



Written Statement of

**Catherine Hill, Ph.D.
Director of Research
American Association of University Women (AAUW)**

**United States House of Representatives
Energy & Commerce Committee
Subcommittee on Commerce, Manufacturing, and Trade**

***Our Nation of Builders: Training the Builders of the Future*
November 15, 2013**

Chairman Terry, Ranking Member Schakowsky, and members of the Subcommittee, thank you for the opportunity to submit input about our nation's future workforce.

On behalf of the approximately 170,000 bipartisan members and supporters of the American Association of University Women (AAUW), I am pleased to share AAUW's perspectives on the challenges of expanding our nation's science, technology, engineering, and mathematics (STEM) workforce. AAUW's member-adopted Public Policy Program strongly supports "programs that break through barriers for women and girls in STEM."¹

The title of this hearing, "Our Nation of Builders: Training the Builders of the Future," is very apt. Building and manufacturing in the future will take a great deal of training as our country seeks to maintain our competitive edge. But to keep that edge we need to have all possible brainpower at our disposal. We need smart men, and smart women. But all too often, women aren't at the table, and they're not in the laboratory, on the manufacturing floor, or construction site. We need to change that.

AAUW believes that community colleges can play a critical role in moving women into these roles and ending the shortage of women in science, technology, engineering, and math fields. By engaging today's educators, we can better reach the builders of tomorrow.

In May 2013, AAUW released *Women in Community Colleges: Access to Success*, offering recommendations for policy and practice to promote women's access and success at community colleges. This testimony is based on this report, and we submit it as part of this testimony.

Women are nearly half of the total US workforce (48 percent) but less than a quarter (24 percent) of the STEM workforce (Beede, Julian, Langdon, McKittrick, Khan, & Doms, August 2011). Women made up a small fraction of many construction trades such as electricians (1.8 percent), automotive service technicians and mechanics (1.2 percent), electronic home entertainment equipment installers and repairers (10.7 percent) (BLS, 2012a).

Many of these STEM jobs are “middle-skill” jobs that require more than a high school education but less than a bachelor's degree and offer average earnings of \$35,000 (Carnevale, Jayasundera, & Hanson, 2012). There are 29 million middle skill jobs in the US today so the career and technical (CTE) system is very important to our workforce and economic growth (Carnevale, Jayasundera, & Hanson, 2012). But at least two major problems affect our ability to meet demand for middle skill STEM workers. First, employers report a mismatch between student preparation and the skills they need (Pathways to Prosperity, 2011); and two, very few women are being prepared to pursue these jobs although women are the majority of postsecondary students. Community colleges can provide a solution to both of these problems by doing more to help students prepare for in-demand jobs and by promoting the participation of women in nontraditional fields like technology and engineering to meet workforce needs.

Gender segregation in the workforce begins at school. In community colleges, women earn the majority of certificates and associate's degrees in personal and culinary services, education, and health care. In contrast, men dominate STEM and STEM-related occupational fields and are nearly three-quarters or more of occupational or CTE sub baccalaureate¹ students in computer and information services, engineering, manufacturing, construction, repair and transportation (USDOE, 2008).

Despite women's underrepresentation in STEM and STEM-related CTE fields at community colleges, research suggests that community colleges can be a good training ground for women interested in STEM and nontraditional fields. While not all community college students are academically underprepared, women who want to improve their math and science skills can do so at a community college at low cost. Additionally, women interested in careers that require a bachelor's degree also use community colleges as a path to a four-year degree. Among STEM students, women were more likely than men to attend a community college at some point on the path to a bachelor's or master's degree in STEM (Tsapagos, 2004). Despite the range of opportunities in STEM at community colleges, research also suggests that women face several barriers in taking advantage of these opportunities.

Women lack information about opportunities in nontraditional fields, including STEM.

Women are often unaware of opportunities in nontraditional fields, including STEM, early in their community college careers (Packard et al., 2010; Starobin & Laanan, 2008), but information plays a key role in recruiting women to technical fields (Mastracci, 2003). A survey by Women Employed Institute (2012), an advocate for women's economic advancement, found that women in low-wage jobs were more likely to consider IT as a possible career path after learning more about salaries, entry-level positions, and training opportunities in IT. But even after learning about opportunities in nontraditional fields including STEM, misconceptions about the nature of STEM work and career options remain a barrier. For example, women in the Women Employed survey thought that IT was too solitary a work environment and did not understand that IT jobs are available in many fields. Women were concerned about isolation and not having role models or support in fields with fewer women diminishing the likelihood of them committing to nontraditional or STEM fields.

¹ Sub baccalaureate refers to postsecondary degrees of less than four years usually awarded by a community college or technical school, including associate's degrees and certificates.

Women face gender stereotypes and bias in entering nontraditional fields.

Studies suggest that CTE programs can reinforce gender stereotypes. Some programs use assessment tests that have been found to be more accurate at predicting men's educational abilities and interests than those of women (Armstrong, 2000). For example, tests sometimes state that fields like welding and auto mechanics require that individuals are physically fit and able to lift heavy objects, so women are advised not to select these fields because it is presumed that they do not possess those characteristics (Lester, 2010). Stereotypes about women's ability in math also dissuade women from these fields. For instance, women who were anxious about taking higher level math courses reported their confidence grew as they persevered and improved (Starobin & Lannan, 2008). Encouragement and support from family, peers and faculty also play an important role (Reyes, 2011; Packard et al., 2010). Some women receive conflicting messages or a lack of emotional and financial support from their families who may not understand the demands of college work and/or who may be doubtful that the women have the academic skills to succeed in technical fields (Reyes, 2011; Starobin & Laanan, 2008).

The lack of familial support is often compounded by a lack of institutional support. For example, poor academic and financial aid counseling can delay transfer for community college students and increase overall cost. For example, if students take courses that are not accepted by the four-year schools, students may have to take additional coursework at the four-year institution which would increase the time to earn a bachelor's degree and increase their overall educational costs (Packard, Gagnon & Senas, 2011 Lester, 2010; Starobin, 2008).

The open door that is the hallmark of community colleges is only a first step. Full access goes beyond admission, providing women with access to all their educational options including nontraditional fields and STEM.

Increasing the number of women in nontraditional fields, including STEM

One of the primary reasons that women enroll in community colleges is to gain skills that will pay off in the job market. Women who are entering or re-entering the workforce are doing so out of economic necessity and want to earn wages that will adequately support themselves and their families. But women are still concentrated in relatively low-paying traditionally-female fields that leave them unprepared to compete for some of the fastest-growing and better-paying jobs in STEM and science and technical occupations.

Women often have limited experience in and awareness of nontraditional fields including STEM, are held back by stereotypical beliefs, and lack support to enter and persevere in these fields. Increasing outreach to women, improving advising services, and creating supportive learning environments can help to increase women's participation and success in STEM fields at community colleges.

AAUW makes the following recommendations for increasing the number of women who enroll and earn certificates and associate's degrees in nontraditional fields and transfer to four-year institutions to earn bachelor's degrees in STEM:

- **Recruit more women into nontraditional fields and STEM fields.** Many college departments assume that students will come to them, and don't reach out to potential

students who have not expressed interest. Increase outreach to and recruitment of women in nontraditional fields and STEM. Most women may not initially express an interest in a nontraditional or STEM field, but may be influenced by outreach and marketing that send the message that these fields are for men and women alike. Recruitment materials should also include information on job opportunities, earnings, and educational requirements for nontraditional and STEM fields.

- **Ensure that institutional practices such as academic and career advising do not reinforce stereotypes or promote discrimination of women.** Academic advisors are a key point of contact for students and academic advising promotes student success. Academic and career advisors (including faculty) can play a major role in increasing women's participation in fields where they are underrepresented. Academic advisors should be educated about occupational segregation, gender bias and the importance of promoting nontraditional careers to women and men.
- **Develop educational and career pathways to help students navigate STEM curriculum.** Program directors can map course and program requirements so students have a clear path to earning a degree and entering a career in STEM. Career pathway maps should also include examples of the kinds of jobs and wages students can expect depending on the degree they earn. Research suggests that this kind of information can help motivate students to persist until they achieve their goal.
- **Use creative instructional approaches like learning communities to support students.** Learning communities are where students take their math and science courses together in a cluster. The learning community facilitates relationships among students and between students and faculty and improves students' social and academic connections. Learning communities have been shown to improve student performance, especially in the first year of college and to promote student engagement and feelings of belonging (Scrivener & Cohan, 2011). Research suggests that learning communities are a promising intervention to foster women's success in STEM. Learning communities provide much needed peer support, create a sense of community, and help to promote feelings of belonging among students. Women who have support and feel like they belong in STEM fields are more likely to stay in these fields. Introductory courses that require little or no experience in technical fields are a good way to attract students and nurture their interest.
- **Expose women in nontraditional fields to role models and mentors.** Research suggests that women who persevere in nontraditional fields despite the barriers they face display resiliency. Successful women in nontraditional and STEM fields can serve as role models and mentors to female students, offer suggestions and strategies for success and reinforce the message that women can be successful in these fields.
- **Partner with local employers to connect students to available opportunities.** Students depend on their schools for information on what programs and credentials prepare them for various jobs and careers. Local employers can share information with community

colleges on the skills they need, job openings, and wage information, which community colleges can use to decide what programs and courses to offer and guide students.

- **Develop and implement transfer and articulation policies that link community colleges and four-year institutions in each state.** Articulation and transfer policies can be established by either states or by agreements between institutions. The goal of these policies is to improve coherence in curriculum and to facilitate the transfer of students across institutions, including the transfer of community college students to four-year institutions. For example, these policies often include rules about common course numbering across institutions, which makes it easier for students to transfer credit for courses completed from one institution to the next. State-level articulation policies that link two- and four-year institutions reduce the burden on individual students to navigate the transfer process. Research also suggests that community college students were more likely to earn a bachelor's degree in states with articulation policies that included common course numbering across two- and four-year institutions, the automatic transfer of associate's degrees, and common/statewide general education core requirements in contrast to community college students in states without similar policies.
- **Strengthen the gender equity provisions of the Perkins Act.** AAUW believes it is important that institutions and states be held accountable for both the participation and completion of women and girls in CTE programs and urges Congress to maintain the gender equity provisions of the Perkins Act (Perkins IV) when it is reauthorized to continue to promote the success of students in nontraditional fields. The gender equity provisions in the law require recipients of Perkins funds to recruit students into nontraditional programs and hold them accountable for participation and completion rates of students. This is the best way to ensure that institutions that receive Perkins funds have incentives to provide the full range of programming necessary to fight women's persistent under-representation in CTE programs, especially those fields that are nontraditional for their gender. These measures help to ensure that women have access to, participate in, and earn degrees in nontraditional fields in science and technology that help them be competitive in the workforce.
- **Collect better data.** Our current federal data source on higher education outcomes does not adequately serve community colleges. The Integrated Postsecondary Education Data System (IPEDS) has two specific shortcomings that prevent an accurate assessment of community college data: First, IPEDS reports graduation rates or completion rates only for full-time, first-time degree or certificate seeking students who begin in the fall. This excludes many community college students who may be well served by their institution but still had to stop-out or fit a nontraditional schedule during their time in higher education. Second, students who complete their associates degrees or certificates before transferring to a four-year institution are counted as graduates, but are not included as a transfer student in the IPEDS data. This obscures the true picture. How are policy-makers supposed to design good policies if they don't know what's going on?

Conclusion

Community colleges are a vital component of the US higher education system and are central to

building an educated workforce. Community colleges are also particularly important in providing access to higher education to millions of Americans, including many women. Without community colleges many fewer women, African Americans, Latinos, student-parents and low-income students would have the opportunity to pursue higher education. Maintaining this commitment to providing access while supporting student success requires that community colleges address the challenges facing their students. In particular, community colleges need to be more attuned to women's lives and educational needs.

Women will benefit most from a community college sector that is committed to providing access as well as supporting their success. However, so too will the country. When women have the resources, support, and tools to reach their fullest potential they are strong contributors not only to the economic well-being of their families but also to the sustained economic vibrancy of the country.

Thank you for this opportunity. We are pleased to be working with you on this critical issue.

¹ AAUW. (2013). *2013-2015 AAUW Public Policy Program*. Retrieved August 5, 2013, from www.aauw.org/resource/principles-and-priorities/