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# The Lack of Women in Technology: The Role Culture and Sexism Play

Paul B. Hanton

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THE LACK OF WOMEN IN TECHNOLOGY: THE ROLE CULTURE AND SEXISM PLAY

A Master's Thesis

Submitted to the Faculty

of

American Military University

by

Paul B Hanton

In Partial Fulfillment of the

Requirements for the Degree

of

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Charles Town, WV

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ABSTRACT OF THE THESIS

THE LACK OF WOMEN IN TECHNOLOGY: THE ROLE CULTURE AND SEXISM PLAY

by

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American Military University, June 2015

Charles Town, West Virginia

Dr. Novadean Watson-Stone, Thesis Professor

The technology industry is huge and will only grow as the world's reliance on technology expands at an ever increasing rate. This ends up generating a large amount of profit along with a large number of jobs that need to be filled by qualified individuals. It is no secret that right now women are vastly underrepresented in the technology industry with no concrete explanation why. Some common theories are that women are not naturally good or interested in technology, the education system is failing young women, or there are not enough role models. This paper seeks another explanation that it is the technology culture and sexism that keeps women out of technology, or subtly forces them out. This study uses qualitative analysis and looks at two case studies which highlight the type of culture in the technology industry that keeps women out. The case studies, and the accompanying figures, show that in the short term, the culture needs to change in before more women will go into the technology industry. At the end of the paper,

some recommendations for future research are given along with some recommendations on how to address the issue of the lack of women in technology.

*Keywords:* technology, women, sexism, STEM, inequality, gender, culture

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# The Lack of Women in Technology: The Role Culture and Sexism Play

## **Introduction**

Information Technology (IT) is a huge industry, spanning the globe. Many of the largest corporations in the world deal with IT, such as Microsoft, Facebook, Google, and Apple. These companies generate massive amounts of revenue and jobs, and the industry is showing no signs of slowing down. In fact, the IT industry as a whole has grown 83.27% over the last five years (Fidelity, 2015). On Career Builder, a popular job search website, there were 24,847 IT related jobs posted in the last seven days alone (Career Builder, 2015). For software developers alone, there were over one million jobs available for 2012 (Bureau of Labor Statistics, 2013).

Information Technology is a very attractive industry to enter and work in so it would only make sense that the split among men and women would be equal, especially since women make up 57% of the workforce (Department for Professional Employees, 2014). Yet, that is not the case. In 2014, the amount of women in technology actually declined from 28.8% to 26.1% (Department for Professional Employees, 2014). Even more worrisome is that fact that in 1985, women were awarded 37% of the computer science degrees, which then fell to 18% in 2010 (Kasson, 2013).

## **Problem Statement**

What is happening that causes women to stay away from the IT industry despite the large amount of jobs and industry growth? There are a couple of major theories, but so far, none has been able to address this issue. Due to the amount of women that are graduating with degrees, there should be some amount of parity in the technology industry when it comes to jobs. Add in the fact that women CS majors are actually declining, it is clear that there is an issue that is not getting any better despite considerable research in this area. In fact, there is research in this area

which dates back to 1996 where Silverman and Pritchard (1996) researched why girls were not as interested in math and science as boys were in Connecticut.

### **Purpose Statement**

The purpose of this thesis is to identify the reason why there are so few women who work in the technology industry from a cultural and societal perspective. Previous research into the area focused on education or biological differences which does not address the whole issue. The end state of this research is to fill gaps in knowledge in this area while attempting to answer the questions of why there are so few women in technology. For the purpose of this study, the terms “technology” and “information technology” will be interchangeable.

### **Research Questions**

The study seeks to address the following research questions:

1. Does the technology culture affect the amount of women who seek jobs in the technology industry?
2. Is there sexism in the technology industry that keeps women out?
3. Is the technology industry culture pushing women out?

### **Significance of the Study**

This study will add knowledge in this area of research and intends to address the issue of the lack of women in technology. This is a rapidly growing field and many organizations are looking to hire women yet cannot find many qualified applicants. Not only does this hurt the company as it shrinks their pool of qualified candidates, but it hurts women as well because it disqualifies them from a potential great career. Also, previous research in this area has not made

any lasting impact on the lack of women in technology. One of the outputs from this thesis will be recommendations on how to get more women in the technology industry.

### **Theoretical Framework**

One of the theories as to why there is a lack of women in technology is that there are differences in the way men and women think, making one better at technology related elements than the other. While this theory is popular, it does address why at a young women seem interested in technology in school, then drop out once they reach high school. This leads to another theory which is that education is causing women to not be interested in technology. Education does play a huge role and can shape the perceptions of kids in school. However, with more women than men receiving bachelor's degrees, the likelihood that education is keeping women from technology is not likely.

The lack of women in technology cannot be explained alone by the theories mentioned above. One of the huge gaps in this area of research is the role sexism and culture play. There are several factors to look at in this research.

- Sexism in the technology industry.
- Sexism in education.
- The perceptions of people who work in technology.
- Cultural biases such as different jobs for men and women.
- The fact that women at a young age show an interest in technology then stop once they reach middle school.
- The culture of the technology industry
- Women in technology around the world.

The research will look at why there is a lack of women in technology from a cultural and sexism perspective. The theory is that culture and sexism is the reason for the lack of women in technology which leads to many different questions. If sexism and culture are to blame for the lack of women in technology, then what about other countries? What specifically about culture and sexism causes women to stay away from the technology industry. Ultimately, this last question is the most important, as it would significantly help improve the number of women in technology.

### **Definitions of Unclear Terms**

- Culture: The specific beliefs and customs of a society.
- Sexism: Discriminating treatment because of someone's sex.
- Society: People living in the same area with the same laws, traditions, and values.

### **Limitations**

- The information and data here were taken from other research and studies.
- No new information collection was done for this research.

### **Assumptions**

- Current rate of women in technology will not increase.

### **Structure of the Thesis**

This thesis will begin with a literature review of past and current research in regards to the subject matter including the role education plays in getting women interested in technology, and differences in how men and women process information. Following that, the discussion section will describe the role culture plays in the lack of women in technology using two case

studies and figures. The thesis will conclude with an implications, discussion, and a recommendations section.

## **Literature Review**

### **Introduction**

The literature review will begin with a brief historical section that describes older research on the topic with some going back more than 23 years. This will give some background on where older research focused its efforts and identify commonalities with current research. The next section will be about one of the major theories in the area, that men are innately better at technological related tasks than women. After that, the section will discuss how perceptions of the technology industry contribute to the lack of women in technology. Next, the importance of role models for young women interested in technology will be discussed, as role models are known to have a positive impact. The next section will discuss how education plays a role in dealing with the lack of women in technology as research shows that young women do display in interest in technology at a young age which tapers off as they approach college. The second to last section discusses the technology culture and how negative stereotypes cause women to be turned away from the industry. The last section describes the relationship between women and technology in other countries, societies, and cultures. If western culture is the cause for the lack of women in technology, then other cultures should show some differences.

### **Historical Research**

The purpose of this section is to highlight previous research that is relevant to the discussion. Looking at past research is important in any study and some of the research mentioned goes back 23 years ago, and it is astonishing how little progress has been made since then. One of the common themes throughout the literature review will be how much of the

research seems to coincide with one another, or simply replicated with some minor changes in variables. In a couple of instances, researchers went and did follow up studies to their own original research.

**Past research.** Research into the lack of women in technology has been an ongoing endeavor as research from the 1990s shows. Even today, no one has yet to fully understand why or what to do about it. Many of the early research focused on the classroom and how it impacted girls' ability to learn. The American Association of University Women (AAUW) (1992) researched the ways the classroom was failing girls and found that there were significant differences between how boys and girls were treated. The paper was published in 1992 and still has some relevance today, 23 years later in regards to technology and education. In particular, they researched how girls were performing in the math and science disciplines. What they found was alarming, as they noted that the gender gap was widening (AAUW, 1992). They also noted that girls saw math and science as the boys domain and the vast majority of girls who take math and science classes do not go on to major in their respective college degrees. Furthermore, sexist attitudes and low confidence among the girls was a huge deterrent for girls pursuing math and science classes.

Another older study that focused on education for girls was a two phase study by Silverman and Pritchard (1996) which analyzed two areas in education, specifically in Connecticut. The first phase focused on middle school girls taking education classes which were mandatory and exploring their attitudes towards technology classes. The second phase of the study focused on high school girls and their reluctance toward taking technology classes. The two phases build on one another, with the first phase focusing on middle school attitudes and the second phase focusing on high school attitudes. Similar to the AAUW study, the researchers in

this study found that middle school girls showed just as much interest in technology classes as boys, which again, tapered off in high school.

Silverman and Pritchard (1996) briefly touch on the differences between boys and girls and how they learn about technology. Specifically, they describe how girls preferred building and decorating houses, compared to boys who preferred to build bridges. What the researchers did not get into were differences in intelligence between men and women. However, there was an early study done by Halpern (1997) which discusses the differences in intelligence between men and women along with what that would mean for schools.

Concurrent with multiple other studies conducted during the time, Halpern found that no sex was purely smarter than the other. Rather males and females each excelled at different tasks. Females excelled at tasks that require access to long term memory, fine motor skills, and reading comprehension of complex text. Males, on the other hand, excelled at tasks that required the working memory and abstract reasoning, especially in math and science. As this study was not specifically focused on men and women in technology, there is no mention anywhere on what sex would be superior. However, it could be extrapolated that men would be superior at technology based on them doing better at abstraction in math and science than women. Working in technology does not require a narrow set of skills as the technology field is very diverse and encompasses many different sectors. For example, there are technology educators which require a different set of skills than a programmer. It would be nearly impossible for a study to pin down what exactly is required as a skillset to work in technology.

One of the most relevant items to this research coming out of these early studies is one conducted by Haynie (1999) that researched a couple of novel ideas. The first was to collect data

on how technology educators perceive the learning environment for boys and girls, and the second was to attempt to monitor the cultural climate. This research runs in direct parallel to this paper and the researcher specifically mentions that more research will be required to evaluate how the culture climate will change over the years.

One interesting comment from the study was from a conservative technology educator. In the survey she was given, there was space provided for write in comments. The comment she wrote stated “The type of personality of women encountered in a male dominated area usually provides for an easier mix of attitudes and does not allow for slurs to be seen in every action” (Haynie, 1999, para. 21). This view can even be seen today, with society deeming certain fields to be the domains of men. The only women that would work in those fields would have to be of a certain type, and vice versa for men who work in “women’s fields”. If only a certain type of women would be interested in technology, then that could explain why there are so few who work in technology. However, this view does not take into account that there are some men who show no interest in technology, raising the question if there is a certain type of *individual* who is more interested in technology, rather than predicated on a specific gender.

In older studies such as this one, the idea of a “man’s domain” in relation to technology is frequently mentioned. When it comes to education, this was often the root cause that was explored for why girls were not as interested in technology classes as their male counterparts. Zuga (1999) explores this idea in an early study citing some feminist theory as part of the solution. In her paper she cites many examples of how science has always had a male dominated view, from using man as the default, or when we say “Mother Nature”, something that needs to be controlled. Despite the many equality advances, these same thoughts are present even today, with occupations still separated into men and women’s domains. For example, nurses and

interior designers are seen as women's jobs while construction workers or law enforcement are seen as men's jobs.

### **Biological Differences Between Men and Women**

According to Worstall (2012) the reason why there are so few women in information technology is "that on average men and women are different". The research and literature into the differences in the way men and women, think and interact with the world is huge and could warrant its own paper. However, this paper is strictly focused on the perceived differences from a technology standpoint, both in learning and using technology. The biological differences views are prevalent even today as highlighted by the comments of chess grandmaster Nigel Short who stated that the reason why men were better at chess than women were because of differences in sex (Merlan, 2015). In short, while biological difference, an area that is well researched, may be a reason for the lack of women in technology, it is definitely not the only answer.

**Differences in intelligence.** Numerous studies have attempted to answer this question, and for a good reason. This topic is highly controversial, right along with race differences in intelligence. Yet, many studies have attempted to answer the overall question, yet dodge answering the same question at the end of their papers. Halpern and LaMay (2000) attempt just this in their paper yet at the end, their conclusion is that the real issue is finding out to make sure that all students are able to reach their full potential. From the standpoint of the topic of this research, it is a hard pill to swallow that these perceived differences are the cause of the research problem. However, this area must be fully explored as some researchers have found that men and women excel at different tasks, yet show no major differences in intelligence. Finding differences in intelligence or, that one sex is better at certain tasks than others, has ramifications in the education sector as well.

In 2007, Sewell performed a study to measure the differences in intelligence between men and women and found that there was no major difference between them. After pouring through numerous studies on the subject and obtaining their reported average IQ scores, he averaged those same IQ scores together and found that men only scored two points higher on average than women (Sewell, 2007).

Another researcher found that on average men have a higher IQ by 3.8 points. (Nyborg, 2005). However this study as well refutes the claim that this means men are more intelligent than women. In addition, the researchers attempted to answer this question in the intelligence differences by hypothesizing that the larger male brain leads to higher intelligence and why men dominate and are at the top in politics and almost everything else (Nyborg, 2005).

**Not interested in technology.** Another common biological related argument as to why there are so few women in technology is that they are just not as interested in it as men are. Arguments in this category usually say that women are just not as naturally interested in technology as men, while men are biologically predisposed to be interested in technology.

These types of views may have been accurate years ago, but no longer hold true. As Fidelman (2012) points out, in the past young women would not choose a technology career because “they think it’s not interesting”. This is a flawed reason as to why there are so few women in technology. According to Corbet, Hill, and Rose (2010), the rates of women getting computer science (CS) degrees is actually falling since 1980. This shows that in a 30 year period, something other than a lack of interest caused a decline in women CS majors. Instead, the lack of interest is related to how young women see technology careers, with their lack of interest coming from somewhere else, rather than biological differences. That somewhere else is culture, which

passively dictates what young women should be interested in. This in turn, leads to warped perceptions of the industry, leading to young women not wanting to be in the industry.

### **Perceptions in the Technology Industry**

Perception is reality, and the perception of the technology field continues to be negative. In early 2015, Newsweek ran an article titled "What Silicon Valley Thinks of Women", and the message it portrayed painted the information technology sector as sexist and misogynist (Burleigh, 2015). This perception of the industry dates back and according to other research like Zuga's (1999) who found the industry to be unwelcoming of women. While things may seem to be getting better, little has changed since then. In addition to the field being seen in a negative light, the technology sector often is seen by society as "nerdy", which many young women and men do not want to be associated with. These perceptions, both the cultural ones and the negative ones, present a huge barrier to girls and women who are interested in technology.

**Outside negative perceptions.** Ballard, Scales, and Edwards (2006) further explored the way perceptions influence women's desire to pursue an information technology (IT) job. The study used a questionnaire to assess the attitudes and perceptions of women who did not work in IT, but were looking to transition careers. Often times in the discussions to get more women into IT, the focus is on the girls and women still in school, rather than those that are graduated or already in the workforce. Women not working in IT deserve a spot in this discussion as some may be willing to transfer to IT related jobs if given the opportunity. The fact that they do not want to or are reluctant to do so, could shed additional light on the overarching problem and solution.

In their research, Ballard et al (2006) found that the required training, long hours, and perception that IT was better suited to men did not dissuade the participants from wanting to transition over to an IT related job. Rather it was the “working in a male-dominated environment” that was the most concerning out of all the questions on their questionnaire (p. 7). Of note is that the participants had no prior experience working in IT but had some experience with technology in their daily lives. The fact that true outsiders had potential issues with working in a male dominated field is telling. The researchers end with suggestions on how to market IT specifically toward women, noting that women perceive IT in a more creative light than men do. This touches on the perceived inherent differences between men and women, however, not that men are better at technology than women.

These perceptions display themselves in education as shown in a study by Mitts (2008) shows. Boys and girls in high school and middle school showed different preferences in activities with males displaying a preference for creating items and girls displaying a preference for tasks with a social function. However, the researcher does note that this is largely due to the societal constructs of Western culture that promotes differences based on genders. This can be seen in the emphasis on which students elect to attend home economics and industrial arts. For some time, industrial arts was for boys and home economics was for girls. Furthermore, the researcher proposed that in order to get and retain girls in technology courses, educators should seek to tailor the classes based on gender, a suggestion echoed by Ballard et al (2006).

**Internal perceptions.** On top of outside influence and perception about technology being a hindrance, there is also the internal perception girls face about themselves and their capabilities. Wender (2004) describes how self-efficacy keeps women from technology jobs as women feel that they are not as capable of being successful in the field. Wender (2004) describes

self-efficacy as “the beliefs in one’s personal capabilities to organize and execute the courses of action required to manage prospective situations” (p. 45). It is obvious how this can affect a person’s ability to perform a task or their interest in even beginning the task as Figure 2.1 shows. A person with low confidence in their abilities will negatively impact their interests, leading to negatively viewing a field. This can lead to a self-fulfilling prophecy where a girl could not be confident in her ability in technology, thereby leading her to stay away from technology. This is detrimental as gaining confidence in a field is a great way to overcome low confidence about a particular subject.

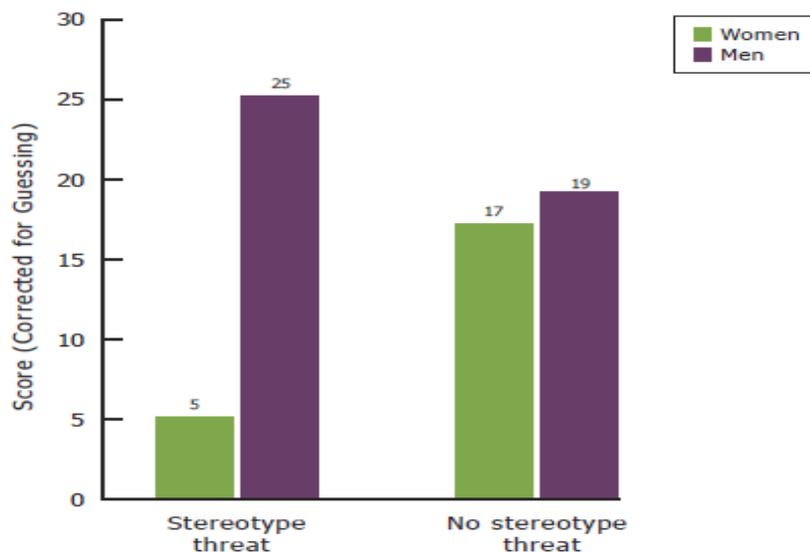


Figure 2.1: How negative stereotypes affect girls.

Note: From *Why so few? Women in science, technology, engineering, and mathematics*, Corbett, Hill, Rose, 2010.

The causes as to why women may be less confident in technology than men warrants further exploration as it could be a cause as to why there are less women in technology than men. How people perceive themselves is powerful and can be a positive influence or a negative one? These perceptions are tied to the stereotypes of the technology industry, that men are better at the required tasks than women. Dweck (2006) conducted a study on how fifth grade girls perceive

themselves at math which can cause them to score lower on tests than their male peers. Furthermore, he found that those who viewed math as something that you had to get better at, rather an innate ability, performed better when confronted with a difficult problem. He also replicated his study at the college level at a pre-med course and found the same thing. In addition, those who viewed their “gifts” as something to develop outscored their male peers.

**Negative stereotypes.** The definition of a stereotype is in this case being “a fixed, over generalized belief about a particular group or class of people” (McLeod, 2008). The idea that men are better at technology than women definitely fits this description. This stereotype is surprisingly prevalent and difficult to eradicate. Kawamoto (2013) wrote an article about the stereotypes and biases women face in technology fields finding that if a man and a woman had the exact same resume, the man’s resume will be judged less harshly than the woman’s.

Another stereotype that is somewhat prevalent in the technology sector is that IT is seen as “nerdy”. Hall (2013) interviewed a prominent women CIO who said this was a barrier to girls pursuing courses in IT along with societal pressure not to pursue STEM. This view that IT is nerdy is also seen by men and not constrained to just women. Heath (2012) agrees and states that the stereotype “seems to be putting young people off entering the industry”. The origin of the stereotype of the IT nerd is hard to pin down, but what that looks like is easy to picture due to the portrayal in popular culture. Usually the IT nerd is a white guy, with glasses, socially inept, and surrounded by technology; all of which is viewed negatively by both girls and boys. Breaking this stereotype, while difficult, will lead to more women becoming interested in technology, which leads to more women in technology careers.

## **Role-Models**

With the lack of women in technology comes an issue of which is there are not enough role models for young women to emulate in technology. Many of the great technology minds in recent history have been men, with very few, if any women. For example, Steve Jobs, Jeff Bezos, and Mark Zuckerberg. Along with this is that fact that young men are more encouraged to pursue technology and engineering careers than young women. Weber (2012) found that 57.5% of young men were encouraged to pursue technology compared to 48.8% of females.

The amount of women in technology for girls and young women to look up to is very scarce. Casey (2013) wrote an article on Information Week on “10 IT Leaders To Follow On Twitter”. Out of the ten he recommends to follow, only two are women. This could be because of the subjective nature of the article, but the trend is displayed elsewhere as well. Bio (2015) has an article on the “Modern Titans of Tech” and unsurprisingly, there are very few women on the list. The list is comprised of “the most famous modern titans of tech” and there are some big names such as Michael Dell, Larry Page, and Bill Gates (Bio, 2015). However, out of the 19 “titans”, only three are women: Marissa Mayer, Sheryl Sandberg, and Meg Whitman.

**The effect of role models.** Why are role models so important? Aristotle believed that role models act as a pattern for our morals, and we learn by observing our role models. Whether what we learn is good or bad, was all dependent on who we model after. Lee (1996) best states the effect role models have by stating:

They put to rest insecurities about a group’s potential to succeed in American society, and they actively lead its members to the fulfillment of that potential. Without a role model, a dissatisfied group’s breadth of vision is severed, obliterating its brightest and

highest point. The possibilities are no longer endless but severely constrained.

Conversely, a community with no need for a role model is secure with itself. It needs no symbol to look up to as a realization of its goals, for the group itself has already achieved them. There is no demand for a role model, and hence there is none.

The technology community desperately needs more women role models as women have not yet achieved any traction in the technology industry. The issue is a vicious cycle, as the lack of women role models means less women enter into the technology workforce, leading to a lack of role models. Compare that to men, who have achieved their “goals” in the technology industry, and thus see no demand for any more role models in technology.

**The lack of role models.** Huhman (2012) agrees that there is a lack of women role models in technology stating “there aren’t more women computer scientists is because there aren’t more women computer scientists”. The lack of women role models begins in the education sector where at colleges, there is a significant lack of women educators in the STEM fields. This is particularly bad in physics, where nationally, only 14% of physics educators are women. The lack of role models starts with major IT companies as they are often at the forefront of dictating what the industry should be doing, for better or worse. In this case, the stats mirror the grim reality that major IT companies know they should hire more women, but until recently, have not made any efforts to. In fact, Google’s workforce is 79% male and the other major companies do not fare any better with “Yahoo, who employs 37% women, Facebook, which is 31%, and LinkedIn, which employs 39%” (Gilpin, 2014). However, while most companies do want to hire more women in technology, the issue that they are running into are the lack of qualified women applicants. If there are few women applicants for technology jobs, then this will only be reflected in the amount of women who work in technology.

Seeing is believing! A common thread that runs throughout this literature review is the perception that women are not as good at technology as men. This perception comes from women themselves internally and their own biases, and externally as well from society. One way to combat this perception is to show that women can be successful in technology careers. This can only happen if there are more women in technology, which is another common thread throughout this paper; the circular issue of not enough women in technology. Having more role models in the industry also increases the amount of mentors available for those women that may be struggling in the industry. Bertagnoli (2014) interviewed a prominent startup female CEO about her experience in the industry and what role mentors play. The CEO told the author a story of how she was getting burnt out when a female mentor gave her advice which helped her pull through. She credits that mentor with the reason she is still in the technology industry.

### **The Role Education Plays**

Education also plays an important role when it comes to the discussion of women in technology. One of the reasons is that women are enrolling in college at greater rates than men. According to the Bureau of Labor Statistics (2014) 72.7% of young women were enrolling in college compared to 64% for young men. In addition, while women who graduate outnumber men who graduate, out of all the STEM fields, women only earn 20 percent of the degrees. This section seeks to explore some of the research into technology education as some studies attempt to explain the lack of women STEM graduates. The focus on technology education stems from the fact that some researchers see education as the main cause for why there are so few women in technology. Some common areas of focus are on how boys and girls have different interests, combating negative stereotypes about technology, and girls' waning interest in technology as they progress through school. Wolfson (2014) agrees stating that she was not interested in math

or science in school and instead was more interested in the social sciences and English, despite currently working in technology and liking what she does.

Many of the older studies in this area are still related to the discussion being had today, about the lack of women in technology and the role education plays. The oldest study cited, from 1992, also pointed out the frequently mentioned “man’s domain”, those areas where women do not feel welcomed. More recent research into the role education plays in this discussion mentions many of the same issues. Technology educators have the added challenges of combating the stereotypes about women and technology with the differences in how boys and girls learn, and their differing interests.

**Differences in learning styles.** There have been numerous studies on how students learn differently. For example, kinesthetic learners tend to learn better by being actively engaged rather than passively such as reading a book. Linguistic learners prefer words, either spoken or written. Just as students have different ways of learning, so to do the genders in some ways. Baker and Scantlebury (1995) found that girls were more interested in activities of a social and verbal nature, while boys were more interested in manipulation of objects and building things. These differences in interest are often stereotypical and reflected in the world around us. From a young age boys and girls are given different toys to play with as the toys for boys are items such as action figures or sports equipment, items geared toward being active and moving. Meanwhile, girls are given dolls, something that encourages social interaction. Because of these differences, the way we educate girls and boys in technology should be reflected as well. This can be difficult as men tend to dominate the technology world at all levels, from early education to Chief Information Officers.

In another similar study, Weber and Custer (2005) also found differences in how boys and girls tend to learn about technology. In their study they gave a survey to middle school and high school students of both genders with questions relating to their preferences for how they wanted to learn. An example would be by writing a paper, or building a presentation. They found that girls were “more interested in design-oriented activities” while boys were more interested in hands on or making things (Weber & Custer, 2005, p. 69). Even though the focus of this research is on getting more women into technology, the findings of this study hold implications for all students regardless of genders. The same way that we can apply the findings to making technology education interesting for girls, the same findings can be applied to boys.

**Differences in interests.** Weber (2012) conducted a later study along the same lines that sought to further evaluate the differences in “Interest, Perceived Personal Capacity, and Participation” between boys and girls (p. 18). The study posits that all three must exist for a student to be successful, which may explain why there are so fewer women than men that pursue technology courses. The researcher found a strong correlation between the young men and women who scored high on the interest, personal capacity, and participation portion, and a desire to pursue an engineering or technology career. Like other studies, the researcher found a difference in the types of activities that girls and boys are interested in. One of the findings that mirrored others was that boys were more engaged when doing a hand on activity such as working on computers (Weber, 2012). The article expounds on this and explains that from an early age, young men are more exposed to technology and engineering activities than young women are, which is reflected in the gendered toys.

**Shifting attitudes.** Another reoccurring theme in researching this topic is looking at how attitudes towards technology seem to shift as girls transition into high school and beyond. Compared to boys, who seemingly stay consistent throughout their time in school. Mitts (2008), described the problem as that young women are simply not choosing engineering compared to young men. Figure 2.2 shows that college men are choosing STEM majors at a greater percentage than women in 2006.

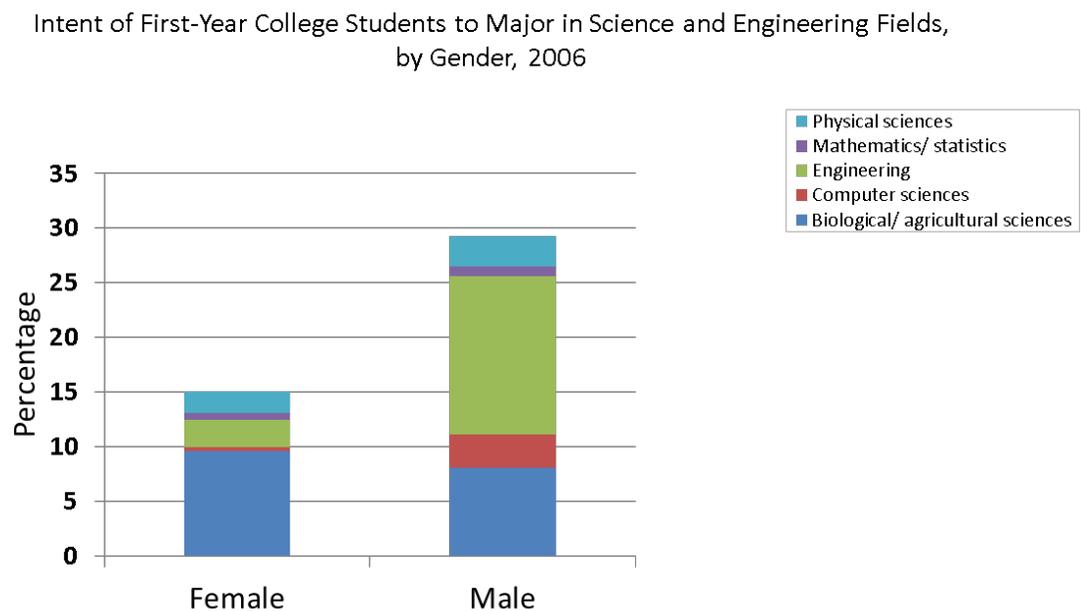


Figure 2.2: First year STEM majors by gender, 2006.

Note: From *Why so few? Women in science, technology, engineering, and mathematics*, Corbett, Hill, Rose, 2010.

The American Association of University Women (AAUW) conducted a comprehensive study on the lack of women in technology and included in it were some surprising research points. The first is that the rate of women that are interested in technology starts to decline once they get to college, and further declines as they enter graduate school (Corbet, Hill, & Rose, 2010). This does not hold true for men, whose rates and retention in technology courses remain steady throughout their time in school. This loss of retention is a relatively recent phenomenon,

as women computer science majors were at 36% in 1980 (Corbet, Hill, & Rose, 2010).

Unfortunately, that number dropped to 18% in 2013. (AAUW, 2015). The retention rates for women once they have careers in the technology industry are not any better as “56% of women in technology leave their employers midcareer” (Gilpin, 2014).

The reasons for the loss of women in technology at the college level is multifaceted, but some of it can be tied to earlier sections of the literature review. Negative stereotypes of the industry, a lack of role models, and a lack of confidence. These factors become increasingly important as Corbet et al (2010) found that young women obtain the skills needed to be successful in STEM courses from high school yet choose not to pursue any STEM courses. Their recommendation is to implement a culture change at universities, one that provides encouragement for women to consider STEM courses.

### **The Technology Industry Culture**

Currently, the IT industry is dominated by men, a point made repeatedly throughout this paper. Strong (2015) attended the Consumer Electronics Show (CES) 2015 in beginning January 2015 and noted that there were very few women presenters, only three out of the 22. CES is a large IT conference that focuses on consumer electronics and consumer technologies. The industry is said to worth \$223.2 billion (Strong, 2015). Despite the size of the industry, only one organization addressed the gender gap during the conference, Intel, who pledged \$300 million toward promoting diversity. Strong, also states that no one seemed surprised by the gender gap, or willing to take major steps to solve the issue, and is also worried that it meant something worse in that people were getting comfy with the male dominated industry and unwilling to change the status quo.

**Research on the IT culture.** Haynie (2003) conducted a follow up study to his earlier research “Cross-gender interaction in technology education: A survey” (Haynie, 1999). In that study he attempted to find out what men and women thought about the technology industry culture. His more recent research attempted to follow up on that study with another by using a “Quasi Ethnographic Interview Approach” to obtain data (Haynie, 2003, 22). This approach uses an interview of a subject, taking into account their demographics, and included questions from the original 1999 research. This approach also takes into account the perspectives of the researcher, and ultimately leaves the reader to draw their own conclusions from the results.

What the researcher found in the 2003 study closely mirrored that which was found in the 1999 study. The first is that the technology industry is overall pretty welcoming of women but still has some issues. The women interviewed noted that the issues seem to stem from only a minority of the men in the profession, and were mostly older as well. All the women interviewed had high hopes that the technology profession would become more friendly as a few key older men retire and more women enter the profession.

The fact is that the technology culture does have a problem when it comes to women. Although, according to Haynie (2003), it seems as if the problem is localized to a few key older individuals, and not rampant throughout. However, because this discussion is even happening across the IT industry means that this is a big enough issue that warrants attention. Contrast what Haynie (2003) says and the very recent Newsweek article on sexism in Silicon Valley (Burleigh, 2015), and two very different pictures are painted. According to the Newsweek article, sexism is inescapable in Silicon Valley. Both perspectives are right, in that Haynie’s research only interviewed 12 women in technology, and his results and research were heavily influenced by his own biases, history, and perception of the industry, something he freely admits in his paper.

**Workplace environment.** Another area that warrants discussion is how the workplace can affect women already in the technology industry. Finding the right work/life balance is challenging for any gender, however, women find it particularly more challenging. Women are still seen as the primary caregivers in society, which means a woman that wants to have a family often has to choose between kids or their career. Also, it is no secret that women on average make less than their male peers, oftentimes for doing the exact same job.

Another obstacle that women face in male dominated fields is they have to worry about how their actions will be perceived. Corbet et al (2010) found that women in technology careers face a double bind, being that they are “either competent or likable but not both” (p. 82). This affects women in that both factors are important for promotion, something men do not have to worry about. This could explain why women leave the technology industry at greater rates than men; women get tired of being viewed as less competent. However, if they are viewed as competent, then they are punished by being rated as less well liked, which can affect promotion.

### **Other Countries and Cultures**

The world is a very big and diverse place and technology now reaches to all parts of it. So far the contents of the literature review have focused heavily on western culture and society, and the effect that it has on women in technology. However, western culture makes up only a fraction of the people globally. As such, it is worth exploring how women in other cultures are viewed in technology along with some of the challenges they face. There is much fewer research in this area and much of it is focused on the Asian Pacific countries. The two countries that will be evaluated are Pakistan and Malaysia, two very different countries with two very different perspectives on the lack of women in technology. In addition, the city of Hong Kong will be evaluated as it is very westernized, even though it is now a part of China.

**Pakistan.** Pakistan is an Arabic country with a Muslim majority that greatly outnumbers other religions. In 2011 it was estimate that only 42% of women were literate compared to 67% of men (CIA, 2015). The country still has problems with women and women's rights, not uncommon in a very patriarchal society. Jawad, (2015) reported on the murder of "a prominent women's rights activist in Pakistan". Sabeen Mahmud was killed in what many saw as an assassination by those who wanted to keep the status quo of men in power. Kazim, Schmit, and Brown (2007) conducted a study on the views that Pakistani women hold toward technology careers. They used a survey method and surveyed technology educators in Pakistan. What they found were some similarities with Western women, and some differences in regards to technology.

The first similarity is that the rate of Pakistani women in technology was no different than Western women. Much of the same reasons were given such as a lack of role models, cultural expectations, and lack of family support. The last factor, the lack of family support, was one of the bigger deciding factors as the family plays more of an important role in Pakistan than in Western countries. Kazim et al states "family support in the decision making process is instrumental" (2007, p. 77). Another similarity was the effect role models had on encouraging some of the study participants to pursue technology education. One participant stated that one of their teachers thought that technology would make sense for her which prompted her to try it out. This encouragement led her to becoming a teacher, a profession that is looked favorably upon in Pakistan for women. This can have a cascade effect as more women technology educators will lead to more women in technology.

Most research in this area seems to suggest that including more women in technology will reduce the perception that it is a "man's field". However, the survey participants indicated

that having more women in technology would reduce this stereotype in Pakistan, a surprise to the researchers. Furthermore, the participants said that the biggest difference lay with themselves, as their teaching capability was a greater factor than the amount of women in the field. Like their Western counterparts, Pakistani women had to work harder than men to prove themselves, but unlike their western counterparts felt that having more women in the industry would not change anything.

**Malaysia.** Malaysia is a small Southeast Asian country with 61.3% of the population Muslim (CIA, 2015). The country has a very strong education system with over 90% of females literate and children are expected to be in school for 13 years, similar to the US. In terms of gender roles, Malaysia is still a male dominated society, however, women have similar amounts of freedom and rights as they do in the US. Despite this, they have issues just like any other modern country, notably the soft sexism often seen in Western countries. Khairuddin (2014) talks about a Malaysian blog post which called “a woman for her membership with a political party as prostitution”. Despite this, a study done by Lagesen (2007) sheds light on some positives in gender equality in technology for Malaysia.

Multiple researchers have found that the Malaysian technology industry is surprisingly welcoming to women, unlike Western countries. Unlike the US, where only 18% of computer science (CS) majors are women, in Malaysia, half of all CS majors are women which translates over to the workforce where half of all computer technology employees are women (Lagesen, 2007). Where other researchers sought to explore why women do not pursue CS degrees, Lagesen sought to explore why Malaysian women do pursue CS degrees. Based on the statements above, this goes against many of the arguments researchers of the technology industry in Western countries believe.

The researcher selected The University of Malaysia (UM) as the research location as it closely mirrored the rest of the countries views of IT. The first item of note is that the government made huge strides in attempting to get men and women into technology, an actively encouraged students to pursue technology degrees. This was due to the fact that the country was going through a technology upheaval that required a well trained workforce. Education for both genders was seen as a priority by parents. In addition, the majority of the workforce at UM are women, which differs from Western institutions.

Unlike other interview methodology research in this area, Lagesen (2007) interviewed mostly female students, but also interviewed male and female educators, and graduate students. Most other research will only interview women and ignore the men. While this is understandable due to the subject of the research, men also have a role in getting more women into technology and ignoring their perspectives does everyone a disservice.

*Enthusiasm.* There are a couple of notable takeaways from this study. The first is that CS was not seen as a “man’s profession”, rather students simply took CS classes because they were interested in it. As state earlier, the perception that technology is a “man’s domain” can be a barrier for entry for Western women, some of who show a desire to pursue technology courses but are deterred because of that perception. A second, lesser, item from this study is that all the female students were very enthused about taking CS classes. They also received a lot of encouragement from both their mother and father, some of which serve as role models. The researcher notes that a lot of the women were encouraged by parents to pursue a technology career. It was also noted that encouragement from fathers had a huge effect. This also ties in to young women having role models in the industry to follow. For some of the research participants, it was actually the father’s advice to pursue a computer science degree that ah the

greatest impact. The fathers saw the industry as beneficial from a financial perspective. One participant relayed how her father actually discouraged her from pursuing a sociology or psychology degree.

*Perceptions of computer science.* Another major takeaway from this study was that none of the participants viewed CS as a masculine field. This concept certainly existed in Malaysian society as engineering was seen as masculine, instead, CS was put in another category. In fact, one participant could not comprehend why CS would ever be seen as masculine. To both Malaysian men and women, since CS jobs meant staying inside at a desk, this meant that it was almost seen as feminine. All the participants were in near unanimous agreement over what is considered a masculine field and what was not. A commonality with masculine fields was that it was outside or involved some sort of physical labor. This split was seen as one of the participants stated “a lot of boys like networking, but girls like more of theory things” (Lagesen, 2007, p. 19). The theory of things in this case being software or management. Likewise, chemical engineering was seen as a feminine field while civil engineering was seen as masculine.

In some ways this view of what is masculine or feminine is worse. It regulates women to indoor tasks, things that keep them safe while men are tasked with the dangerous outside work. After looking at this study, it is clear that there were a lot of forces at work to make Malaysia a better place for women in CS. The government pushed both young men and women to pursue a technology related career, parents pushed their children to pursue jobs that would pay well, and society had different views on what was considered a masculine field.

Currently, none of these factors exist in Western society, which could explain the lack of women in technology. Even in chemical engineering, Malaysian women are on par with their

male counterparts ratio wise. However, Malaysia is not a perfect place for women in technology. Heavy emphasis is placed on the needs of the family, meaning some children get pushed into careers they are not interested in as in the case with a few of the participants who were pushed into CS so they could support their family down the road. What Malaysia does demonstrate is that getting more women into technology can be done.

**Hong Kong.** Out of the two countries and one city, Hong Kong is the most Westernized. Hong Kong became a part of China in 1997 but still retains some of its autonomy. Because of this it is still considered very westernized, but is still Chinese as well. Because of this, we should see similar attitudes and perceptions about women in technology in Hong Kong as we do in other Western countries.

Yau and Cheng (2012) conducted a study to determine the confidence level of Hong Kong students in using technology for learning. Their research question was “Do male students have more confidence in using technology for learning than do female students?” (Yau & Cheng, 2012, p. 74). They surveyed over 200 Hong Kong University students and their results mirror those of other Western countries. Research into how young women and men differ in their confidence levels in using technology for learning have found that men are more confident in Western countries.

Yau and Cheng (2012) found that “male students were more confident in using technology for learning than were female students” (p. 78). The researchers suspect that this is more of a social problem than a matter of a lack of interest. For the purpose of this study, technology used for learning included email, the Microsoft Office suite of products, and programming languages. While the study answered the researchers question, it failed to find an

explanation for why the lack of confidence. However, other studies posit that young women are not being exposed to technology as often as their male peers.

There are a couple of other explanations as to why young women would not be as confident using technology as men. The first is that they are not encouraged to use technology, or pursue technology courses. These outside influences could be parents, teachers, or peers. The second is that young women may view technology as the “male domain” leading to a lack of confidence in competing with men. Both of these factors lead to young women displaying a lack of interest in technology, which in turn leads to them not using it. Gaining more confidence in an area first requires one to make an attempt at it.

## **Conclusion**

This section began with a discussion on past research in this area and ended with a discussion on other cultures and societies. There are many similarities between the two sections, noting that even in other countries, not much has changed. Just as Zuga (1999) researched the theories behind the “male domain”, that view is still present today. In addition, there is still a lack of role models and educators are struggling to retain young women in technology courses. The good news is that researchers are still dedicated to finding answers to the problems. However, many questions still remain, especially those that surround other races in Western society. While outside the scope of this paper, it is worth mentioning that the percentage of African Americans and Latinos in technology are even worse than that of women.

## **Research Design**

### **Introduction**

This section of the paper details how the research will be conducted and the methodology to be used. The section begins with a brief re-cap of the research question and a few follow on questions which were also evaluated. The identification of the variables immediately follows. The next two sections describe how the data was collected and then and then a brief summary is given for the research design. Finally, a limitations section describes any limitations with the research design.

### **Research Questions**

My study seeks to address three main questions. The rate of women in technology has not been getting any better. Are there causes to this outside of perceived differences in men and women or faults with the education system?

1. Does the technology culture affect the amount of women who seek jobs in the technology industry?

This question is at the core of what the paper sought to evaluate, different than previous research in this area. The literature review began this discussion but none of the articles mentioned in that section researched the role culture plays in the lack of women in technology. Specifically, the technology culture. The research in this paper sought to fill that gap in knowledge.

2. Is there sexism in the technology industry that keeps women out?

Sexism, like racism, can be a powerful de-motivator for women and could be one possible reason for why there are so few women in the technology industry.

### 3. Is the technology industry culture pushing women out?

While few, there are some women in the technology industry and this questions explores how they are affected by sexism and the culture in the IT industry. This is important as even if the issue of getting women into the IT industry is fixed, it will mean nothing if they are not retained in the industry.

#### **Identification of Variables**

As this paper seeks to evaluate why there is a lack of women in technology, the major variables that were looked at are the percentage of women in technology related jobs and the percentage of men in technology related jobs.

#### **Data Collection Technique**

The research for this paper was conducted through qualitative analysis, specifically, using document analysis. Two case studies were analyzed due to their relevance with the current research. Other literature from sources were used as well such as articles from the government, libraries, and the internet to back up the two case studies. The two case studies selected highlighted the technology culture and showed how it is preventing women from entering the field. The first case study was from a high profile gender discrimination lawsuit and sexism in the IT industry. The other case study is about how one woman came to view the industry she was in as guilty of pushing women out of the field. In addition to the case studies, figures are included to show the declining rates of women in technology, graduation rates of computer science majors, and how sexism forces women out of the field.

**Limitations**

This research design has several flaws, notably of which there is very little quantitative data. The percentages of women and men in technology were easy to quantify, but due to the sociological nature of the research, this design almost falls into quasi-experimental territory. These types of research designs can still lend additional knowledge in the area, but will not create new data. Another limitation is that western society and culture can be ill-defined. While a brief explanation was given in the literature review, there is no single definition in academia.

## Results

### Overview

This section was organized around two case studies though, while different, still highlighted the same issue. They illustrate the culture that is pervasive in technology today that keeps women from technology, and prevents those that do go into technology from staying. The first case study is a high profile case that ended in March 2015 where a prominent venture capitalist firm was sued for gender discrimination. It was the most prominent gender discrimination case Silicon Valley has face thus far and people on either side were eagerly awaiting the outcome and what it would mean for the technology industry. The second is a less well known incident and its effect on one woman working in technology. The incident was enough that the woman felt that she did not belong in the industry anymore, unfortunately a sentiment shared by many other women that work in technology. Also included in this section are two figures which show the declining rates of women in technology.

### Case Study #1: Ellen Pao's Lawsuit

In March 2015 a high profile Silicon Valley case ended, one that stemmed from a 2012 lawsuit. Ellen Pao, was a junior investing partner at the influential venture capitalist firm Kleiner Perkins when she filed a lawsuit alleging she was passed over for promotion because of her gender. Kleiner Perkins is a huge venture capitalist firm that has invested in more than 500 companies including Amazon, Google, and AOL. Even though there have been other gender discrimination cases in Silicon Valley, none have garnered the type of publicity as this one, likely due to the size of the defendant organization and the issues raised.

At the core of the lawsuit was Ms. Pao's assertion that she was passed over for promotion due to retaliation for breaking off an affair she was having with one of her coworkers. She also

accused the firm of giving her poor reviews for speaking up at the lack of promotion, something the firm firmly denied. The firm stated her poor reviews and lack of promotion were because she “because she “lacked the ability to lead others, build consensus and be a team player, which is crucial to a successful career as a venture capital senior investing partner” (Streitfeld, 2015).

Throughout the trail there were many details presented that shed a negative light on Kleiner Perkins and Silicon Valley as a whole. One male executive allegedly said “that women would never succeed at Kleiner because women are quiet” (Streitfeld, 2012). Another executive said that the reason why women were not invited to big executive dinners “because they would “kill the buzz” (Streitfeld, 2012). Her boss at the time remarked “that Ms. Pao had a “female chip on her shoulder” (Streitfeld, 2015).

Ms. Pao ultimately ended losing the case in March 2015 and did not get any of the \$16 million she wanted. In the jury’s eyes, Kleiner successfully presented a case which showed that Ms. Pao was terminated because of her lack of potential rather than her gender. Despite losing the case Ms. Pao asserts that “the battle was worth it” as it highlighted the sexism in Silicon Valley and the technology sector (Streitfeld, 2015). She currently works at Reddit as the Chief Executive.

### **Case Study #2: Sexist Attitudes in Startup**

Elissa Shevinsky used to think of herself as just one of the guys in the technology industry and fought hard to fit in; ignoring inappropriate sexist jokes or remarks because she loved what she did and wanted to keep doing it. All that changed in September 2013 where she was watching livestream of TechCrunch Disrupt, a huge technology conference.

During the conference there is an event called the Hackathon, where developers and hackers have 24 hours to create a product then show it to the conference attendees. At this particular conference two programmers presented their app which immediately outraged Shevinsky. Called Titstare, it was an app “where you take photos of yourself staring at tits” (Hu, 2013). The app received an instant laugh out of the male dominated audience. For its part, TechCrunch immediately issued an apology and now implements more stringent naming requirements to prevent something like this happening again.

The next day after the Hackathon, Shevinsky’s business partner, Pax Dickinson, tried to defend the app and its creators on Twitter which pushed Shevinsky to quit their company. Prior to quitting she ignored other sexist tweets by Dickinson but felt that this time was different as it opened her eyes to the way the technology culture truly was, forcing her to act. Dickinson eventually apologized and was able to coax Shevinsky back to the company, albeit with a few concessions. Shevinsky was now the public face of the company, all tweets had to be run through her first, and all interviews as well (Miller, 2014).

### **Percentages of Women in Technology and the Impact of Sexism**

Figure 4.1 shows how the percentages of women in STEM fields have risen on average from 1960 until 2013. However, the computer and math fields have remained the same since 1960 where they were at 27%; in 2013 they were at 26%. While the other fields have shown steady increases, the computer and math field rose to its peak in 1990 where it was at 33%, then started to decline since then.

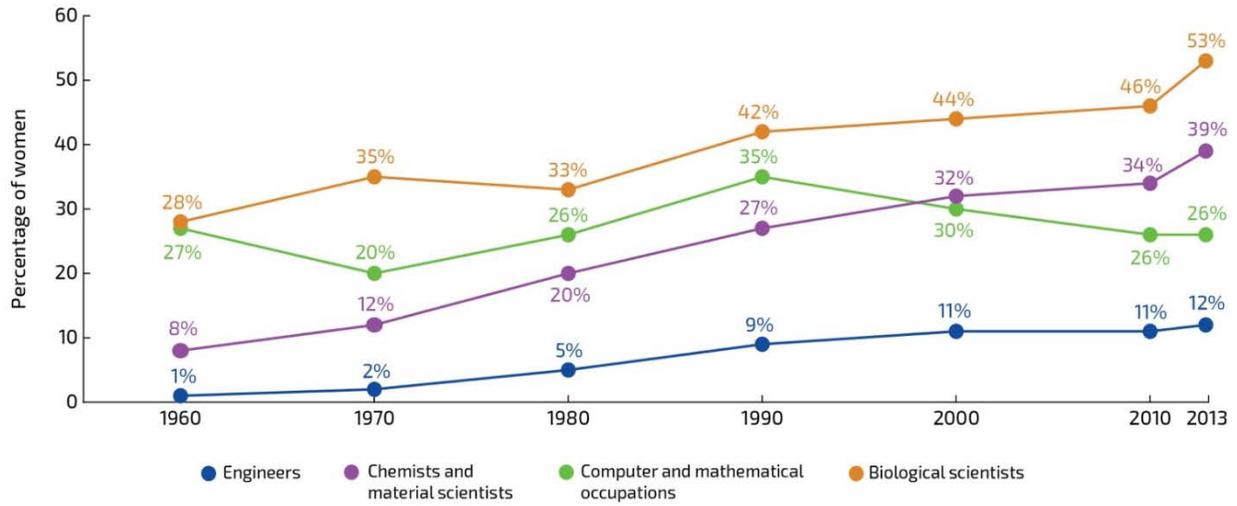


Figure 4.1: Amount of women in STEM jobs from 1960-2013.  
 Note: From *Solving the Equation* report, AAUW, 2015.

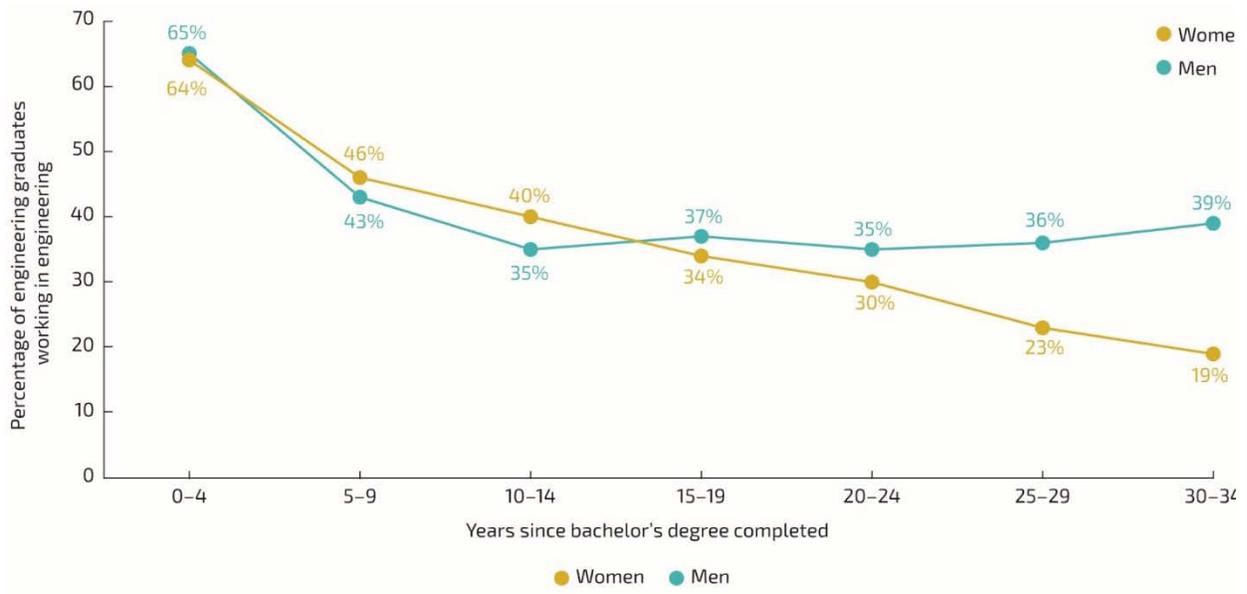


Figure 4.2: Retention in engineering in 2010.  
 Note: From *Solving the Equation* report, AAUW, 2015.

While not technically technology, engineering is one of the STEM fields and has similar issues with retaining women. Figure 4.2 shows the retention percentages for both men and women. While men remain steady after 10 years in the industry, the percentage of women who leave start to decline almost immediately upon entering the industry, an alarming statistic which can be compared to technology.

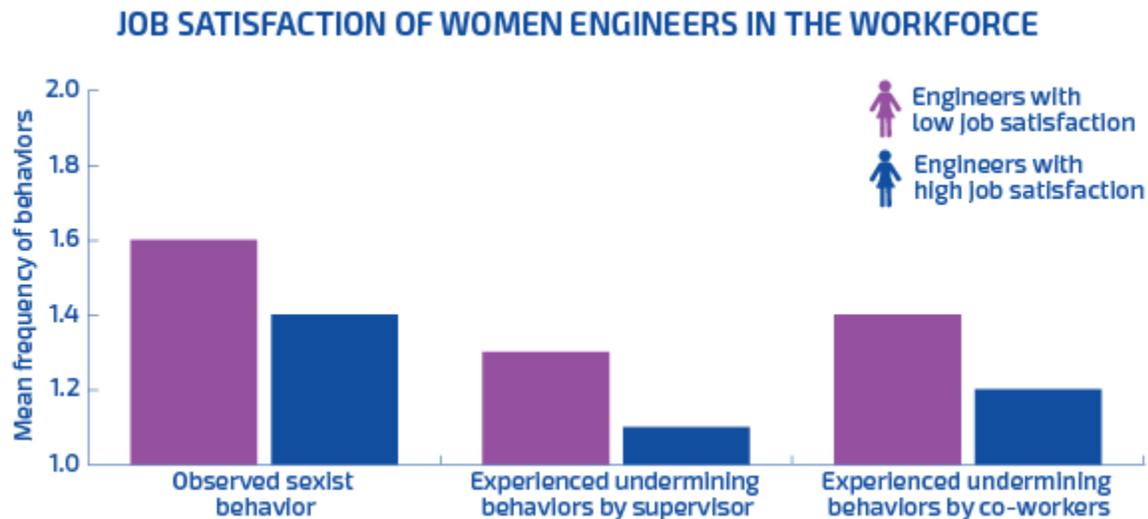


Figure 4.3: Job satisfaction of women engineers.

Note: From *Solving the Equation* report, AAUW, 2015.

The amount of women in engineering is worse than that of technology which means some parallels can be drawn from engineering. Figure 4.3 shows the job satisfaction of women engineers with the purple showing the women engineers with low job satisfaction and the blue showing the women engineers with high job satisfaction. What this shows is that the amount of sexist behavior had an impact on job satisfaction for women engineers, with those experiencing more frequent sexist behaviors reporting lower job satisfaction. In addition, undermining by coworkers and supervisors had a similar impact on job satisfaction.

### **College Graduation Rates of Men and Women in Computer Science**

Figure 4.4 shows the percentages of computer science majors at Harvey Mudd College compared to those of the national average. While the national average has declined, Harvey Mudd’s has increased to almost 40%.

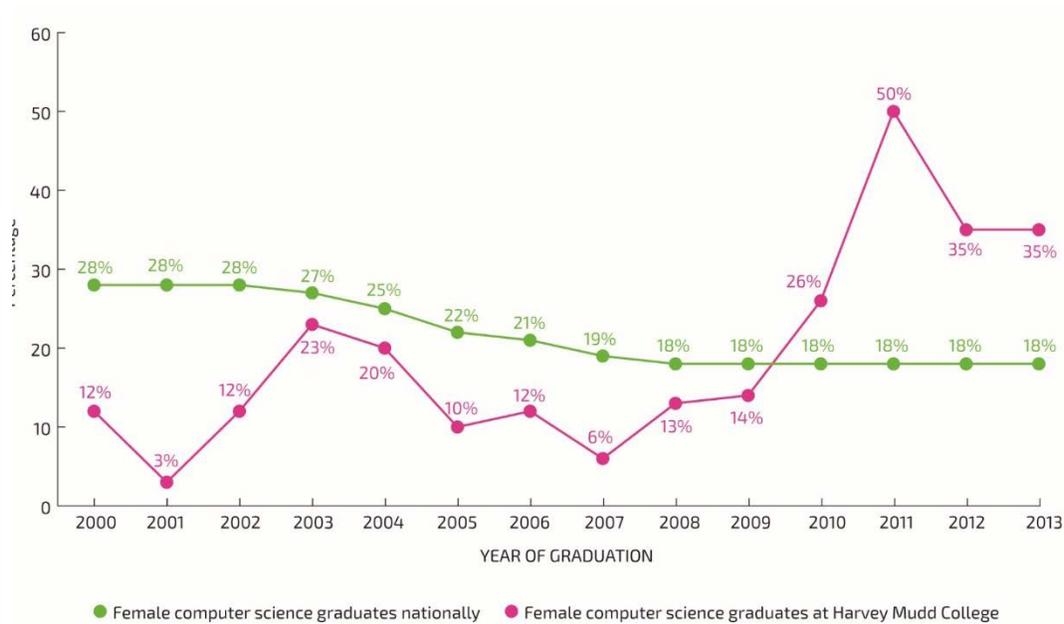


Figure 4.4: Female computer science graduates at Harvey Mudd College, 2000-2013.  
 Note: From: From *Solving the Equation report*, AAUW, 2015

Figure 4.5 shows the amount of degrees conferred between 1971 and 2007. The rate of degrees conferred to women outpace men around 1982 and remained that way since. Currently, women receive approximately 55% of all degrees, a little over half.

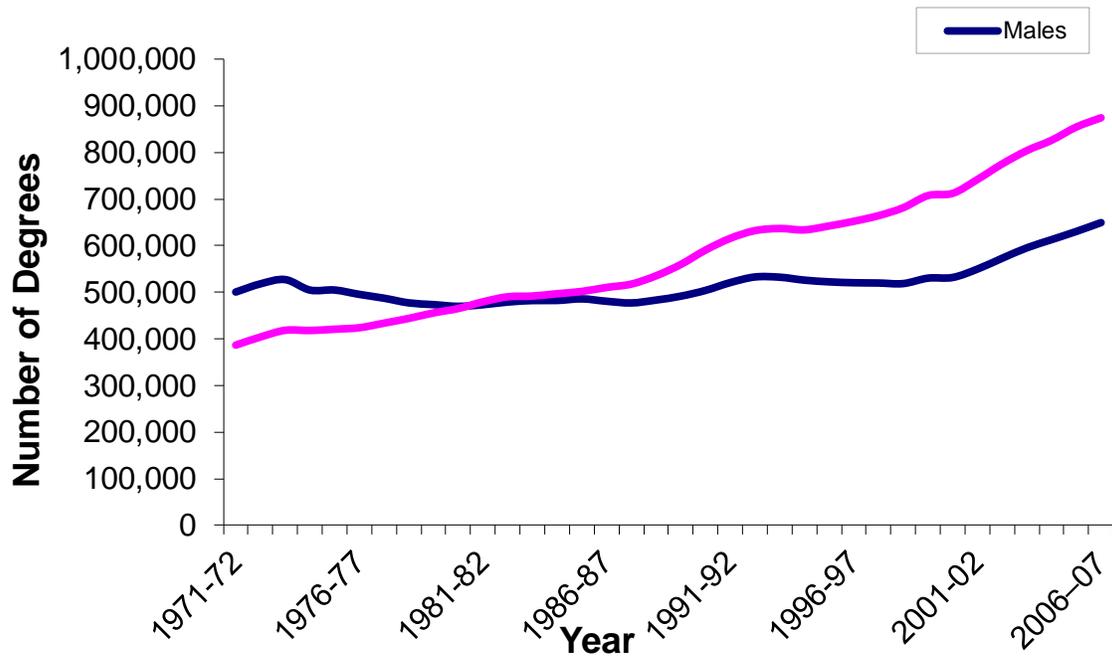


Figure 4.5: Bachelor degrees earned by gender, 1971-2007.

Note: From *Why so few? Women in science, technology, engineering, and mathematics*, Corbett, Hill, Rose, 2010.

Figure 4.6 shows the amount of men and women who choose STEM majors as first year students. While the biological/agricultural sciences are about equal between the genders, computer science majors are vastly underrepresented for women.

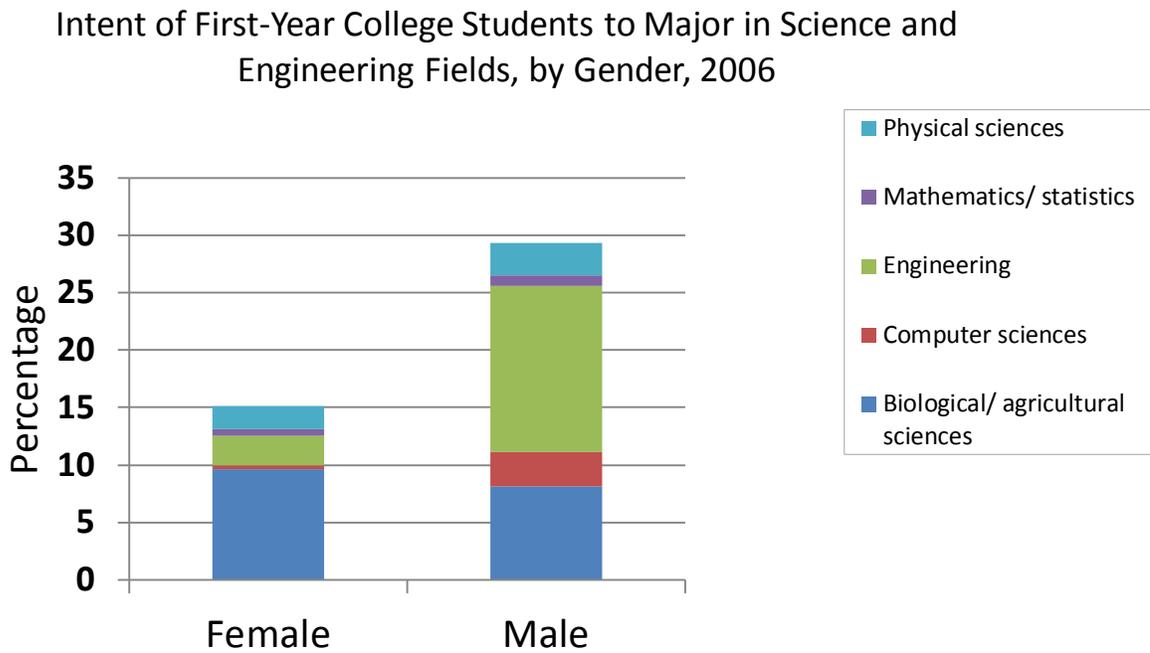


Figure 4.6: First year STEM students by gender, 2006.

Note: From *Why so few? Women in science, technology, engineering, and mathematics*, Corbett, Hill, Rose, 2010.

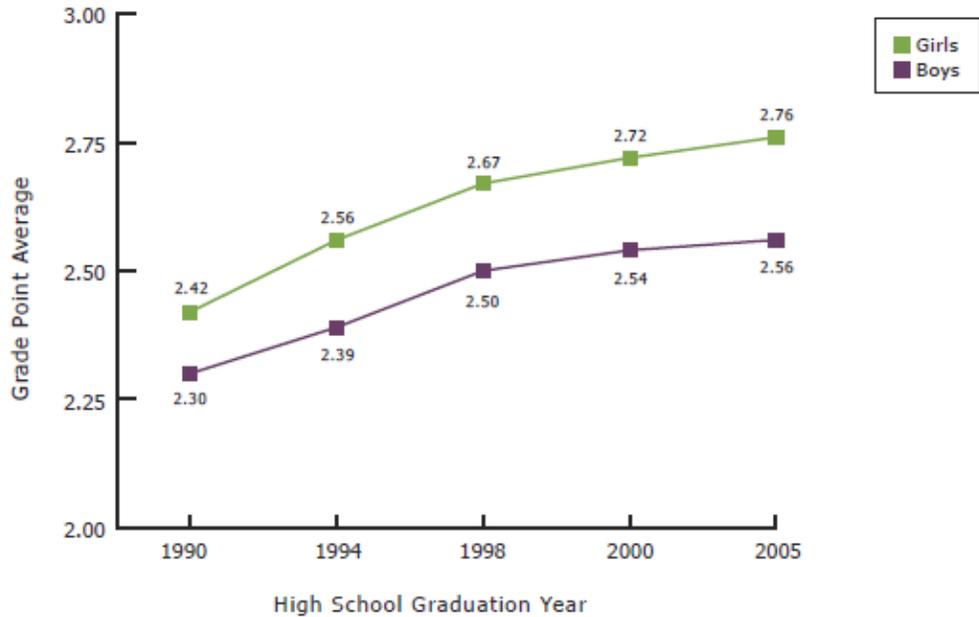


Figure 4.7: GPAs of male and female students, 1990-2005.

Note: From *Why so few? Women in science, technology, engineering, and mathematics*, Corbett, Hill, Rose, 2010.

Figure 4.7 shows the GPAs of male and female high school students in math and science. On average, girls have a higher GPA than boys.

### **Summary**

This section presented two case studies that show how the technology culture often keeps women out or forces them out. While Ms. Pao did not win her trial, her experiences were still very much real and encountered by many other women like her. The second case study also presented an example of many women choose not to stay in technology; because they do not feel welcome. This section also displayed figures which showed the declining rates of women in technology and how sexist attitudes push women out of the industry. Also displayed in this section were the amount of degrees conferred by gender and computer science majors by gender. The next section expounds on these case studies and figures and why they firmly fit into the research on why there is a lack of women in technology.

## Discussion

### Overview

This paper sought to evaluate whether sexism and the technology culture are to blame for the lack of women in technology and in addition, push women out of the technology industry. The two case studies presented and the accompanying figures answer the research questions that sexism and the technology culture are why there are so few women in the technology industry.

### Sexism in the Industry

Is there sexism in the technology industry that keeps women out? Both case studies addressed the issue of sexism in the industry, something other research has neglected, and showed that sexism has an impact on drawing women in the technology industry and retaining them. As shown in Figure 4.1, the amount of women in computer science degrees is falling despite the numerous research into the area. As part of STEM, the engineering field has also been struggling to retain women much like computer science. As Figure 4.2 shows that the retention rates of women in engineering steadily declines from when a woman enters the industry. Pair this with Figure 4.3 which shows the job satisfaction of women who work in engineering, and there is a clear picture that sexism actively drives women out. It is no coincidence that those with the lowest job satisfaction also experienced the most sexist actions.

What the first case study highlights is a much more complicated issue in that much of the sexism is “soft” sexism. While Ms. Pao experienced sexism in the workplace, the jurors were not convince she was let go because of her gender. This shows that sexism can be hard to prove unless it is blatant and public; often it is not. The second case study did describe outright sexist behavior with Mr. Dickinson and his comments on his social media account. Far too often

women who work in the technology industry brush off the soft sexism and try to fit in as another one of the guys, much like Ms. Shevinsky attempted to do. As we can see in Figure 4.2 and 4.3, eventually women get tired of working in the sexist technology culture and leave.

The second case study also highlighted a disturbing incident of outright sexism with the application presented at Techcurnch (Hu, 2013). An application such as this should not have been made in the first place, but the fact that it did, again highlights the sexist culture that pervades the technology industry.

### **The Technology Culture**

Similar to Haynie's (2003) study, the two cases provide more evidence that the technology industry culture is keeping women out of the technology industry and pushing those that are currently in the industry out. Figure 4.7 refutes many of the common arguments to why there are so few women in technology. The figure shows that girls have an interest in science and math, perform very well in the two subjects, and are just as capable as boys at both. However, education does play a role in fixing the technology culture. Figure 4.5 shows that women earn more degrees than men, yet Figure 4.6 shows that most of those degrees are not any of the STEM fields, let alone computer science. This is a complex issue which ties many of the points made in this paper together. Is the technology industry culture pushing women out? The sexism in the technology industry is seen as the dominant culture and there are too few women to change it from within. Most of the women that choose this field end up leaving because of the culture which is seen by other women and girls. The effect of role model was explored earlier showing the impact that seeing women leave the industry has on young women who may think about pursuing technology. Compound that with high profile cases such as Ms. Pao's, or the many

instances of soft sexism in the workplace and it is easy to see why there are so few women in the technology industry.

As stated earlier, education does play a role. It is important that girls and young women receive encouragement to pursue technology throughout their lives. Figure 4.4 shows that it is possible to increase the amount of women who pursue computer science degrees, which Harvey Mud College managed to accomplish. One of the ways they accomplished this was exposing women college students to women that worked in the industry and by fighting the negative perception many young women have about the technology industry (Shellenbarger, 2013).

### **Implications**

Addressing the issues with the culture will have second and third order effects. Fixing the culture will keep women in the technology industry meaning more role models and a better perception of the industry. This in turn would lead to more women wanting to join the industry from a young age as they see more women like them working in the field. The short term solution is to make it a priority to hire more women as some companies have said they would do. Over time, by having more women in technology, the culture will slowly start to change, and even faster if women were put in decision making positions.

This also has implications for the men who work in technology as well. Much of the culture change will have to be undertaken by men who currently rule the technology industry. They are the ones who will have to take the risks and hire women, be aware of what they say, and correct each other. Unfortunately, changing culture takes time. Although, the technology industry has been around for some time, it can be seen as the last bastion of the boys club.

**Limitations**

This study had several limitations. One limitation was based on the research methodology. Using document analysis means no new data was generated. While the discussion section portrayed new information, it was all based on data gathered from prior sources. Another limitation was in that this study can be applied to Western culture but little else. Future research could look into other cultures and societies.

**Recommendations for Future Research**

While using document analysis is a simple way to obtain information, much more could have been gained from using an interview method. A possible study into the technology culture could focus on obtaining information through interviews of women who are in technology. This way, first-hand knowledge could be obtained rather than through documents. With the interview, possible questions to the participants could be their recommendations on how to improve the situation, offering useable information.

Another area of research could be on the attitudes that men have about women in technology. Here, the interview approach could be used as well by interviewing men both inside and outside the industry. While men have no problem getting into technology fields, they also play an important role in getting more women into technology. Finding out their opinions and attitudes could offer some insight into how to make things better for everyone.

Given enough time, another interesting study could be a longitude one that charted the course of girls who were interested in technology. This study would begin by identifying girls who were interested in technology and following them throughout their schooling to see how

many actually end up working in technology. This could offer additional insights into what and where exactly the decision to not pursue a technology career occurs.

### **Conclusion**

The lack of women who work in technology is a well-documented issue which has not been getting better. As the need grows for more skilled workers in the technology field, it would benefit everyone to ensure that the best individuals are hired regardless of gender. Right now, this is not happening. This paper sought to address the issue of the lack of women in technology by arguing that it was caused by sexism and a negative culture. These two items acted as a barrier to keep women out and to push them out if they were already in the industry. The literature review highlighted alternate theories which all tie back to culture and society. The two case studies presented in the results section illustrate this fact by showing the type of culture that permeates the technology industry and the effect the culture has on women. One of the recommendations is that companies should start immediately making the hiring of women a priority. Over time, this would lead to a better environment for women working in technology. More research in this subject is needed and could identify exactly why more companies do not hire more women.

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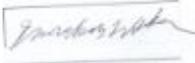
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