be able to capture benefits such as an increased standard of living, new career opportunities, increased accessibility to programs and products, and economic prosperity. Advances in medicine, enhanced national security, environmentally sound resource management, and economic growth are all indicators of a healthy and diverse STEM workforce.

“Today’s U.S. economy depends more than ever on the talents of skilled, high-tech workers. To sustain America’s preeminence we must take drastic steps to change the way we develop our workforce. An increasingly large proportion of the workforce consists of women, underrepresented minorities, and persons with disabilities—groups not well represented in science, engineering, and

technology (SET) fields. Unless the SET labor market becomes more representative of the general U.S. workforce, the nation may likely face severe shortages in SET workers, such as those already seen in many computer-related occupations.”

-- Report of the Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development; National Science Foundation

The number of females and underrepresented minorities are low in both our college-level STEM degrees and in the national STEM workforce. According to the National Science Foundation (NSF), women make up 46% of the total workforce but hold only 24% of jobs in technical or STEM fields. African-Americans and Latinos each comprise 13% of the total workforce and only 3% of the technical workforce. It is imperative to our economy and national health that we find multiple avenues to increase interest in STEM careers and transform these worrisome statistics into numbers that better represent the population.

To be effective in promoting STEM to girls and underrepresented minorities, it's important to understand some of the reasons that they turn away from the field. Pop culture, family and education systems can all play a part. The most notable affectations are:

- Advertisements in technology magazines tend to portray men in more technical roles than women. Television often portrays everything technical as a male field. Shows such as *Dexter's Laboratory*, *Bill Nye the Science Guy* and *Beakman's World* all introduce STEM to girls as if males are intellectually superior. In *Dexter's Laboratory*, Dexter is often interrupted by his not so bright sister. *Bill Nye the Science Guy* and *Beakman's World* feature outdated, stereotypical men (with pocket-protectors and glasses who are seen as anti-social and nerdy) as the main characters. The women in the show are usually lab assistants or people who are learning from or looking up to the main character.
- Many girls and other underrepresented groups feel that STEM courses are only interesting to boys, don't align with their interests, are not relevant to their lives and therefore, they see no need to take them.
- Generally, the parents and educators in conservative minority cultures are less likely to encourage girls to enter STEM fields.

- Only 20% of all parents are expected to encourage their children to consider an engineering career. (*Harris Interactive, 2008*)
- The public at large is unaware of the future demand for STEM related careers. If a child grows up with a parent, aunt, uncle, friend, neighbor or other relative who is in a STEM field, they may have a good idea what is involved in STEM careers. However a large segment of society does not have those role models and may need further guidance.

The perceptions and reasons listed above are not a comprehensive list and not the only reasons that girls and underrepresented minorities shy away from STEM fields. The efforts to capture their interests need to be orchestrated as a national movement because only when we begin to work as a team and communicate a consistent message, will the results change. The need is so pressing that the U.S. government is also working on the task. The *Educate to Innovate Campaign* launched by President Obama in 2009 has three goals:

1. Increase STEM literacy,
2. Move American students from the middle of the pack to the top, and
3. Expand STEM education and career opportunities for underrepresented groups, including women and girls.

Fortunately, to turn the tables and help girls and underrepresented minorities be positioned for bright futures in STEM fields there are many effective strategies that can be employed. Student's attitudes about careers in science, math and engineering are often formed before the high school years so the majority of these ideas should be focused on elementary and middle school students.

- Promote and provide hands-on activities.
- Introduce role models or mentors that look like the students.
- Provide activities that involve teamwork and collaboration.
- Choose activities that encourage problem solving and have an application to the real world.
- Encourage students to attend STEM related summer camps.
- Allow girls to work on all-girl teams until they develop confidence in their problem-solving and spatial visualization skills.

- Communicate that girls make great scientists, technologists, mathematicians and engineers.
- Increase teacher and school counselor awareness of the STEM career opportunities that are available for girls and other underrepresented groups.
- Market STEM classes to both students and parents in a way that is inclusive of girls and other underrepresented groups. For example, create flyers in bright colors that show a diverse representation of students participating in your class or activity.
- Encourage participation by holding outreach and academic events, such as competitions and fairs.
- Tap into your local women's groups and other STEM related organizations for mentors, classroom visits, donations and judges at your competitions and events. Anyone that can share the fun of STEM careers is a good source.

Current ninth graders will be entering the workforce as college graduates in 2019. As the baby boomers retire in droves and our world becomes more technologically driven, new leaders and technical experts across all segments of our population must be ready to meet the demand. The students of today are bright, technologically savvy, and have the capability to become what we need. It is up to us as a society to nurture their interests, guide their exploration and expose them to the capacity they will have to shape the world. STEM careers are the brightest light of our future—not only for students but also for an enhanced standard of living and economic prosperity.

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