Addressing Gender Discrepancy in STEM

By Helen Gordon

"The lowest proportion of women is in the fields of informatics (10.4%) and technology (8.5%)" (The Gender Gap in STEM Fields, 2019). Women, it seems, have always been belittled and marginalized by men in every field, but when the future is in Science, Technology, Engineering, and Mathematics(STEM) where women are scarcely represented, there is a huge issue. When women make up 50% of the global population, but only 8.5% of the technology field, gender stereotypes,and barriers for women in STEM have to be dropped. I want to do everything I can to help as everyone should. The discrepancy of female to male representation is sadly high both historically and recently, but there are efforts to solve this issue, many of which are implemented in my school, Westchester Academy for International Studies.

Can you name a female scientist? "Between 1966 and 1977, over 5,000 drawings of scientists made by girls were collected. Only 28 (0.56%) of them depicted female scientists." (The Past, Present, and Future of Women in STEM, 2022). Women have been discriminated against it seems since the beginning of time. Women have fought for every right men seem to intrinsically think they deserve. Women fought for the right to vote(1919/1920), to own themselves, to make their own money, and then to get a fair chance at education and higher education. "In the 19th and early 20th centuries, in both the United States and the United Kingdom, the founding of womens' colleges provided for the first time a clear career path for women scientists. Although some women were able to practice as individual scientists, many benefited from what has been described as the "harem effect," in which male scientists employed groups of women assistants."(Women in Science). Women who did get jobs as professors or

researchers at universities in the science field were often forced to resign after they chose to get married, according to a study by the University of London Institute of Education. Women during World War II and the rest of the 20th century got to work in physics and technology, but it was scarce and the women who got to work in the field were called "calculators" or "computers". All these womens work was used for larger projects, like the infamous Manhattan Project, with at best little credit for their tireless efforts, but more often no credit and men ignoring their contributions.. Examples of this phenomenon can be seen in the popular movie *Hidden Figures*. After the first rendition of the "modern" computer women were some of the first people to truly work on these computers, but as the field began to be seen as more intellectual and prestigious, the women were soon replaced. Unfortunately, this stereotype of men being more intelligent and therefore destined to take jobs in the technological, mathematics, and physics fields has continued into the 21st century and still exists today.

Since 1977, "over 80 similar studies [on the gender of scientists drawn by young girls, previously mentioned] with more than 20,000 participants were conducted since then. And by 2016, a whopping 58% of scientists drawn by girls were females."(Past, Present, and Future of Women in STEM, 2022). Young girls are able to see more of themselves in science, but issues in the technology field still remain very present. For example, the Massachusetts Institute of Technology (MIT) has been dubbed the number one school for computer science, yet even the best schools do not have equal representation of women. Even with efforts, "MIT's Department of Electrical Engineering and Computer Science (EECS, "Course 6") has seen a steady increase in total female majors over the past six years. Since 2011 the proportion of female majors has increased from 30% to 38%"(Gender diversity across MIT, 2016), but they are still not at 50:50

ratio. Part of the problem and drive of the technology gender divide is that many people believe in the outdated and false stereotype that women are only suited to work in humanitarian fields, so the men can work in the math-related fields. This creates almost a cyclical bias sending women to humanitarian jobs, young girls seeing women in only humanitarian jobs, young girls becoming women and following them, believing that is where women should be, and setting a precedent that women belong in humanitarian jobs.

Sadly, cyclical bias is not the only problem. An article by Harvard Business Review states there are 5 main biases that push women out of STEM fields: constantly having to prove themselves, having to present as masculine, maternal life, feelings of competition toward other women, and isolation. Even when women get into their desired STEM field they have to prove themselves, again and again, to show their male counterparts that not only do they deserve to have the job, but are competent and worthy of being listened to. Furthermore, women have to walk the line of acting masculine enough to be competent and feminine enough to be likable. With this also comes the decisions of maternal life— sorrowly, other fields are not exempt from this effect but it is very prevalent in the STEM fields— where once a woman has a child her commitment and competence will constantly be questioned, as having a child makes you less able to work in the technology field and do math. If you are thinking that women are therefore making support networks you are unfortunately wrong. "About a fifth of the scientists surveyed reported 'I feel like I am competing with my female colleagues for the 'woman's spot'' "(The 5 Biases Pushing Women Out of STEM, 2015) women see each other as the competition or someone who has to go through the same difficulties they did in the field, making it very hard to create support networks. Finally, is the issue of isolation both by others and by the women

themselves. Many women, especially women of color, avoid being too social in order to, once again, maintain a look of competence. Others often exclude women of color to make them feel "not comfortable" as the only person of color there, but this only further isolates these individuals. What all these studies show is that women are rarely hired into STEM fields, and once there must do everything they can to maintain a role of competence and gain the respect of male counterparts often to the point of competing with other women or isolating from colleagues. Fortunately, there are thousands of groups and people making efforts for inclusivity.

One easy way to fix the gap in STEM fields is to treat young girls interested in STEM the same way society treats young boys interested in STEM. Terribly often, "girls who express an interest in STEM early on often lack encouragement to pursue these fields, while their male counterparts receive full support from teachers, parents, and other influencers" (Closing the Gender Gap Through STEM, 2016). Girls need to be encouraged and given many opportunities K-12 in STEM and specifically technology, because starting change off at a young age will let it bloom and grow into the collegiate and professional spheres. "Based on a survey of about 350,000 participants in 66 nations, this study concluded that explicit and implicit national gender-science stereotypes were weaker in countries with a higher female enrollment in tertiary science education. This study also demonstrated that stereotypes about science were strongly gendered, even in countries with high overall gender equity." (The Gender Gap in STEM Fields, 2019). The American Association of University Women (AAUW) states many small and large goals/steps that can make a huge impact in representation and inspiration to women in STEM to break these biases. The AAUW states the following steps: instill a mindset of confidence, prioritize from preschool through high school, encourage college women to major in the STEM

fields, focus on retaining women in STEM studies, and urge STEM employers to recruit, hire and promote women. Starting young girls in the STEM fields early on allows them to grow and find what they enjoy in the different STEM fields. With mentors, teachers, and parents instilling confidence in girls that STEM is for everyone gives them the advocacy to feel they can pursue STEM through their secondary, collegiate, and professional lives. We need to break the cycle and the idea that women should only be in humanitarian fields. Seeing role models like you in a desired field makes all the difference; this means both women, as well as women of color. We need to have opportunities for young girls, prioritize these opportunities, instill confidence in them that this is a valid field for them that they can flourish in just like their male counterparts, continue to encourage women in these fields in the college and professional fields, have women support each other, and make sure women are retained and hired in these fields. Luckily there are many groups aiming to help combat this issue some of which are National Girls Collaborative Project, National Math and Science Initiative, Women in Engineering Proactive Network, Million Women Mentors, American Association of University Women, Scientista, Association for Women in Science, Finding Ada, The White House Office of Science and Technology Policy/White House Council on Women and Girls, Association for Women in Science (AWIS), Girls Who Code, Society of Women Engineers (SWE), National Girls Collaborative Project (NGCP), and Organization for Women In Science for the Developing World (OWSD). Some organizations specifically for women of color in STEM are Black Girls Code and Latinas In STEM.

At my school there are people working to help make STEM opportunities open, known, and encouraged for non-male students. I sent out a survey to all the people in the technology

classes at my school. The results of the survey showed that 41% of the individuals in technology classes at my school identified as male. The other 59% identifies as either female, genderfluid, or non-binary. I am a female and am the president of my school's robotics team and 3 of the other 5 offers are non-male. The sponsors of my robotics club continue to encourage me and the other non-males on our team to reach for officer positions and be the major coders, builders, and engineers on our team. I am very thankful for their support, but too many do not get these opportunities and mentors. Last summer I participated in the Girls Who Code immersion program and I met a lot of other women in STEM. In one of the talks my group had, a member shared that they had once tried to join their predominantly male school robotics team and felt belittled and like she never got to do anything. I began to think if there were some people at my school who had similar apprehension or concerns or generally wanted to work more with code than with engineering; so I started my own Girls Who Code club at my school with my very supportive sponsor. Being able to share my love for programming with other girls at my school has been a great experience and if anyone has the opportunity they should always look to help those in the community and share their love for STEM.

Women should not have to earn their place in STEM when men have never had to, but they do. Although society is very slowly changing its views and there is a 10% increase in women in some companies and schools here and there, it does not mean the fight is over. Everyone should do whatever they can wherever because when the future is STEM, and there need to be women in STEM.

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