THE IMPACT OF CAREER SERVICES ON

Women Pursuing Tech Careers

A collaboration between the National Association of Colleges and Employers and Break Through Tech

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The Impact of Career Services on Women Pursuing Tech Careers

EXECUTIVE SUMMARY

There is much that is changing concerning the future of work, the highly specialized expertise needed to pursue and land a technology job, and the urgent need for more diversity in the technology industry. In light of this, it is natural to consider career services within higher education as having the potential to be the point of most significant impact to drive transformative outcomes for students in general and women in particular, pursuing technical roles across industries. Generally speaking, the purpose of career services programming is to connect students to employment and serve as the nexus between industry and academia. With this backdrop, it seems clear that there is both an opportunity and an imperative to examine how career services is supporting the need for more women pursuing technical careers.

With this in mind, Break Through Tech and the National Association of Colleges and Employers (NACE) collaborated on a research project that examined the current state and the impact of college career services on undergraduate women pursuing technology careers. The goal was to learn if there were best practices and innovations in college career services aimed at addressing the challenges faced by women pursuing tech careers, whether female college students pursuing tech careers use career services, and whether the use of these services matters in outcomes.

In summary, the qualitative survey data of college career services professionals revealed that:

- The importance of mentoring by industry professionals was the most frequently referenced best practice along with standard career services offerings like resume writing and interview preparation support.
- Less frequently but importantly mentioned as a best practice were targeted interventions like services that explicitly took a gender lens and running programs specifically for student organizations like 'Women in Tech' groups.
- Equally as important were the kinds of programs that were rarely mentioned, including engagement of faculty, helping students land internships, and a focus on employer engagement beyond traditional job fairs.

For the most part, reported 'best practices' for undergraduate women pursuing tech careers were no different than those reported writ large.

The survey further revealed that career services professionals see the challenges that face their female students pursuing tech careers to be the same as long-standing, well-known challenges: women's lack of confidence; the lack of female leaders (both in academic and industry); and the reality of an unwelcoming, inequitable, hostile work environment that students face.

Quantitative survey data of students on the frequency of usage of campus-based career services and the consequent outcomes were even more interesting.

- Perhaps not surprisingly, the data show that men generally use career services more frequently than women and that men get more job offers than women. This is particularly important and unfortunate because the data also show an important result. **When women do take advantage of career services, they benefit from them more than their male counterparts as measured by job offers received.** This is true for women versus men in general, where the advantage that men have in terms of acquiring more job offers all but disappears if both groups take advantage of career services.

- More remarkably, the data show that for men and women in STEM disciplines, the advantage in terms of job offers reverses. **Women in STEM who use career services get more job offers than men in STEM who use career services.** In other words, **career services can level the playing field for women in tech**.

Our findings underscore the pivotal role of career services in bridging the gender gap in the tech industry. The evident impact of career services in leveling the playing field for women in tech calls for heightened scrutiny, exploration, innovation, and investment. This merits a closer examination of strategies to foster greater engagement among undergraduate women in tech, both through college-based career services and external organizations offering innovative career support. Understanding and enhancing these pathways will be instrumental in empowering women in tech and driving further progress in this crucial area.

Women Pursuing Tech Careers

About the National Association of Colleges and Employers (NACE): Established in 1956, the National Association of Colleges and Employers (NACE) is the only professional association in the United States that connects nearly 11,000 college career services professionals, more than 3,600 university relations and recruiting professionals, and more than 400 business solution providers that serve this community.

NACE is the premier source of market research on career readiness, the employment of recent college graduates, and the college-to-career transition. NACE forecasts hiring and trends in the job market; tracks salaries, recruiting and hiring practices, and student attitudes and outcomes; and identifies best practices and benchmarks.

Learn more at www.naceweb.org

About Break Through Tech: Break Through Tech works at the intersection of academia and industry to propel women and non-binary students into computing degrees and tech careers. Our programs have reached thousands of students during their early college years, with an emphasis on welcoming Black, Latina, low-income, first-generation college-goers, and non-binary students. Through deep engagement with nearly 200 industry partners, our programs prepare students to launch their tech careers.

Learn more at
www.breakthroughtech.org/about-us

Introduction

Break Through Tech and the National Association of Colleges and Employers (NACE) collaborated on a multi-year research project, undertaken in 2022 and extending into 2023, that examined the impact of college career services on undergraduate women pursuing technology careers and how career services could support those women. This report examines the motivators behind the research, important findings, and recommendations that arise from those findings.

The demand for technology talent is significant and growing. By 2031, there will be **4.2 million computing-related job openings, but U.S. colleges and universities will graduate only 25% of the needed workforce**, according to the latest data from the National Center for Women & Information Technology (NCWIT).

The growth in the need for technology workers is coming at a time when the percentage of college degrees being awarded to women is at an **all-time high**: **Women account for 58% of all bachelor's degrees**, but just **22% of those in computer science and information technology**, according to the National Center for Education Statistics.

In terms of the computing workforce, women are similarly underrepresented, accounting for just 27% of workers. Worse, in AI—the fastest growing area within the tech industry—women account for just 22% of the tech talent worldwide, according to **the Alan Turing Institute**.

Given this challenge, it is natural to look at career services within higher education institutions as having the potential to contribute to improved outcomes for women in tech, especially as career services is the nexus between academia and work.

Traditionally, the emphasis has been on what career services does, such as helping students learn how to market themselves and facilitating connections between students and employers. As was highlighted in a recent study from the Project on Workforce at Harvard University, the focus has tended to be on data that are simply an accounting of *how many*—how many workshops were offered, how many jobs were posted, how many interviews were scheduled, how many students and employers were served, and so forth. While benchmarking is important, the problem is that these supporting statistics do not address how the career center's services actually affect college students and their eventual career outcomes.

However, both informal and formal data suggest that the career services function within higher education is chronically underfunded and understaffed. In addition, career services is typically not specialized for the most in-demand careers in technology.

Despite these findings, the good news is that we can quantify the impact career services has on students and their entry into the world of work. In fact, recent NACE research has not only surfaced the connection between career services and job offers but also the role career services plays in how students view their institution and how career services impacts equity.

These circumstances motivated the joint research project undertaken by Break Through Tech and NACE, which was designed to address four key questions:

- What are the best practices and innovations career services practitioners and college recruiters report in serving women who are pursuing tech-related careers?

- What are the persistent challenges in providing career services to women pursuing tech careers?

- Do female college students pursuing tech careers use career services—and *does it matter*?

- What are the recommendations for working with women pursuing tech careers?

To address these questions, we developed a multifaceted research methodology, including an open-ended survey of career services practitioners in higher education and recruiters in industry, followed up with a deeper-dive survey based on those results; an analysis of student data related to career services with a focus on female STEM students, and outcomes from the NACE's *2022 Student Survey*; and a review of relevant best practices. Taken together, this represents the first time, to our knowledge, that research has been crafted to better understand university-offered career services focused on women in tech as well as the usage and impact of these offerings.

Women Pursuing Tech Careers

Career Services and the Impact on Graduate Outcomes

Analysis of results from NACE's Class of 2022 Student Survey found a number of connections between career services and positive graduate outcomes.

When looking at the connection between job outcomes and use of career services, we found:

1.24 job offers

Graduating seniors who used at least one career service received an average of 1.24 job offers.

0.05 increase

For every additional service they used beyond just one, their average number of job offers increased 0.05.

1.0 job offers

In comparison, graduating seniors who didn't use any of the career center's services averaged 1.0 job offers.

job offers

The Landscape for Women in Technology

To gain an understanding of the landscape for women pursuing careers in technology, we undertook two studies: the first was a broad, open-ended survey designed to elicit best practices and challenges in serving women pursuing tech careers; the second study was a deeper dive based on results from the first. (Note: For both surveys, data were coded by three independent coders, with each coder identifying responses that were linked by a common theme or idea. This then allowed us to index the responses into larger categories.)

DATA COLLECTION

The open-ended survey was distributed to 1,846 career services higher education practitioners who hold NACE membership, of which 10% responded, and to 839 college recruiting professionals at NACE-member employing organizations, of which 6% responded.

The survey was purposively constructed with open-ended questions to gather depth and nuance. Specifically, respondents were asked to identify:

- Two best practices to prepare undergraduate women for careers in technology, and

- Two challenges faced when addressing the needs of undergraduate women entering technology careers.

Participants were also asked if they were aware of stellar programs specific to college women pursuing technology careers. These results were used to conduct a deep-dive survey to learn more about such programs. The deep-dive survey was distributed to 23 colleges and 19 employing organizations cited as having outstanding programs. In all, 18 colleges (78.3% response rate) and six employers (31.6% response rate) responded.

BEST PRACTICES TO PREPARE UNDERGRADUATE WOMEN FOR CAREERS IN TECHNOLOGY

In our open-ended survey, we asked respondents to name two best practices to prepare a diverse group of undergraduate women for careers in technology.

Looking across the findings, we can see three large themes: 1) best practices that focus on connecting female students to industry directly, 2) best practices that focus on traditional career services, and 3) best practices that involve collaboration across the university.

Theme 1: Best practices that focus on connecting female students to the industry directly

Practitioners highlighted strategies that provide opportunities for advising, support, and networking through career services programs as well as pathways for female students to connect with professional women for career coaching and networking. **Mentoring** was most frequently cited as a connector.

Comments from participants included:

"Coach [female students] specifically on how to build and enhance a network of like-minded women in tech careers."

"I work at a women's college and know mentorship is especially important for women's career development. Furthermore, we recruit [alumnae] in the tech industry to provide students with concrete support with things like resume writing and technical interviewing to help students' transition into the industry."

Respondents also shared the importance of ensuring access to diverse career panels in classrooms and career center workshops as a means of connecting female students with the industry.

Comments from participants included:

"I teach/facilitate a sophomore resource seminar in computer science, which involves many guest speakers. In developing the curriculum and speaker list, I try to include both male and female speakers who can serve as resources to the students."

"Currently we do not have any gender-focused programs for any career types. However, we are of the mindset 'if you can't see it, you can't be it,' and we try to have female and diverse speakers at workshops and information sessions to talk to students."

theme one

Internships were also cited as a means for connecting female students with the tech industry. This is supported by other research. According to a **recent NACE quick poll**, 80% of 166 responding employers indicated that internships provided the best return on investment as a recruiting strategy compared with career fairs, on-campus visits, on-campus panels, or other activities. From the employer's perspective, NACE's annual Job Outlook survey consistently shows that internship experience is often the deciding factor when employers are evaluating two otherwise equivalent candidates.

Comments from participants included:

"We convey the importance of finding internships and jobs that align with a student's values, and which offer a culture of inclusion."

"Our university has already recognized the challenge faced by underrepresented groups in technology and have/are taking steps to address them through collaboration with companies that have also recognized this as well."

theme
two

A second large area of practices can be categorized as **career services**, writ large. Respondents to our survey noted that general career services, e.g., access to coaching, advising, and other resources, can help women learn about and prepare for careers in technology.

One practitioner listed the following as important to supporting female students:

"Individual coaching and advising sessions, direct connections to employers interested in hiring female-identifying students, assisting in the preparation of resumes, introductions, mock interviews, and salary negotiations."

Another suggested the importance of interview preparation:

"Work with students to break down job descriptions and practice interviews so that they are able to put their best foot forward."

In addition, respondents also noted the importance of career services to connect with students in classrooms to share information on careers.

"Our career services office makes class presentations for gateway courses for the majors and then again for the capstone courses for those majors."

Although respondents noted that general career services at colleges can help to better serve women in technology, they also noted that having a **gender lens on career services** is equally important. This means designing and delivering specific programs/workshops/curriculum that explicitly use a gender lens and framework.

Practitioners cited the importance of the following:

"Immersion programs that introduce students to companies, alumni, and professionals in technology with an emphasis on meeting women in these organizations who are at a variety of stages of career."

"Providing advice and connections to programs such as Break Through Tech, Women in Computer Science, and Women in Engineering Programs."

"Developing gender-focused career development programming, including resume writing, negotiation, networking events, etc."

"Addressing/naming impostor syndrome in women before they self-select out."

theme
three

Theme 3: Best practices that involve collaboration across the university

Respondents also identified the importance of career services programming that is connected to and collaborating with other departments and organizations on campus, such as faculty and relevant student organizations.

Respondents provided the examples, including:

"We also encourage and promote student organizations that are in STEM—Women in Technology and Women in Engineering."

"[We work with] student organizations serving women in tech fields, allowing them to inform on best practices in recruiting and connecting with these students."

"Provide career and professional development presentations to various student organizations such as Society of Women Engineers (SWE), Women in STEM, and LGBTQ+."

"We teach a course specifically focused on gender equity in STEM for first-year and upper-division students."

"I collaborate with the computer science faculty to connect employers willing to offer internships to first- and second-year female and underrepresented students."

CHALLENGES ADDRESSING THE NEEDS OF UNDERGRADUATE WOMEN PURSUING CAREERS IN THE TECHNOLOGY FIELD

We also asked respondents to identify their top two challenges faced when addressing the needs of undergraduate women pursuing tech careers.

The most frequently referenced challenges were:

• The impact of gender socialization, which impacts many (if not all) aspects of marking the transition from campus to career;

• The lack of female leaders in the technology field—both in terms of college faculty and in the industry; and

• The concern that female students have in entering an environment that may be unwelcoming—even hostile—and inequitable.

Larger themes related to these challenges emerged.

Theme 1: Gendered expectations and socialization impact women's career paths

First, respondents highlighted how broader societal beliefs and practices impact female students' expectations, confidence, and career plans. One of the main challenges practitioners identified was **gendered thinking** of female students. This includes the ways women may subscribe to and internalize socially constructed gendered views of skills, confidence, and occupations.

Respondents cited:

"[Women's] underestimation of [their] abilities—[and] having to remind them that they are capable and that they have to convince others [of] the same and not count themselves out before getting started."

"[A challenge is] encouraging them to go beyond the limitations they've set for themselves and those set for them by societal expectations. [We need to] teach them to be bold and brave in a corporate setting."

"[There is an issue with women] not knowing their value and [therefore not being comfortable] negotiating comparable salaries compared to male counterparts."

This is particularly important as gendered thinking has real-world implications. As Figure 1 illustrates, findings from NACE's *2022 Student Survey* found that female graduating seniors expect to earn 16% less than their male counterparts. This expectation gap mirrors the actual pay gap that men and women face in their first jobs post-graduation. Moreover, when we look at the intersection across race and gender, the expectation gap holds. (See Figure 2.)
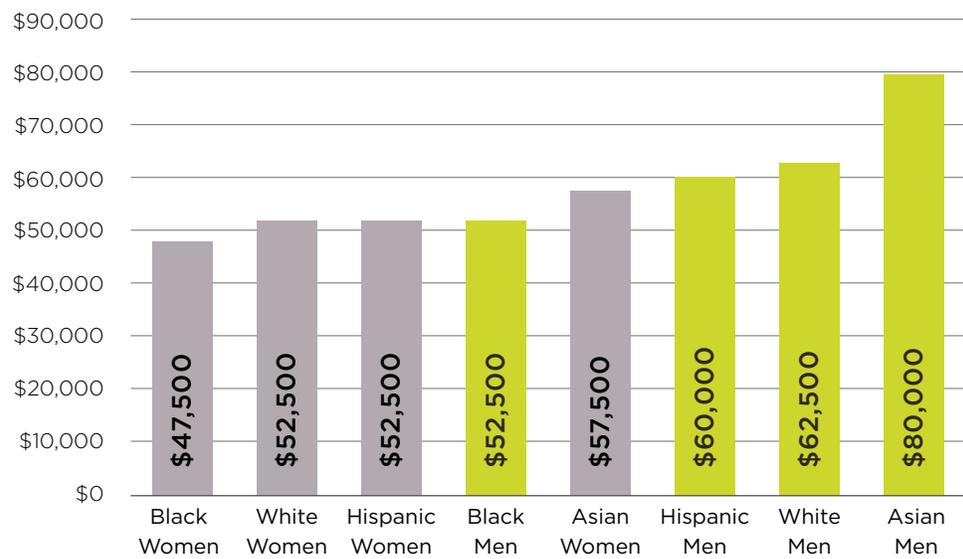
FIGURE 1

Women expect to earn less—and they do

Men: $62,500 (Expected Salary), $64,203 (Actual Salary)
Women: $52,500 (Expected Salary), $52,266 (Actual Salary)

Source: 2022 Student Survey, National Association of Colleges and Employers

FIGURE 2

Expected salaries by gender and race

Black Women: $47,500
White Women: $52,500
Hispanic Women: $52,500
Black Men: $52,500
Asian Women: $57,500
Hispanic Men: $60,000
White Men: $62,500
Asian Men: $80,000

Source: 2022 Student Survey, National Association of Colleges and Employers

theme

Theme 2: Systemic inequalities remain
significant barriers to women's success

Respondents also identified a number of challenges related to the workplace. Broadly, respondents pointed to **larger structural and systemic barriers** to women's success in technology, including hostile workplace culture, inequity in positions and promotions, and other inequities embedded in social structures.

Respondents noted:

"Women are hesitant to enter the field due to a perceived good old boys' network."

"[It is challenging to know] how to identify and promote inclusive employers that are committed to not just the recruitment of women, but also retention and advancement."

"We emphasize equity, access, and inclusion so much in our campus culture, but the hard truth is that the world is not always like this, and some students find out only once they begin working somewhere."

"[It is a challenge to] position services and programs in ways that do not seem like they are pandering to women, while at the same time not being presented in a way that makes it seem like the field is so [dominated by men] that they shouldn't even try to enter the field."

Practitioners also identified a lack of **representation** as a challenge—specifically, the low number of women in the pipeline and classes as well as a dearth of female professionals in the field who are able to serve as mentors and role models.

Respondents also found that **employer visibility** was a factor in some areas, specifically that there are not enough employers connected with the colleges. For instance, one noted:

"Availability within immediate radius of headquarters/within institutions that have been historically core sourcing hubs for us."

Respondents also noted challenges that were focused on the institutions themselves, including challenges related to getting students to attend and **use career services** in general as well as a lack **institutional resources** available.

Beyond the institution, respondents also found a **general lack** of support for early career graduates. As one respondent noted:

"[There is a] lack of available resources that can help women navigate their first few years on the job so that they can persist and be successful within the industry."

Career Services Can Help Level the Playing Field for Women in Technology

To complement the qualitative data from our research into the landscape for women in technology, we incorporated quantitative data from NACE's annual Student Survey, which asks students directly about their use of career services, experiential learning opportunities, and other job-search related issues.

Our goals were:

- To investigate the extent to which STEM students were using career services in relation to their peers;

- To determine if women make use of career services differently than men;

- To determine if using career services made a difference for women in comparison to men; and

- To determine if using career services made a difference for women pursuing STEM majors in comparison to men pursuing STEM majors.

DATA COLLECTION

NACE collected data from February 22, 2022, to May 15, 2022, from students through NACE member colleges and universities. In all, 15,680 students responded from 262 four-year institutions (14% response rate). The schools range across all types and sizes.

To explore the usage of career services, we divided students into groups based on their major and gender, creating four groups: men in STEM, men not in STEM, women in STEM, and women not in STEM.

Using responses from NACE's Student Survey, we plotted the percent of these students who used 11 different services. (See Figure 3.)

To explore the impact of the use of these services, we compared mean job offers for students who used the different services across the different groups of interest.
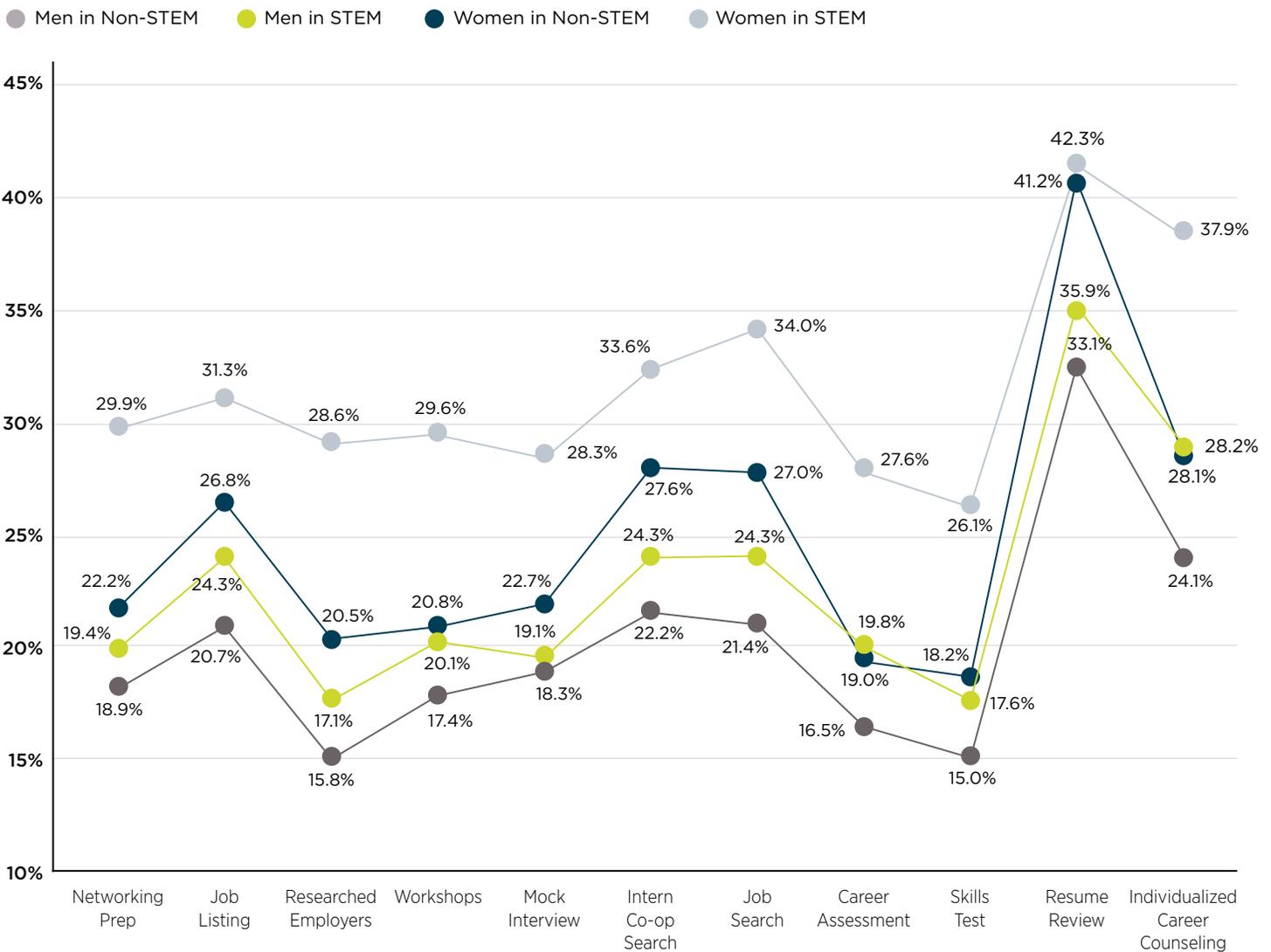
FINDINGS

Finding 1: Men use career services more often than women.

As shown in Figure 3, men in non-STEM majors used career services at the highest rates, and women in STEM majors used career services at the lowest rates. Interestingly, these results are stable across all 11 categories of career services. These results are particularly unfortunate when we consider the impact of using career services for women in general and for women in STEM in particular.

FIGURE 3
Use of specific services by gender and STEM status

● Men in Non-STEM ● Men in STEM ● Women in Non-STEM ● Women in STEM

Source: 2022 Student Survey, National Association of Colleges and Employers

Finding 2: Using career services has a larger positive impact on women than men.

When comparing women who use career services with those who don't, in general, women who use career services have more job offers than women who do not use services. (See Figure 4.) This holds true for each type of career service considered. When comparing men who use career services with men who don't, only some career services appear to have a positive impact. (See Figure 5.) Moreover, in all cases, the impact of using career services is greater for women than it is for men.
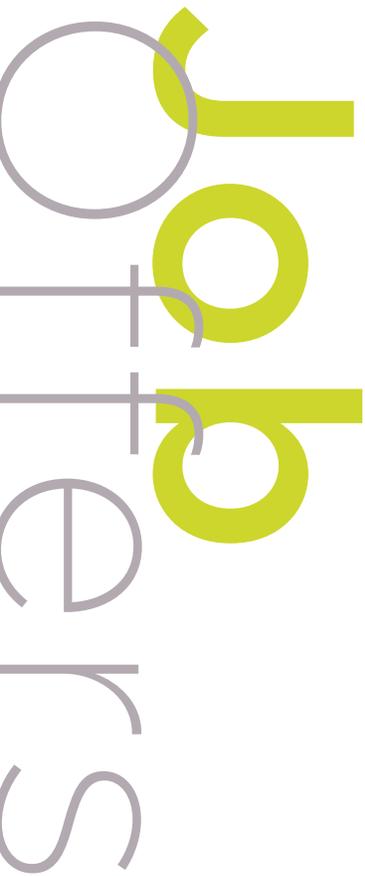
Offers

FIGURE 4

Impact of using career services on number of job offers, women
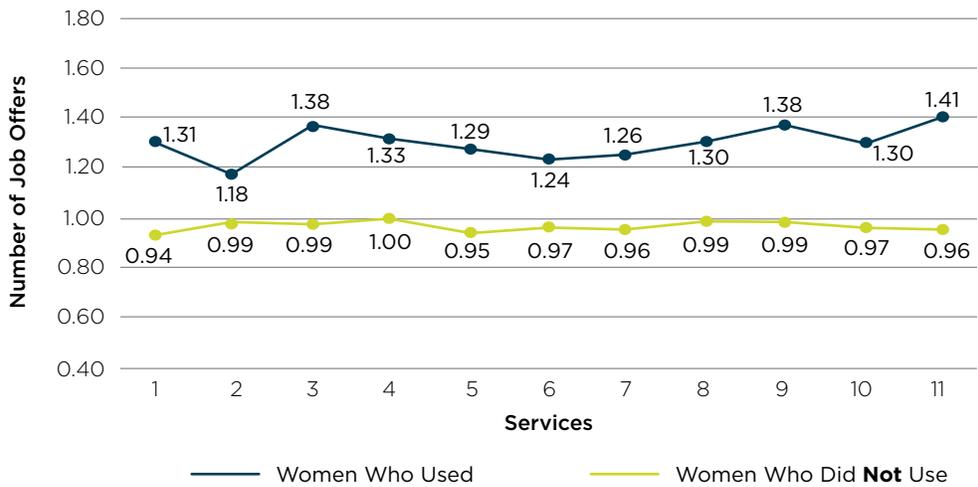
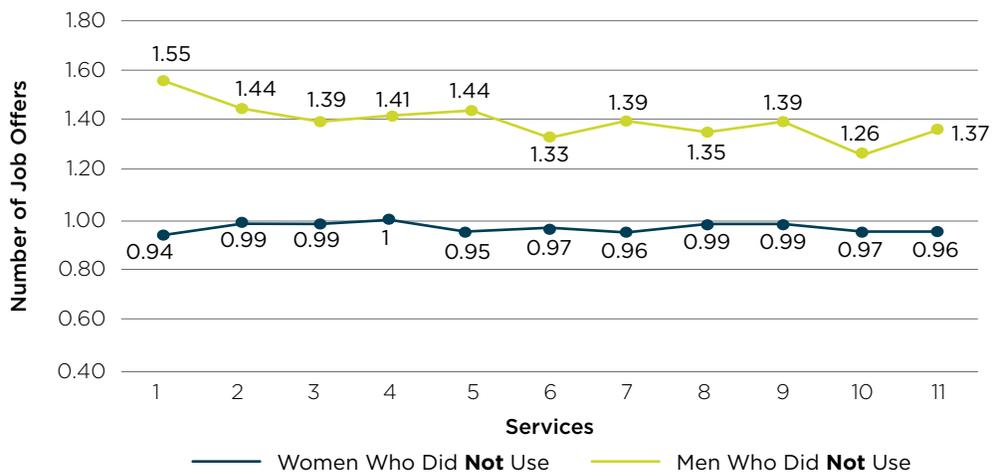Source: 2022 Student Survey, National Association of Colleges and Employers

KEY
1 = Individualized career counseling
2 = Resume review
3 = Skills test
4 = Career assessment
5 = Job search
6 = Internship/co-op search
7 = Mock interview
8 = Workshops
9 = Research employers
10 = Job listings
11 = Networking prep

FIGURE 5

Impact of using career services on number of job offers, men
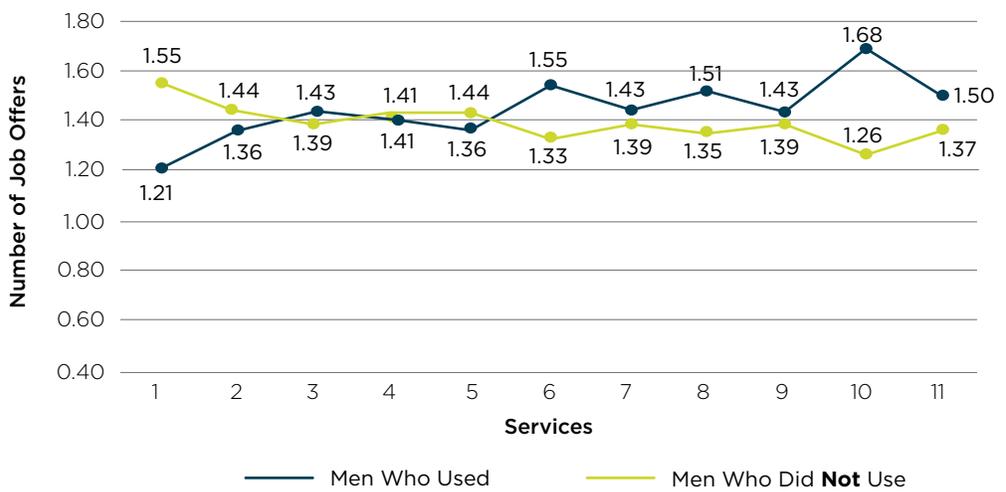
Source: 2022 Student Survey, National Association of Colleges and Employers

20

Finding 3: While men get more job offers than women, using career services narrows this gap, helping to level the playing field.

As can be seen in Figure 6, when neither group uses career services, men get more job offers than women. When both groups use career services, men still get more job offers than women, but the gap narrows considerably. (See Figure 7.)

FIGURE 6

Average number of job offers, men vs women who do **not** use career services

Source: 2022 Student Survey, National Association of Colleges and Employers

KEY

1 = Individualized career counseling
2 = Resume review
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FIGURE 7

Average number of job offers, men vs women who use career services
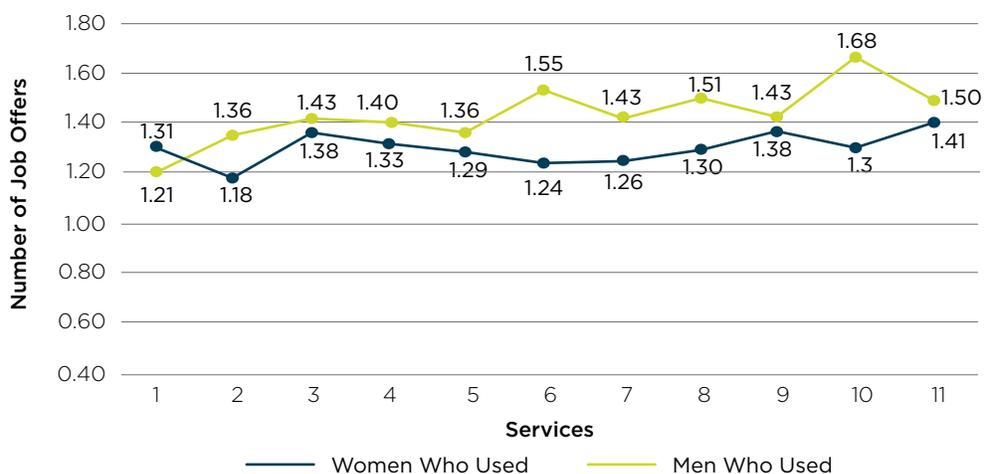
Source: 2022 Student Survey, National Association of Colleges and Employers

Finding 4: When women and men in STEM majors use career services, women actually outperform men as measured by job offers.

Perhaps the most surprising and important results were revealed when we compared men and women who were both in STEM-related majors. First, the data show that when neither group uses career services, men in STEM get more job offers than women in STEM. (See Figure 8.) **However, when both women and men in STEM use career services, women outperform men in terms of job offers received. (See Figure 9.)** The outcomes actually reverse in favor of women for the first time. This important result holds for every type of career service studied, with the exception of the use of job postings.

Taken together, these data illustrate that the use of career services can help level the playing field for women in general and particularly for women pursuing technology careers.
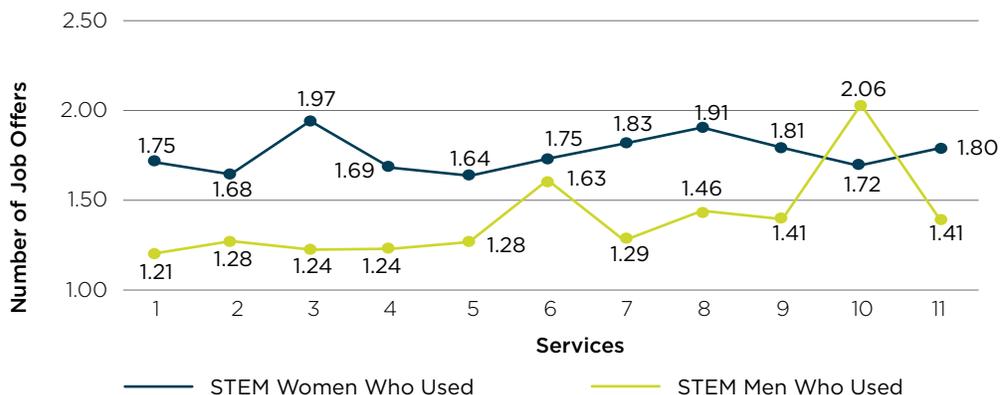
FIGURE 8

Average number of job offers, STEM women vs STEM men who do **not** use career services
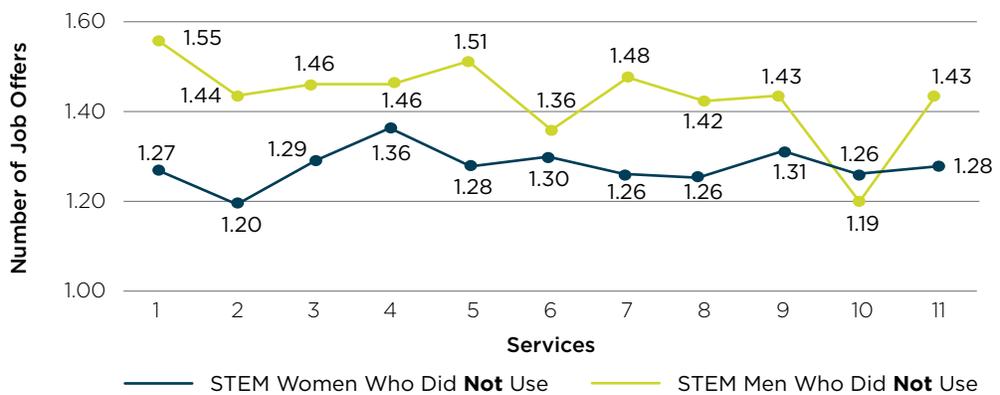
Source: 2022 Student Survey, National Association of Colleges and Employers

KEY

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FIGURE 9

Average number of job offers, STEM women vs STEM men who do use career services

Source: 2022 Student Survey, National Association of Colleges and Employers

Job listings, skill tests, and STEM students

- As Figure 9 shows, the use of job listings has a meaningful impact on STEM men, but not STEM women. This ties back to **earlier research from Hewlitt Packard** that found that women apply to jobs only if they are 100% qualified, whereas men apply to jobs where they are 60% qualified. This translates into fewer opportunities for women. A **LinkedIn Gender Insights report** found that women apply for 20% fewer jobs than men, despite sharing similar job search strategies. So, even when women use the job posting service offered by their career services office, they apply for far fewer jobs.

- Figure 9 also illustrates that the use of a skills test has a positive impact on job offers for women in STEM but almost none for men in STEM. While this is speculative, it is possible that women in STEM who may be uncertain about their sense of belonging in a STEM career and/or may be experiencing levels of imposter syndrome get important positive feedback and confidence when a skills test confirms that they have, in fact, chosen a career that is 'right' for them based on their skills.

Recommendations

The data illustrate that career services can have a significant, positive impact on women pursuing tech careers. Leveraging that impact, however, requires careful consideration.

As demonstrated from our qualitative survey responses, the reality is that there are several broad-based challenges that need to be taken into consideration when designing a suite of career services that are targeting women in tech. While these are factors that go beyond the scope of the campus career center, they need to be acknowledged and accounted for in the design of programs, including but not limited to issues related to gendered thinking and societal norms, lack of role models, and systemic inequities. Designing career services programs that address the reality of these issues head on and offer strategies for women about to enter the tech industry would be a significant step forward.

In addition, the results that show the positive impact of the skills test and the neutral impact of the job board for women in tech suggest that there are opportunities for programmatic intervention. The positive impact of the skills test suggests that women still lack confidence in their 'rightful place' in a technology career. There are opportunities to develop programs that start with first-year orientation and continue throughout the student's journey that could work to mitigate this misplaced doubt. This holistic approach highlights the importance of collaboration of career services with academics.

Furthermore, while there has been increased attention over the past decade to encourage women to apply for more jobs, women still remain reticent. It appears that different kinds of messaging, programs, and/or interventions are needed and would be worth pursuing.
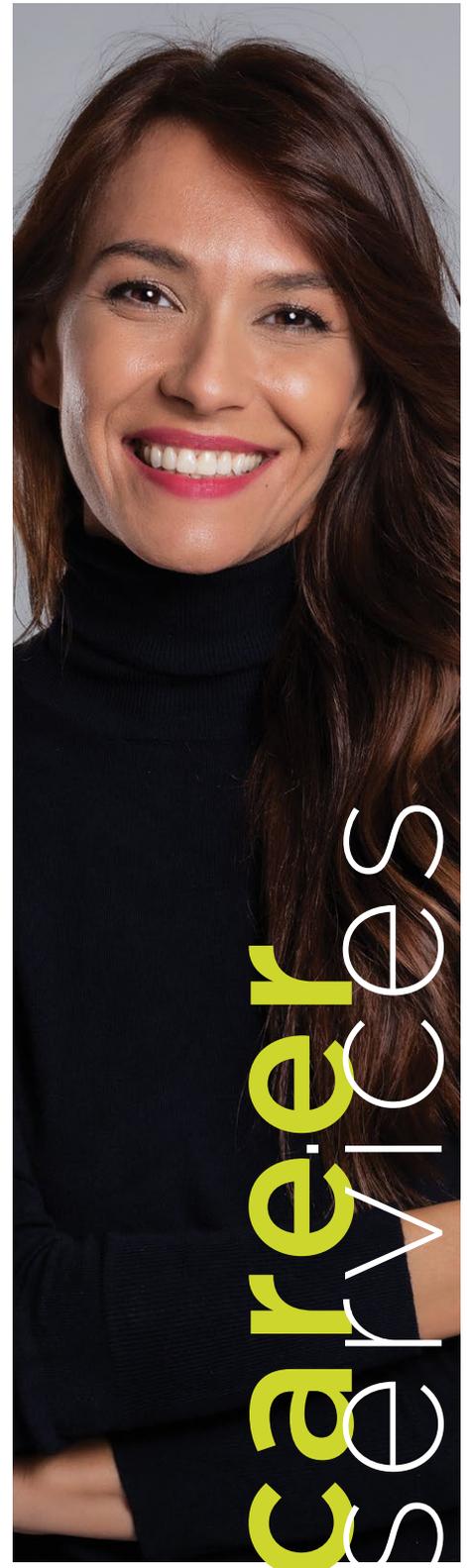
career services

There are steps career services practitioners can take to address those challenges, leverage their impact, and help female students succeed in tech careers.

1. Encourage women to use career services. If we can encourage more women pursuing tech careers to use the career services offered on their campuses, we can significantly impact their ability to land a job upon graduation. The fact that women in STEM actually outperformed men in STEM when they used career services is remarkable and worthy of focused attention to leverage and amplify this reality.

2. Undertake targeted efforts to connect with female STEM students, and tailor messages to their needs and concerns. As part of this, work with faculty to make classroom presentations and student organizations that are focused on STEM majors. Integrating career services into classrooms and co-curricular activities can help students better access services and increase uptake.

3. Ensure that the approach to encouraging women to pursue technology jobs is both holistic and systemic. Our research demonstrates that there are several challenges that impact women's success in technology—including confidence gaps and impostor syndrome, lack of role models and mentors, and systemic bias.

3. Develop programs specific to women entering the technology industry. Participants in our survey identified several institutions with programs focused on women in technical fields, including MIT (a variety of programs/resources exclusively for women); University of Maryland, Baltimore (Center for Women in Technology); University of Illinois Chicago (Women in Engineering); Georgia State University (WomenLEAD); Lemoyne College (Stempower); Spelman College (Braven); and Agnes Scott College (shadow experience program).

5. Build partnerships with external organizations and programs designed specifically to support female STEM students, e.g., Society of Women Engineers; Girls Who Code, Break Through Tech. These partnerships can help build community and connections to industry.