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Abstract

Computer Science offers graduates an avenue into the tech industry, one of the most lucrative fields in the United States (EEOC, 2016). Despite these incentives, women are enrolling in computer science related majors in decreasing rates, and are comparatively less likely to stay in these majors than their male counterparts (Google, 2014). Experts from various fields contend that the most effective way to both enroll and retain women in tech careers is to promote computer science at the middle and high school levels. Indeed, the problem of making the field more diverse and gender-egalitarian has invoked the attention of think tanks, universities, and the private sector. The goal of this paper is thus to promote computer science to young women within the Freehold Regional School District. There are three main ways to accomplish this. First is to establish a mentorship program between prospective middle-high school students and current college students. Second is to invite prominent women to speak about their experiences at middle and high schools. Third is to set up district-wide hackathons (one for middle school and one for high school) that encourage the development of coding skills, provide opportunities to network with the greater tech community, and give a general conception of the industry. All of these programs have the backing of various organizations (the costs are covered by sponsors), co-opt the existing infrastructure of established institutions, and have

already seen a 100% success rate when implemented in other locations.

Annotated Bibliography

Ashcraft, Catherine, Elizabeth K. Eger, and Michelle Friend. National Center for Women & Information Technology. (2012). *Girls in IT: The Facts*. Retrieved from <https://www.ncwit.org/sites/default/files/resources/girlsinit_thefacts_fullreport2012.pdf>.

This report, compiled by the National Center for Women & Information Technology, is one of the most recent and accurate metrics to evaluate the progress of women in computer science. It provides numerous statistics ranging over a 20-year span on the status of women in the tech industry.

Ellen Spertus. Massachusetts Institute of Technology. (c, 1991). *Why are There so Few Female Computer Scientists*? Retrieved from <ftp://publications.ai.mit.edu/ai-publications/pdf/AITR-1315.pdf>.

Ellen Spertus from MIT warrants why female participation in computer science and STEM fields is low. Understanding what deters and prevents women from entering the field provides valuable insight in how to improve both enrollment and retention.

Freehold Regional High School District. (2016). *FRHSD 2015 Annual Report to the Community*. Retrieved from <http://www.frhsd.com/cms/lib8/NJ01912687/Centricity/Domain/4/Annual%20Report%20FINAL.pdf>.

The Freehold Regional High School District presents an annual report on diversity,

demographics, college readiness, academic achievement, and fiscal policy for each of its individual high schools. This is important in gauging how much progress should be made in improving the gender gap at the high school level.

Gaudelli, William. Teacher Education Quarterly, (2006, Winter). *Convergence of Technology and Diversity: Experiences of Two Beginning Teachers in Web-Based Distance Learning for Global/Multicultural Education*. Retrieved from <http://files.eric.ed.gov/fulltext/EJ795200.pdf>.

William Gaudelli, associate professor of social studies education at the University of Central Florida, provides unique insight on different methods that most efficiently teach computer science and information technology to students in high school. This provides insight on the best methods for the mentorship program

Google. (2014, May 26). *Women Who Choose Computer Science— What Really Matters: The Critical Role of Encouragement and Exposure*. Retrieved from <http://static.googleusercontent.com/media/g.wxbit.com/en/us/edu/pdf/women- who-choose-what-really.pdf >.

Google, (one of the companies conducting groundbreaking research on diversity in tech), uses internal data alongside National Science Foundation reports to calculate the most effective way to involve young women in computer science and STEM from a young age. The report concludes that community events (such as hackathons) shape girls' perceptions about the tech industry, and are associated with large advances in enrollment at the post-secondary education level.

Lee, Nancy. Google. (2016, August 17). *Focusing on Diversity*. Retrieved from

<https://blog.google/topics/diversity/focusing-on-diversity30/>.

Nancy Lee, VP of People Operations at Google, compiles statistics from Google's EEO-1 Report to highlight how gender diversity in computer science has actually decreased in the past 20 years. She writes about possible solutions, and highlights certain Google-led programs to alleviate the problem.

Leslie, Sarah-Jane, et al. Women in Science 347.6219 (2015): 262-65. ScienceMag.org.

American Association for the Advancement of Science, (2015, Jan. 16). *Expectations of Brilliance Underlie Gender Distributions across Academic Disciplines*. Retrieved from <https://internal.psychology.illinois.edu/~acimpian/reprints/LeslieCimpianMeyerFreeland_2015_GenderGaps.pdf>.

Leading Princeton University psychologist, Sarah-Jane Leslie et al. conduct research into the low percentage of women entering STEM fields. The report was published in ScienceMag, and concludes that one of the most prominent causes preventing women from reaching STEM comes from societally based stereotypes during psychological development years. The report concludes that motivating young women to join STEM from the 6th-10th grade has one of the largest impacts on improving female retention within STEM fields such as computer science.

Major League Hacking. (2012). *The MLH Hackathon Organizer Guide*. Retrieved from <https://guide.mlh.io/>.

Major League Hacking (MLH) is an organization that provides resources for individuals to host and plan hackathons. Hackathons are 24-hour coding events that offer computer science students opportunities to build, learn, network, and explore the tech

community around them. This website provides extensive documentation and planning advice on how to start a hackathon at a middle and high school level.

National Center for Education Statistics. (2013, December). *Digest of Education Statistics: 2012*. Retrieved from <https://nces.ed.gov/programs/digest/d12/>.

The National Center for Education Statistics annual report compiles national data of K-12 and post-secondary education to provide an outlook on current and future trends in the educational sphere. It provides a conception of the work that needs to be done in order to improve retention at the high-school and post-secondary education levels.

U.S. Equal Employment Opportunity Commission, (2016, May). *Diversity In High Tech*. Retrieved from <https://www.eeoc.gov/eeoc/statistics/reports/hightech/upload/diversity-in-high-tech-report.pdf>.

This report from the Equal Employment Opportunity Commission (EEOC) provides an overview of the rapid service and labor growth within the tech industry, and highlights four key diversity problems that inhibit tech from realizing it's full potential.

Williams, Maxine. Facebook Newsroom. Facebook, (2016, July 14). *Facebook Diversity Update: Positive Hiring Trends Show Progress*. Retrieved from <http://newsroom.fb.com/news/2016/07/facebook-diversity-update-positive-hiring-trends-show-progress/>.

Maxine Williams, the Global Director of Diversity at Facebook, uses data from the company's EEO-1 Report to break down and display gender demographics at Facebook.

Yellin, Tal, and Rob Hanley. Cable News Network, CNNMoney (2010). *How Diverse Is Silicon*

Valley? Retrieved from <http://money.cnn.com/interactive/technology/tech-diversity-data/>.

Using information obtained by filing Freedom of Information Act requests with the Department of Labor, this CNN Money interactive graphic organizes gender and race data from five large tech firms; Cisco, Dell, eBay, Ingram Micro, and Intel.