

How to attract more women into STEM careers

Getting more women into STEM careers will require a partnership among parents, educational institutions, government, industry, and organizations

Women have made substantial inroads into STEM (science, technology, engineering, and mathematics) fields and careers over the past few years, but there's still a long way to go. Further progress will obviously benefit the women involved, and it will also help address a worldwide need for more STEM professionals. But how do we achieve these goals?

To answer this question, the Automation Federation interviewed three female leaders in STEM education and advancement.



Naomi Climer is the President of The Institution for Engineering and Technology (IET, www.theiet.org), a non-profit organization with a mission to inspire, inform, and influence the global engineering community by supporting technology.



Teresa Helmlinger Ratcliff, Ph.D., PE, is the Interim Vice Provost of Outreach and Engagement, and the Executive Director of Industrial Extension Services at North Carolina State University (www.ncsu.edu), a leader in STEM education.



Peggie Ward Koon, Ph.D., is the 2015 Chair of the Automation Federation (www.automationfederation.org), the 2014 President of ISA (www.isa.org), and the CEO and Founder of Leading Change LLC, a management consulting firm.

Here are the opinions of these three leaders on how to get more women into STEM careers, and how to help them succeed once they are on board.

Sparking interest

The first step, all three leaders emphasize, is getting young women interested in STEM education and careers at an early age. "Schools do focus on subjects that are crucial to the foundations of engineering, such as math and science, but I think the link

between the core subjects and the exciting, creative, and diverse careers within engineering that may appeal to young women is made too late or not at all," says Climer. "This, in turn, could be a reason for the lack of girls considering a job in the industry.

"Companies need to showcase the work they do to spark STEM interest, such as hosting open days. At the end of July this year, the IET worked with venues and businesses across the UK to host an inaugural Engineering Open House Day. The idea was to give young people and their parents the opportunity to go behind the scenes to see what it's like to be an engineer," explains Climer. "Several high-profile organizations came on board in support of the day, and a number of young people and their parents attended the various organizations. They took part in a variety of activities, including behind-the-scenes tours, workshops, and talks from inspirational engineers. Parents and children were also able to ask questions about engineering careers, and find out more about the important role engineering plays at these venues."

Dr. Koon gives her take on the subject. "There are so many factors that determine a young person's (male or female) choices with regard to pursuing an interest in a specific area of education or a profession. There were four different influencers in my life: family (parents, siblings, etc.), school teachers and coaches, other role models, and industry. I believe that today, as in the past, young women need these four influencers actively working together to identify their STEM potential and interest, encourage them and help them to develop, and provide opportunities for their interest to grow," relates Dr. Koon.

Dr. Ratcliff has strong opinions regarding ways to promote STEM interest at an early age. "It's up to us to engage girls in STEM discovery early on, and keep them interested and confident in their abilities. If they are exposed to real, relevant and exciting applications of STEM early on—think coding or robotics—and have opportunities to explore those applications in an environment where it's safe to fail, they are more likely to solve problems by thinking, 'How can I approach this in a different way?' as opposed to, 'This is hard; I don't want to do it anymore.' They begin to utilize critical thinking skills that encourage creative solutions to practical problems in the same way STEM professionals ask questions and solve problems in the real world," concludes Dr. Ratcliff.

Once interest is sparked and kindled, the next step is getting schools to join in.

Getting educational institutions on board

Schools have come a long way since women were pushed into home ec classes, but further improvements are necessary. “Parents must be encouraged to become advocates in the school system for their young daughters who show interest in STEM education. Teachers must be trained to recognize interest and be advocates for inclusion of young women who show interest and/or potential in STEM fields. And industry must partner with schools, colleges, and universities to provide scholarships, internships, and other programs that help young women pursue STEM education and careers. Government has a role to play in this as well by providing incentives to schools that develop programs to promote STEM education for young women,” notes Dr. Koon.

As an employee of an educational institution, Dr. Ratcliff has some concrete suggestions on this issue. “Giving teachers opportunities to visit companies and connect with women in STEM careers can entirely change the way they teach and promote STEM material. Connecting educators and industry leaders to more innovative and relevant curricula throughout the K-12 pathway also generates opportunities for female students and teachers alike to be mentored by successful women working in STEM. It’s very powerful for female students to hear directly from women who have achieved academic and professional success in STEM fields,” says Dr. Ratcliff.

Climer shares her opinions on transitioning young women from STEM interest to pursuing educational opportunities. “It’s hard to know the right moment to pitch engineering to young people. There is such a wide variety of options available and engineering is intrinsic in everything you look at from fashion to power generation to biomedicine. There are also jobs that haven’t even been invented yet that will eventually be available to today’s young people,” observes Climer.

“And, while it is currently difficult to get a job in other sectors, engineering jobs are available and it is reasonable to assume this trend will continue given the global infrastructure projects taking place. In engineering, you get a better shot at employment than other types of careers. Schools have a role to play and need to do more to instill in girls the confidence to opt for science and math at A-level, and employers need to do more to make their approach to recruitment and retention more female friendly,” notes Climer. As Climer states, employers need to do their part, too.

Ensuring equal employment opportunities

Hiring women for STEM positions is just the first step to what should be long and fulfilling careers. “It is so easy to hire a

qualified young woman, put her on a STEM team, and check the box that says ‘I did my part by hiring a bright young woman to fill that STEM opening on my team.’ But making the hire is just the beginning. So often there are other issues related to corporate culture and team dynamics that must be addressed—issues that are sometimes overlooked or just plain ignored—and that surface after the hiring process,” says Dr. Koon.

“For example, a STEM team may be predominately male. Women who enter STEM professions may find themselves surrounded by senior-level men who have either never worked with a woman peer or have no desire to work with a woman as a peer. And, unfortunately, sometimes women who have finally been ‘accepted’ as a part of these teams may immediately view the ‘new girl’ as a threat and offer little or no help or support. Every team member must be educated so that they and management understand the importance of diversity and inclusion to the success of the entire team and the company,” observes Dr. Koon.

The IET is active in this area, explains Climer. “There are some best practices emerging to help companies retain and promote a more diverse group. These include measuring and reporting on diversity, training to recognize unconscious bias, and reviewing processes such as promotion to ensure there is no unconscious bias. The IET is currently working with a Trade Union (Prospect) to issue some best practice guidelines in this area.”

Dr. Ratcliff provides a wrap-up on how industry can help women succeed in STEM careers. “Companies need to see that retention initiatives are a long-term investment. Data shows that firms that promote women to senior management positions enjoy superior economic performance, especially if innovation is a key part of their business strategy. Yet, more than half of women working in STEM roles in the corporate world quit before they attain senior management roles, and many attribute leaving to low salary and lack of advancement opportunities. When women and men have the same degrees and the same level of experience, there is no logical reason for men to make more money and have better professional opportunities.”

Dr. Ratcliff believes the same objective methods used to maintain product quality can apply to personnel decisions. “In manufacturing, we standardize the work done on the factory floor to minimize error and deviation. The same should be done to develop criteria used for candidate selection, evaluation, and promotion. The unbiased results will bring about a more diverse workforce, further enabling recruitment and retention of talented women.”



The Automation Federation (www.automationfederation.org) is a global umbrella organization of sixteen (16) member organizations and seven working groups focused on advancing the science of automation technologies and developing the automation workforce of the future.



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