

CALLING ALL STEM EMPLOYERS:

WHY WORKPLACE CULTURES MUST SHIFT TO CHANGE THE GENDER LANDSCAPE



ONTARIO
SOCIETY
OF PROFESSIONAL
ENGINEERS

BREAKING BARRIERS FOR WOMEN IN STEM

MAY 2018

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For a list of our partners and to learn more about the project, please visit: www.letsbreakbarriers.ca



Status of Women
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PROJECT OVERVIEW

In 2017, Status of Women Canada (SWC) awarded the Ontario Society of Professional Engineers (OSPE) with a grant for a 36-month project that addresses barriers that contribute to the under-representation of women in Science, Technology, Engineering and Mathematics (STEM). The *Breaking Barriers for Women in STEM* project works with students, educational institutions, employers and governments, and has generated and analyzed grassroots perspectives to develop technology-based tools to help overcome systemic barriers.

This report summarizes findings based on interviews, focus groups and a survey of men and women in STEM professions. As well, university and college female students in STEM were consulted and surveyed to gather their perspectives about careers in STEM. A total of 81 individuals, all in Ontario, were consulted in focus groups and interviews. In addition, 2,956 surveys were completed by 1,172 men and 1,727 women STEM professionals from across Canada. Statistics from the 2016 Canada Census have also been used to support the findings.

Over 50 per cent of the female respondents have 5 to 20 years' work experience in STEM positions, with over 50 per cent of men having over 20 years' experience. In general, women are isolated in STEM workplaces. A large majority (81 per cent) estimated that less than 30 per cent of the STEM professionals in their workplace are women.

Based on the feedback from the survey, interviews and focus groups, we can confidently say that women in all STEM disciplines and roles face similar challenges in the workplace. The top challenges expressed are:

- Feeling disrespected and undervalued by managers, co-workers, contractors and/or clients;
- Lacking mentors and/or role models;
- Being paid less than colleagues of the opposite gender doing the same or lower level work;
- Work culture and job demands that compete with family and/or community responsibilities;
- Having weak professional networks.

However, the data also shows that as the representation of women in STEM workplace increases, there is a decrease in the number of women reporting all these top challenges, except for work-life balance issues. What is abundantly clear is that the barriers women in STEM face is a *workplace issue*. To break these barriers, employers need to assess their corporate culture and adjust policies and practices accordingly. As such, the purpose of this report is to raise awareness among employers about the challenges facing women STEM professionals and to share ideas on how to make workplaces more equitable and inclusive for women.

SETTING THE STAGE: STEM PROFESSIONALS IN CANADA

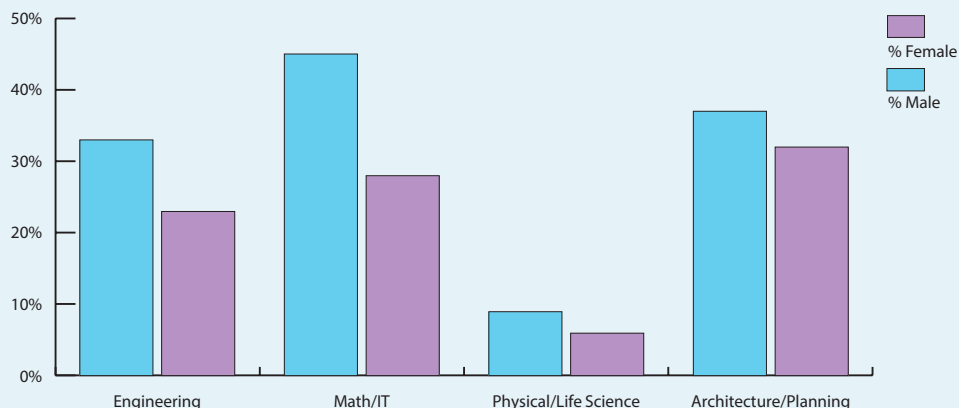
SWC has invested in organizations across Canada to help break systemic barriers that discourage or prevent women from achieving economic prosperity on an equal footing with men. In STEM professions the presumption is that there are fewer women than men in STEM workplaces, resulting in less economic benefits for women. From an employer perspective, their question may be whether there is evidence that these conditions exist, and if they do, how to improve their policies and procedures. Based on census data, the answer is 'yes.'

OSPE analysed 2016 census data and can confirm that, although women continue to make strides to increase their presence in STEM workforces, significant differences exist between the proportions of men and women in STEM occupations. Of all the STEM professions, life sciences have the largest proportion of females, whereas engineering demonstrates

the lowest. Comparisons of men and women employed in STEM occupations with university degrees in Canada are summarized in Figure 1.

For engineering technicians and technologists, it is more difficult to define the proportions of men and women in specific occupations as these professions work in a wide range of occupations. Those with engineering technician or technologist diplomas/certificates would not necessarily self-identify as working as an engineering technician or technologist. They are therefore not included in the census analysis in this report. However, the 2016 Canada Census does categorize several individuals who list 'Engineering Technologist' as their field of study and those who possess a college certificate/diploma in said field. The same data indicates that 13 per cent of Ontarians with an engineering technologist/technician diploma are female.

Figure 1: Proportions of Employed STEM Professionals with University degrees in Canada Working in their Field of Study



WHERE IT BEGINS: SCHOOLS AND EDUCATION

The under-representation of women in STEM fields reflects choices made in high school and post-secondary education.

Among female students in focus groups held at Ontario colleges and universities, there was near unanimous agreement that their high school experiences were discouraging, or at least unsupportive, for young women considering a STEM education and career.

Despite the discouragement, all women college or university students expressed their satisfaction with their programs of study and with their choice to pursue a STEM post-secondary education. Women, however, are clearly a minority in STEM post-secondary programs. For example, as reported by Engineers Canada, the percentage of women in engineering degree programs in Canadian universities is 19.3 per cent. In computer engineering, the numbers are lower with women representing only 10.1 per cent of graduates who earned software engineering degrees and 8.6 per cent of computer engineering degrees.

Indeed, in focus groups there was almost unanimous agreement that female students are satisfied with their program of study. There is an undeniable optimism and positive outlook towards future careers among the young women who participated in the OSPE research.

But does this optimism carry over into the workforce once these women find jobs in STEM? Focus groups and surveys of STEM professionals reveal this optimism and positive outlook may, in some cases, be tempered.

Comments typical of student frustration with high school include:

“Guidance counsellors were dissuasive of girls pursuing a STEM education.”

“Career courses in high school need to be entirely re-done. There were not helpful at all. Some teacher told me that I can’t get into engineering.”

“Nothing helpful in high school; Teachers thought girls should be teachers; High school doesn’t help you prepare to make that decision.”

Regardless of gender, post-secondary STEM students consistently say they intend to pursue a career in STEM. In the OSPE survey of students in various STEM programs, 95 per cent of males and 93 per cent of females plan to pursue STEM careers. Comments from women students include:

“I love what I am studying. It is intriguing and challenging.”

“I enjoy the material that I am learning, and through networking and mentorship opportunities I feel like I will enjoy a career in engineering.”

“I love math!! I can’t imagine doing anything else that didn’t involve math.”

WORKPLACE CULTURE: CHALLENGES EMPLOYERS NEED TO ADDRESS

The majority of women interviewed and surveyed who successfully secured jobs in STEM are very satisfied with performing technical work. Nevertheless, compared with men, many challenges exist for women in the workplace. As mentioned by the Canada-United States Council for Advancement of Women Entrepreneurs and Business Leaders (the Council) (2018),

“Women face direct and indirect barriers in both technical and business-oriented roles. They are more likely than men to start lower on the corporate ladder, often lack female role models and, indeed, may be the only female among their everyday work colleagues. Sometimes, women can face bias in the workplace and have difficulty making their voices heard.”¹

Grassroots perspectives from the OSPE study echoes the above observations. One question on the survey of STEM professionals is particularly revealing. When asked, *what challenges have you faced at work that made it difficult for you to advance in your career?* significant differences emerged between the male and female respondents.

As indicated in Figure 2, men and women identify different challenges to advancement. Two challenges are statistically tied as the top choices and in practical terms affect one out of two women:

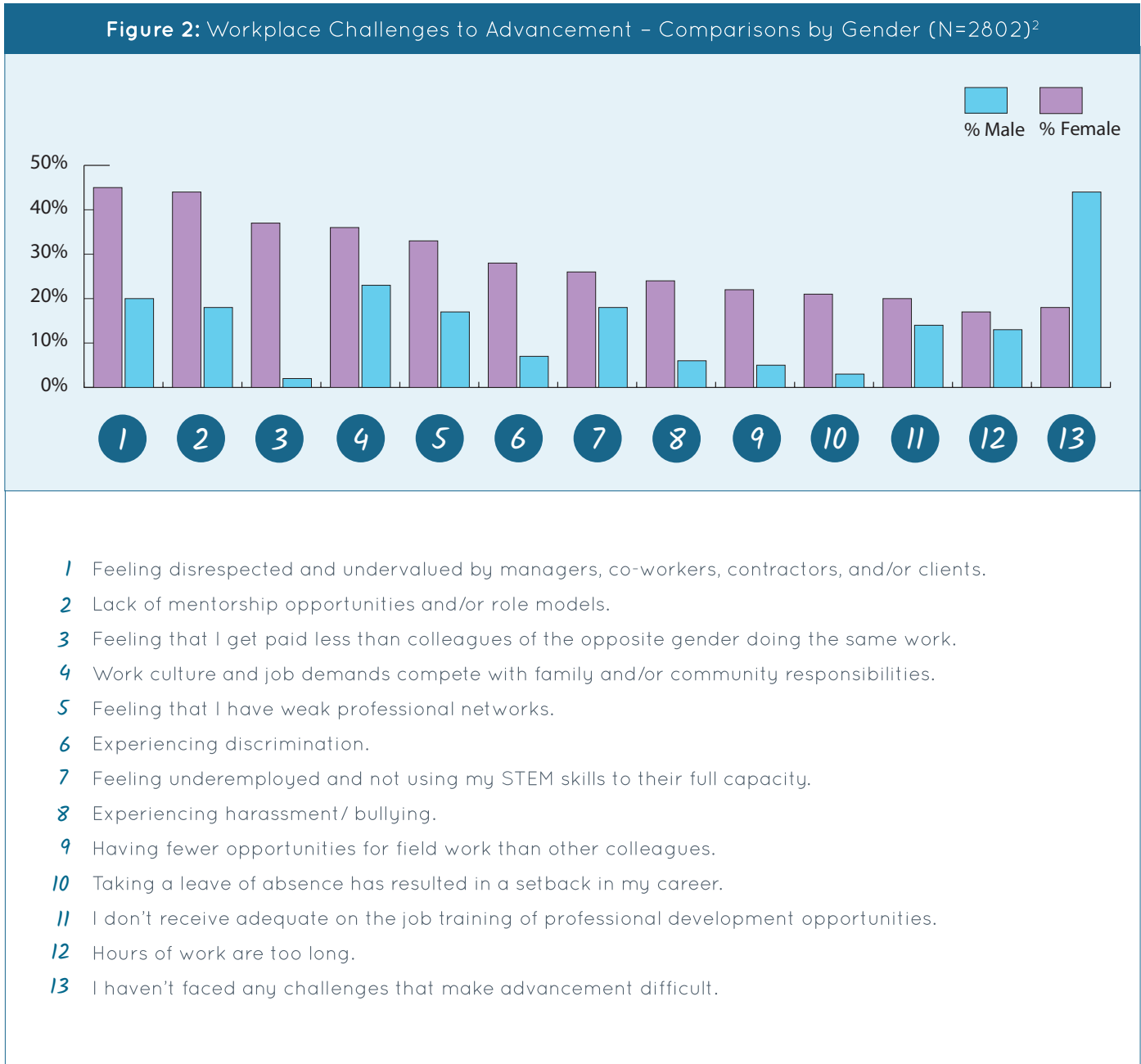
“Feeling disrespected and undervalued by managers, co-workers, contractors, and/or clients.”

“Lack of mentorship opportunities and/or role models.”

For men, the most common response is, “I haven’t faced any challenges that make advancement difficult.”

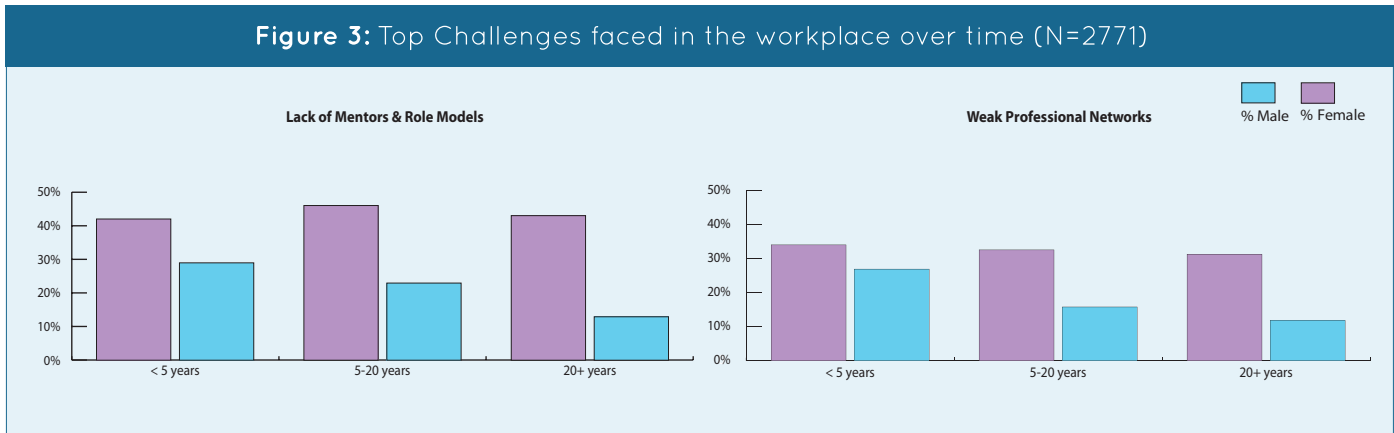
¹ Canada-United States Council for Advancement of Women Entrepreneurs and Business Leaders. *Increasing the Number of Women in Science, Technology, Engineering and Math (STEM)*. 2018. <https://advancingwomeninbusiness.com/pillar-two/>

For the top five challenges, there are significant differences between men and women at each stage of their careers. In all cases, a higher percentage of women report that these are obstacles to their career advancement.



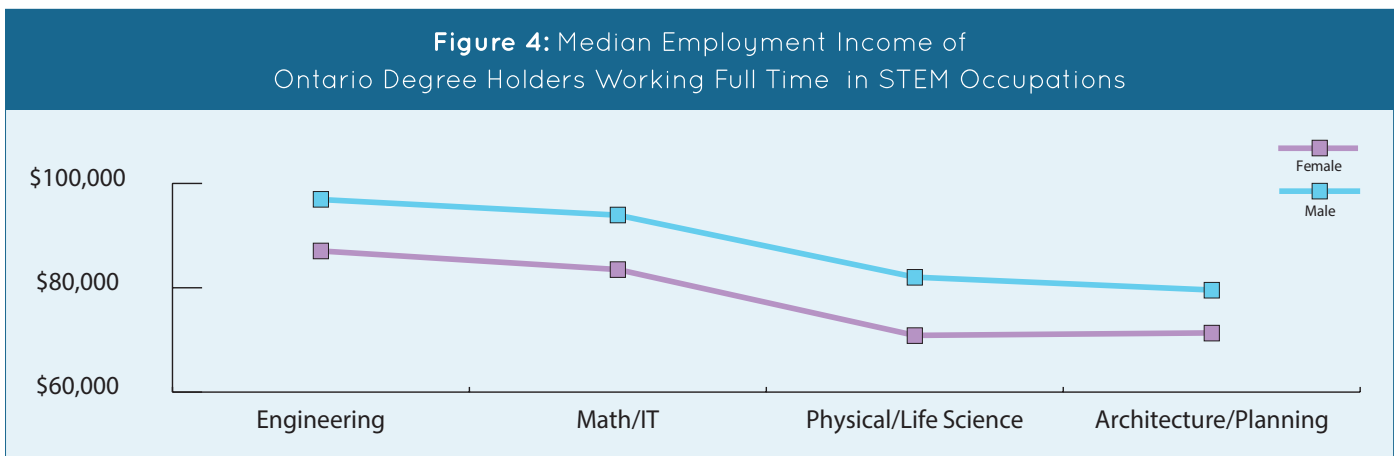
² Note: Differences between female and male responses are statistically significant for each challenge as well as “no challenges”. Over all challenges, Chi-square test significance is <0.005.

Responses to the question of challenges are compared based on years of STEM work experience in Figure 3. This comparison highlights the striking fact that, unlike men, the challenges faced by women do not decline as they progress in their career, as it does for men.



The 2016 Canada Census confirms that the challenge of women perceiving they get paid less than men is more than a perception – it is a reality. As demonstrated in Figure 4, women in all STEM occupations reported income that is consistently lower than that of their male counterparts.

Source: 2016 Census Canada

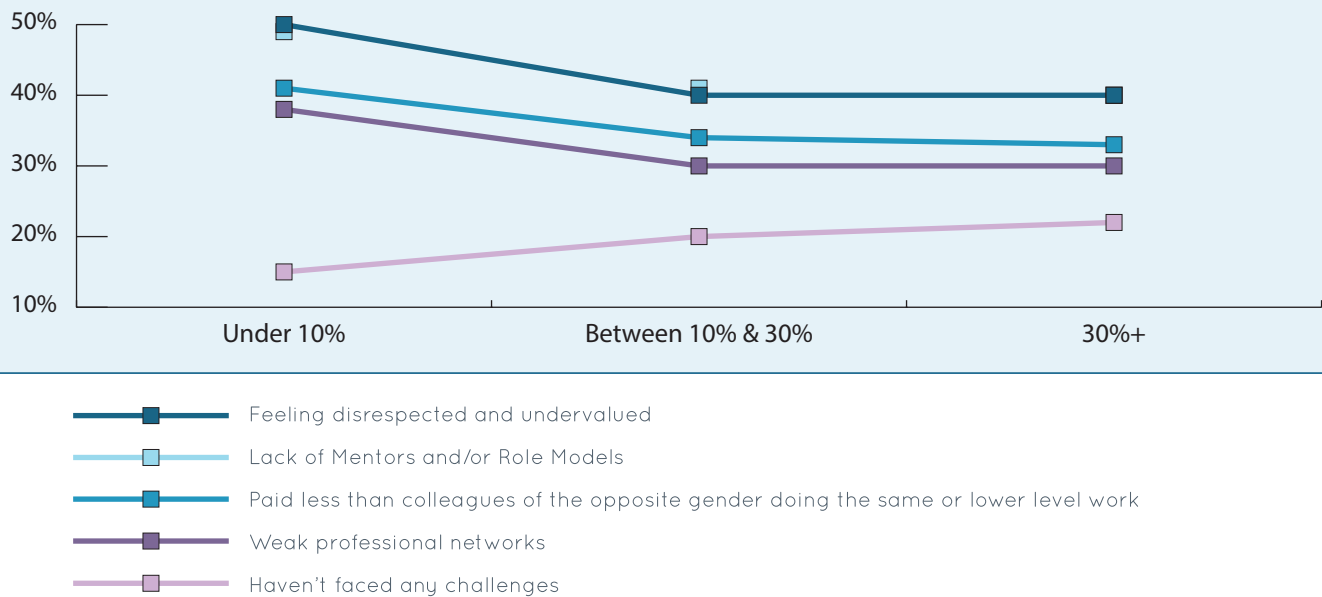


WORKPLACE NUMBERS MAKE A DIFFERENCE!

It is clear from our data analysis that having more women in STEM workplaces has a positive effect. In Figure 5, four of the top challenges for women are compared based on the level of representation of women in STEM workplaces. When women are very isolated (i.e., fewer than 1 in 10 females working in STEM roles in their workplace), a significantly higher percentage of women report that they experience these challenges. In contrast, when the level of

representation of women increases, a significantly higher proportion of women report that they have not faced any challenges to career advancement. This result supports Engineers Canada’s position that a 30 per cent ratio of women in the profession is a tipping point for changing workplace culture.

Figure 5: Top Challenges Women in STEM face, when compared to the proportion of Women in their Workplace (N=1637)



Additional information was gathered in a focus group with 16 professional women who work in STEM at a Women in Renewable Energy (WiRE) event. Several poignant observations were made in interviews and on a questionnaire concerning challenges they face in the workplace. Comments include:

“Proving the technical competence to everyone around (peers, managers, customers) is the biggest challenge.”

“Unfortunately, many business deals/relationships are built from personal relationships and if you’re not invited to the golf game, fishing trip or whatever the event may be, you are potentially excluded from these opportunities.”

“Out in the field there are very few women. I often get the impression some men are uncomfortable having women entering a workspace that has previously been dominated by men.”

“Being an outsider of the ‘old boys club,’ never being fully accepted; Jokes that are derogatory; At times feeling that women have to work a bit harder and longer to prove your technical capabilities.”

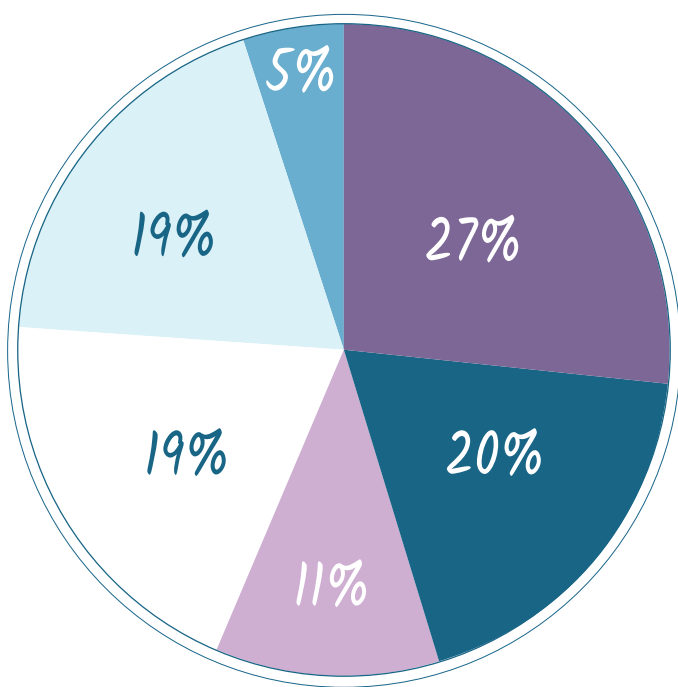
There is no disputing the fact that challenges exist for female professionals in STEM workplaces. The critical question however, is how do women overcome these barriers? And more importantly, how can employers alleviate these challenges to create equity between women and men in the workplace?

This is at the heart of OSPE's project - OSPE wants to find ways to facilitate the breaking down of these barriers.

In the survey women STEM professionals were asked, 'If you experienced any challenges, how did you overcome those challenges?' The results are revealing and summarized in Figure 6.

Figure 6: Summary of How STEM Women Professionals Overcome Workplace Challenges (N=958)

- Persevere/work harder
- Openly communicate
- Found Mentor/Group; Family Support
- Quit/change jobs
- Haven't overcome
- Upgrade skills/education



A total of 958 women responded to this open-ended question. Many shared detailed and often intimate accounts of their experiences and in many cases, struggles.

Answers were categorized in the following six general areas:

● *Persevere/Work Harder:*

260 women responded, many using one word 'persevere,' with this category as their number one choice. Respondents said that they had to work harder to prove their worth and show men they were equally capable of doing the job.

● *Openly Communicate:*

192 women relied on open communication to overcome or cope with challenges. They indicated that by sharing their opinions and goals with supervisors and co-workers they achieved what they wanted. However, open communication also meant that some women, needed to assertively speak with harassers to let their feelings be known and to convey that some behaviours and verbalizations are inappropriate.

● *Found Mentor/Group; Family Support:*

101 women reported that finding a mentor, joining a networking group or organization, or receiving family support helped them overcome challenges. It is especially noteworthy that mentors play a significant role in assisting women with their career success. Several women stressed that joining groups like WiRE (Women in Renewable Energy) provided great support.

○ *Quit/Change Job:*

180 women reported that they were forced to or chose to quit their job to overcome challenges. Many successfully quit to open their own businesses, while others moved on to companies that were more respectful. It was common for women to state they quit their job to raise a family. Several individuals stated they quit private sector jobs for government jobs as they found more equitable compensation and greater respect.

○ *Haven't Overcome:*

178 women clearly stated they have not overcome the challenges they face. The overall impression expressed by people in this category is that they have accepted there may be nothing they can do to overcome challenges.

● *Upgrade Skills/Education:*

47 women chose to upgrade their skills/education to overcome challenges. Some respondents mentioned they are pursuing a graduate degree. Many mentioned upgrading their skills either through self-study or formal professional development. All respondents seemed to indicate their choice to upgrade skills or education was a positive career move, although several indicated they had no other choice if they wished to advance.

DISCRIMINATION

Both women and men report that they have faced different types of discrimination in the workplace, with more women than men reporting discrimination based on gender or age (Figure 7). Thirty-eight per cent of women with less than five years' experience indicate that they have faced age discrimination compared to 20 per cent of women with over 20 years of experience.

One in four women report that they have experienced both gender and age discrimination.

Figure 7: Types of Discrimination Reported

	% of Female	% of Male
Gender	65%	6%
Age	31%	13%
Race or ethnic background	9%	12%
Non-Canadian qualifications	3%	5%
Non-Canadian experience	3%	5%
Sexual orientation	2%	1%
Disability	1%	2%

Overall comments from the survey and interviews describing how women overcome discrimination include:

“It may take multiple efforts to position yourself as a woman of technical competence and your work is observed like on a job interview every single day.”

“Be ready to bravely walk the path of being “different” in the perception of other woman, who think of you as woman that works man’s jobs.”

“Everyone should try to acquire some sales strategies during their career. I find being concise with my ideas and stating them with confidence is more favorably received.”

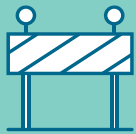
As discussed in this section, many women overcome workplace challenges in a variety of ways. Regardless of how women overcame these challenges, the onus should be on employers to create a workplace environment that is more equitable and inclusive for women.

By learning how women currently overcome workplace challenges, employers can implement actions to alleviate or eliminate them — leading to workplace equity between men and women.

KEY FINDINGS

A number of challenges that make it difficult for women to succeed in STEM careers have been identified from our research. For too long, women have either developed strategies for managing these challenges or they have left to pursue opportunities outside of STEM. It is time to recognize that these are systemic barriers that need to be addressed in order to create more equitable workplaces and to prevent the loss of talented professionals.

The key findings can be summarized as follows:



1 Women across all the different STEM workplaces have common challenges;



2 The percentage of women who experienced a number of the top challenges decreases significantly when there are more females in STEM roles in their workplace;



3 Two out of three women report discrimination based on gender and one in four experiences both gender and age discrimination;



4 Differences between the number of women and men who experience the top challenges are significant at all career stages.



NEXT STEPS FOR OSPE

OSPE agrees with a number of the recommendations that are outlined in the report entitled, *“Increasing the Number of Women in Science, Technology, Engineering and Math (STEM).”*³ In their action plan, the Council calls for governments to set up a comprehensive online portal to share a variety of resources to change the gender landscape in STEM fields.

While this is a reasonable long-term goal, OSPE’s project has a shorter-term focus on using technology to create and disseminate information to foster systemic change in STEM workplaces.

Over the next year, OSPE’s project will develop technology-based tools for employers that facilitate changes in policies, behaviours and mindsets to break down barriers for women in STEM.

OSPE will also conduct research to identify best employer practices and will share these findings with the broader corporate community. This aligns with an overarching theme of the Council’s action plan — to encourage companies to showcase their successes, identify and share learning tools and to strengthen training.

The Council also recommended that companies develop mentorship programs for women in

STEM. In OSPE’s survey, all participants were asked, *“what type of tools or resources would help you navigate your career?”* Among women, 44 per cent answered mentoring and 25 per cent recommended networking events for women. Career development opportunities were also mentioned by 15 per cent of women, and notably 13 per cent of women indicated the need for training in diversity, sensitivity and/or bias for all staff members. In this regard, OSPE is pleased to say that its *“Engineering Professional Success: OSPE’s Pilot Mentorship for Female Engineering Graduates,”* of which SWC provided seed funding, is expanding and the number of mentor/mentee matches is increasing.

OSPE is not advocating the setting of quotas for women in the workplace, nor stating that all companies treat women with disrespect. We believe that barriers do exist, and it is time for cultural and workplace policy changes to eliminate *any and all* forms of discrimination and inequity. We need to ensure that STEM employers are attracting and retaining all of Canada’s talent to drive innovation and keep our workforce competitive in the global economy.

³ Canada-United States Council for Advancement of Women Entrepreneurs and Business Leaders. *Increasing the Number of Women in Science, Technology, Engineering and Math (STEM)*. 2018. <https://advancingwomeninbusiness.com/pillar-two/>



ACTIVATING ACTIONS FOR EMPLOYERS TO BREAK DOWN BARRIERS

To ensure companies are attracting and retaining key talent, they need to create change within their organizations that break down these barriers.

All participants were asked “*what type of workplace policy changes are needed to support women pursuing STEM careers?*”

Policies involving work-life balance including flexible work arrangements, part-time opportunities, reduced work hours and

in-house daycare were the top answers mentioned by 33 per cent of women. Clear policies on equal hiring, promotions and opportunities were identified by 24 per cent. Better parental leave policies that encourage partners to also take parental leave would help level the playing field and reduce the stigma of career gaps for women was highlighted by 15 per cent.

When asked what the **main solution** was to break down barriers for women in STEM workplaces, a quarter of both women and men responded that there is **critical need** for a **full cultural shift**, with improved attitudes towards women within the workplace. Participants suggested this across all STEM disciplines.



WORKPLACES

To attract, retain and advance women in STEM careers, companies need to take the following key actions:

- Appoint a champion within your leadership team
- Assess your workplace culture
- Address unconscious bias
- Actively sponsor and mentor
- Appraise company policies and practices:
 - Flexible work arrangements
 - Pay equity
 - Harassment/Discrimination prevention
 - Parental leave for men and women
 - Recruitment and promotion
- Measure your progress and celebrate successes





ACTIVATING ACTIONS FOR HIGH SCHOOLS & POST-SECONDARY INSTITUTIONS



HIGH SCHOOLS

*To encourage enrollment
in STEM*

- Connect students to female role models
- Explain pathways to STEM careers
- Promote STEM outreach programs
- Educate parents and advisors about STEM professions



POST-SECONDARY

*To encourage
graduation in STEM*

- Recruit female faculty
- Remove unconscious bias
- Reorient events for inclusivity
- Reform outdated traditions



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