Community Report

Bigging Omaha's Women in Tech Gap

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Do Space Women Innovators Fellowship

31 July 2019

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Introduction

While more women than men currently graduate from college in the U.S. (Feeny, 2015), only 18% of computer science degrees are earned by women (National Center for Education Statistics, 2017) -- a percentage that reflects over a decade of stagnation. Moreover, only a quarter of U.S. computing jobs are held by women, down from a peak of 36% in 1991 (Ashcraft, McLain & Eger, 2016). Representation is even worse for women of color: Black women hold 3% of computing jobs while Latinas hold 1% (Ashcraft, McLain & Eger, 2016). Based on the demographics of the United States, these proportions should look significantly different.

The 2010 U.S. Census estimated that women accounted for 50.6% of the Omaha population. Of those women, 65.4% were considered to be a part of the labor force. **Despite Omaha's significant population of employable women, they hold only 24.4% of local tech roles** (Miller, 2019). This math doesn't add up, Omaha.

Diversity in tech is essential to creating new and innovative products. The beauty of diversity, both surface-level and on a deeper level, lies in the variety of approaches to solving problems. While the business case for diversity suggests significant added value to organizations, it's also the right thing to do.

Project 18, a local community group focused on making Omaha the most women-friendly tech community in the U.S., conducted a grassroots study examining women in tech roles last year. Preliminary results showed marked discrepancies between how Omaha men and women in tech felt about the support their employers gave them based on gender (Hegarty, 2018). Many Omaha women in tech and tech-related jobs reported that they perceived gender had been a factor in predicting negative workplace experiences, like missing out on raises and promotions, and in some cases, being taken less seriously in their careers.

Nationally, women leave the tech industry at a 45% higher rate than men (Hewlett, Sherbin, Dieudonné, Fargnoli, & Fredman, 2014). Though the Project 18 survey was an important first step toward understanding our local landscape and the barriers that women face once they enter our tech workforce, we need to further explore why Omaha

women choose to pursue tech majors at the university level, and, having entered the tech industry, how and why they choose to leave or persist.

Research Objective

This research focused on exploring the experiences of two main groups of women in the Omaha area: (1) women in traditional university programs whose current or former majors had a strong emphasis in computer science, and (2) women who were currently or formerly working full-time in tech roles for Omaha employers.

Research question topics included pre-college and family experiences (Gulshan, 2005), personal traits (Ballard, Scales, & Edwards, 2006; Graham, 1997; Smith, 2012), major or career choice (Ballard, 2005; Bunderson & Christensen, 1995; Goodness, 1990; Thackeray, 2005), culture and climate of the program/work environment (Smith, 2012), stereotypes (Cheryan, Plaut, Handron, & Hudson, 2013), and future plans (Graham, 1997).

Methodology

Recruitment occurred in several ways: direct appeals through social media channels (e.g. Twitter, Instagram, and Midwest Dev Chat); posting in company social networks; in-person solicitation at GETConf 2019, ICAN Women's Leadership Conference 2019, university tech affinity groups; and word of mouth.

A total of 20 Omaha women participated in the study: seven students and 13 employees. Of the seven students, only one had left a tech major. Three of the 13 employees had left tech careers. Of those three, one was considering a return to tech. Research guides were created to maintain a consistent interviewing experience, but participants were free to talk about the areas that they felt had the greatest influence on their tech path. Students ranged from sophomores in a 4-year program to members of a PhD program. Employee work experience ranged from two years into their first tech job to working for over 30 years in the industry.

Participants spent 30-60 minutes, either in person or on a web-based Zoom call, sharing their personal stories and perspectives, from how they chose their majors to what steps they took along their career paths. Each participant was offered a gift card for her time.

Findings

Mentorship, Sponsorship & Representation

This study can be added to the myriad studies that have shown that there is a powerful social component influencing womens' decisions to leave or remain in tech. Though some use mentorship and sponsorship interchangeably, they are two distinct concepts (Ayyala et al., 2019). Mentorship deals with assistance received over a longer period, usually with career development. Sponsorship, on the other hand, deals with specific instances where sponsors advocate on behalf of proteges for high-visibility opportunities.

All of the participants currently in the tech field, either as a student or as a professional, had a mentor or someone in their support circle who they turned to when they felt frustrated. Participants who had someone to sponsor them and help them move forward in their career or studies felt like they had the confidence to keep going. They could see themselves as successful.

When speaking with students of color, some mentioned that seeing other women in classes was nice, but not enough. Members of the same race or ethnicity would naturally gravitate toward each other and could be unintentionally exclusionary, making them feel othered. One way to improve the number of women of color in this field is to highlight their accomplishments. It is particularly important for women of color to see successful women in tech who represent their identities.

Omaha organizations and universities that see the most successful and satisfied women in tech have some form of mentorship program that links women in tech together. If your organization does not have enough women to support an internal program, consider partnering with other local businesses to create a mentoring coalition.

"	There was one point in time, the semester I went into a computer science professor's office for help with an assignment and it was about halfway through, and he goes, 'What major are you again?' I told him it wasn't computer science. And he goes, 'Your mind thinks like a computer scientist, though.' And it took me a semester of reflecting on it. He had asked me to be a TA for the Java class. So, him kind of keeping on board with me throughout the program and not letting me slip through the cracks was probably very pivotal. "

- 	Current tech student

"	I think having good mentors, a good support system? There's obviously so much to learn, and to know that having two people there that are gonna help you when you're struggling and having difficulty understanding something. The people who are willing to sit with you and walk you through what's going on. "

- 	Current tech student, when asked "What keeps you in your major?"

"	Most important factor for staying? The mentors and the relationships that I've gotten to kind of create at every company, and I keep in touch with all my old coworkers. "

- 	Current tech professional

"	I mean, there are times when I get frustrated because I can't figure things out at work. But I had really supportive people who were willing to sit with me and "

walk me through things. And it's never demeaning. So there's always hope in it.

" In all of my time, in junior high and high school, I've always been one of the only females in those classes. "

Flexibility

Unsurprisingly, flexibility was shared as a major reason to either stay in or leave tech. Employees who have the flexibility to work from home are more likely to be happy in their jobs (Fonner & Roloff, 2010; Gajendran & Harrison, 2007). Some employees were able to see the positive effects of higher job satisfaction even when working from home only once or twice per week.

Telecommuting/telework has existed for decades and the technology that facilitates successful work-from-home situations has improved over the last 10 years. Myriad video chat, real-time collaboration, and knowledge sharing tools exist to allow workers to work together when they're not in the same office, or even the same time zone.

Studies have repeatedly shown that flexibility attracts and retains more women in the workplace. According to a Pew Survey, 70% of women with families said that having a flexible work schedule was extremely important to them (DeFelice, 2018).

Improved flexibility (including remote work), part-time opportunities, and intensive onboarding programs would be well-received for women in tech in Omaha. If organizations are having difficulty sourcing the talent they're looking for, they could consider growing it internally through job shadowing or hosting their own boot camp with a guaranteed job upon training completion.

> If I could have stayed part-time, gone down to two, maybe even three days a week, and been able to have that period when my kids were little to telecommute, if I could have done that, I probably would have stayed in the field.

- Former tech professional

" I really appreciate the little things, like having a flexible schedule, being able to work from wherever I want to. They're so supportive. If I asked for anything, you know, they don't say no, unless they have a good reason to. And I don't think they've ever actually said no. The people who I work with now are also just like, genuinely good people. "

-   Current tech professional

Different Interests

The one student in this study who left a tech major did so because she realized that it was not going to help her get to the job she knew she wanted.

Programs in the Omaha area, such as Girls Who Code and Mystery Code Society, have made strides in bridging the gap between girls who know about tech/coding and girls who do not by way of introduction or exposure to the topic. Exposure at an early age can help some students figure out that they enjoy tech and create a plan for how they will learn more about it. For those who don't have exposure or introductory programs, it can seem as if the door is closed to tech in the future. They may not consider a career in tech if they can't navigate how to get there.

However, careers aren't exclusively linear. If students want to pursue a different interest, they need a path to understand how to incorporate and synthesize what they've already learned into their new aspiration. **If schools are unable to provide the resources to teach the technical competencies for a career in tech, they should educate on how core knowledge, skills, and abilities prepare you for all types of work and how to obtain those attributes on your own after formal education.**

> One of the big reasons behind my decision to shift majors was the fact that I had my heart set on these career goals that I knew I loved and that major was not going to be the path that got me to that place.

- Former tech student

Gatekeeping & Sexism

The most heartbreaking part of this study was hearing about the sexism, harassment, and trauma to which some professionals had been subjected. For some, these experiences were enough to make them leave the field altogether. People in positions of power cut off resources, demeaned, belittled, sexualized, and dismissed skills of women. Hearing these stories was a cruel reminder that sexism still exists -- and it exists in Omaha.

One way to help combat prejudice is through an exercise called the jigsaw classroom (Aronson & Aronson, 2012). This was originally developed to help reduce racist thoughts or behaviors in children by placing them in small desegregated groups and making each child dependent on the other children in his or her group to learn the course material and do well in the class. Formal studies demonstrate that children in jigsaw classrooms perform better and show greater increases in self-esteem than those in traditional classrooms; further, they show more evidence of true integration and better abilities to empathize with and see the world through the eyes of others. This process is effective because it breaks down in-group and out-group categorization and fosters the notion of the class as a single group. Further, it places people in a "favor-doing" situation, which leads people to like those for whom they perform favors. Lastly, it encourages the development of empathy. 10-year-old students who had spent two months in a jigsaw classroom were more likely to successfully take the perspective of a story character and correctly answer questions from this character's point of view than were students who had not had the jigsaw classroom experience. **Small, interdependent groups, or a greater reliance on interdependent work assignments could be created in organizations to curb a rampant sexism problem in organizations.**

"   I remember interviewing for a company and then hearing a male classmate make some rude comment about how I was going to have an unfair advantage because I'm a woman. "

- Former tech professional

> " I heard him bad mouthing the woman at the company who was willing to be my mentor. "

<div align="right">-   Former tech professional</div>

> " He decided to go back on his word and just offer the job to this dude that nobody wanted. And so I was devastated. "

<div align="right">-   Current tech professional</div>

> " He kept saying over and over again, like, 'but how can you speak clearly to developers, if you're not a developer?' "

<div align="right">-   Current tech professional</div>

Bright Spots

Though there are some sinister behaviors that can drive women from this field, there are strong triumphs that participants shared that can give the community some hope. When asked about things that make them feel strong in their careers or studies, participants were quick to point to instances when they felt like they were accomplishing great things or helping other women. Most participants saw themselves as creative — either through the musical or artistic hobbies they have, or through the problem-solving lens with which they view their work. One participant even made a direct correlation between her love of learning foreign languages and learning programming languages.

"   Being able to work both independently and together with people to come up with solutions has always just been really exciting to me. And it took me a long time to figure out what I wanted to do, but I really love, like, the whole technology world. "

-       Current tech professional

"   I think that we, as women, are more aware, and hopefully more vocal for each other. We're trying to lift each other up and bring more women into the same sort of field. How can I open the door for you? That's where my head is at. "

-       Current tech professional

"   I feel really strong and proud of myself that I, you know, made it to that point where I learned. I mean, I still don't have all the answers, but I was able to do my job most of the time and not have to ask for help, or, or just feel confident enough in "

myself that I've learned what I need to know and be able to do my job pretty independently.

- Current tech professional

Limitations and Future Directions

Since this study used qualitative methods, it cannot quantify the number of tech women in Omaha who these stories represent. More research should be conducted to examine how prevalent these findings are for women staying in or leaving tech in Omaha.

This study focused on traditional ways of entering the computer science/ coding/programming field. Several participants in the career category entered their jobs by going to an area code school. More attention should be paid to those women who enter a technical field through a boot camp or other non-traditional means, as well as the types of students that they attract and benefit.

Further, the gig economy is booming and more women than men are freelancing, which means these individuals may not be working in traditional organizations. A brief search on Upwork shows 199 freelancers in Nebraska that specialize in web, mobile, & software dev and 61 that specialize in IT/networking. It is unclear how many of those freelancers on that one platform identify as women. However, we can assume that at least half of them are women. According to a 2014 study, 53 million people in the US are working freelance, and just over half of them are women (Edelman Berland, Inc, 2014). There are other means of freelancing outside of Upwork and there is an opportunity to explore why these technical individuals choose to freelance. Top reasons for freelancing include schedule flexibility and ability to pick up extra money.

Another limitation of this study was the lack of representation of folks who did not consider a tech major in college and therefore did not enter one. Future research should interview high school students to understand why they choose or dismiss a tech major to uncover more potential reasons as to why there are not more women in tech.

This study only examined cisgender women's backgrounds. Experiences of transgender women and non-binary individuals in tech need to be uncovered so that we can understand more about the specific challenges they face and what our community can do to better support them.

As in the tech itself, women of color were underrepresented in this study. Of the 20 women who participated, only 4 identified as women of color. A greater effort needs to

be made to explore intersectional experiences in tech to make sure that recommendations to improve the local tech community support women of color.

Conclusion

The most profound part of this research was the gratitude that participants had for a space to share their stories and experiences. Three of the 20 participants refused the gift card compensation, saying instead that they were just glad that someone had asked them to share and that there was a project that was exploring how to make things better for them and women like them.

By allowing these women to share their stories, we as a community can better support their needs and the needs of other women like them. By collecting data on the experiences of women in Omaha, we can begin to track progress over time in an effort to make Omaha a better place to be a woman in tech - and thereby a better place for all technologists.

It's not enough to simply identify that we need to do more to help tech women in Omaha. We can all help the Omaha tech community by doing the necessary work to ask the critical questions that will help us to understand what specific things we can do to help our sisters in tech. The next time you meet a woman in tech, ask to hear her story. The more stories we hear, the more we are able to do as a community.

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About the Author

Bianca Zongrone Jefferson is a Senior Product Designer at Hudl and the owner of Maebean, LLC, a research and design business in Omaha, Nebraska. She has a Master's degree in Human Resource Development from Villanova University and has done research and PhD coursework through the University of Nebraska-Omaha. In her effort to introduce companies to research and testing, she has implemented or updated formal, moderated usability testing programs at several Omaha companies. She has spoken at user groups and classrooms in the Omaha area about the importance of UX and how others can implement or enhance UX practices and techniques in their own companies.

Bianca is proud to serve as an advisory board member of Mystery Code Society, an Omaha nonprofit that champions gender equity in tech through beginner and intermediate coding education for women, femmes, and non-men.

Appendices

Career Interview Guide

<u>Pre-College / Family</u>

- Did you have a computer in your home growing up?
- Do you have family members in a STEM field?
- Tell me about the support you receive from your family with regards to your career.
- Do you feel your family/parents influenced you in pursuing a CS career?

<u>Personal Traits</u>

- Tell me how you would describe yourself. How do you think your friends would describe you?
- Do you consider yourself to be creative? Why or why not?
- What were your academic strengths and weaknesses in school?

<u>Career Choice</u>

- Tell me about how you chose your career.
- Can you think of any one event that really had an effect on your choosing computer science as a career?
- When you first thought about your career did you already know in what field it might be?
  - If not, at what point did you decide this career path?
- Have your perceptions of the field have changed since beginning your career? If so, how?
- Do you enjoy your career as much as you thought you would? Why or why not?
- Tell me about a time where you felt strong at your job or in your career? Why did it feel that way?

- Have you ever thought about switching careers?
- Have you ever felt discouraged?
    - If so, who did you talk to or how did you handle it?
- What has been the most important factor for you staying in your career?

Culture and Climate of The Field

- How has being a woman in this field affected you?
- Tell me about what the tech culture is like?
    - Would you say it's competitive? Collaborative?
- Does the culture or climate present any barriers for women?
    - If yes, how have you persisted?
    - If no, how do women in general persist?

Stereotypes

- Since women are a minority in this field, how does that affect your experience?
- Do you think that women do just as well as men in computer science? Do you do just as well as men in your job?
- Describe what people who work in tech are like.
- Do you feel you fit that description?

Career

- What are your upcoming plans? Personal? Professional?
- How has Omaha been as a place to work?

Exit Questions

- Can you name any women you know or knew who left a tech career?
    - In your opinion, why did she leave?
- Is there anything I haven't asked that is relevant to your background or experiences?

College Interview Guide

Pre-College / Family

- Did you have a computer in your home growing up?
- Do you have family members in a STEM field?
- Tell me about the support you receive from your family with regards to your major.
- Do you feel your family/parents influenced you in pursuing a CS major?
- Did you ever have a teacher support your major? Tell me about that.

Personal Traits

- Tell me how you would describe yourself. How do you think your friends would describe you?
- Do you consider yourself to be creative? Why or why not?
- What were your academic strengths and weaknesses in middle school and high school?

Major Choice

- Tell me about how you chose your major.
- Can you think of any one event that really had an effect on your choosing computer science as a major?
- When you first thought about college did you already know what your major might be?
    - If not, at what point did you decide to major in computer science?
- Have your perceptions of the field have changed since beginning college? If so, how?
- Do you enjoy your major as much as you thought you would? Why or why not?
- What is your favorite class that you've had in undergrad? Why was it your favorite?
- Have you ever thought about switching majors?
- Have you ever felt discouraged?

    ○ If so who did you talk to or how did you handle it?

  ● What has been the most important factor for you staying in your major?

Culture and Climate of The Program

  ● How has being a woman in this major affected you?

  ● Tell me about what the program's culture is like?

    ○ Would you say it's competitive? Collaborative?

  ● Does the culture or climate of your program present any barriers for women?

    ○ If yes, how have you persisted?

    ○ If no, how do women in general persist?

Stereotypes

  ● Since women are a minority in this department, how does that affect your educational experience?

  ● Do you think that women do just as well as men in computer science? Do you do just as well as men in your classes?

  ● Describe what computer science majors are like.

  ● Do you feel you fit that description?

Career

  ● What are your post-graduation plans? Personal? Professional?

  ● Do you plan on going into a computer science field for work? Why or why not?

  ● In what area of computing would you like to work and why?

  ● Where do you think you'll look for work? Why?

Exit Questions

  ● Can you name any female students you know or knew who left computer science?

    ○ In your opinion, why did she leave?

  ● Is there anything I haven't asked that is relevant to your background or experiences?