WOMEN IN SKILLED TRADES

Evaluation of CNC Mechanical Millwright Program for Women

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Submitted to Women's Enterprise Skills Training of Windsor Inc.

Women in Skilled Trades: Evaluation of CNC Mechanical Millwright Program for Women

Program Partners

Funded by

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Submitted to Women's Enterprise Skills Training of Windsor Inc.

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Executive Summary

The Women in Skilled Trades (WIST) CNC Mechanical Millwright program was built on a partnership between the community, labor union, education, and employers to bridge the gaps and break down the barriers that limited the ability of women to enter and be retained in the skilled trades in the Windsor-Essex region. Working with community organizations and school boards, WEST actively recruited diverse women with multiple barriers to employment. Participants attend St. Clair College to participate in 15 weeks of training for Level 1 Industrial Mechanic Millwright Apprenticeship in-school Curriculum and 70 hours of hands-on" CNC Practical Skills with General Machinist concepts.

The general purpose of this evaluation was to determine how well the WIST program was implemented, what was attained in terms of human and social capital gains, and the strengths and weaknesses of the program itself. Within this broad purpose, the objective of the process evaluation was to describe problems, solutions, and best practices demonstrated in the implementation of the WIST partnership model. This evaluation examined the elements of the WIST partnership model to determine what methods of service delivery or implementation strategy were linked to the successful outcomes for participants.

Findings

The key findings are organized based on data collected on participant outcomes, participant perspective, and service deliverer perspective. The latter includes data from interviews and surveys administered to employers, educators, and program staff involved with the administration of the Women in Skilled Trades (WIST) training.

Program Outcomes

1. About 40 percent of participants from Intake 1 and 28 percent of participants from Intake 2 obtained their Level 1 Certification. The difference between groups may be explained by the challenges associated with Covid-19 closures. Participants in Intake 3 are still waiting to complete in-class component due to closures.

2. WIST participants who were employed before participation in the program were 5.07 times more likely to attain Level 1 Certification than those who were unemployed before participation in the program.

3. The estimated future earnings for those who completed the WIST program was moving towards an equal value for money over time.

Participant Perspective

1. Most program participants indicated that they joined the WIST program to access new job opportunities (29%), followed by a search for a new career (25.8%).

2. Survey respondents identified four training challenges associated with the WIST program. These included Covid-19 (26.9%), rigorous coursework (26.9%), financial challenges associated with full-time program participation (19.2%), and the challenge of finding work placements (15.4%).

3. About 65 percent of participants agreed that their in-class training provided an understanding of the gender stereotypes and hidden biases in skilled trades and 75 percent agreed that the training provided an understanding of the barriers and issues women face on shop floors.

4. The three main challenges identified by those who completed work placements were not enough women on shop floor (41.7%), balancing work and family (33.3%), and lack of support (25.0%).

Service Deliverer Perspective

1. Employer engagement was identified as a key challenge. There were 16 employers who accepted WIST placements between 2018 and 2021. Fifty-six percent of employers accepted one program participant for placement (n=9 employers) and two employers accepted 5 participants for placements over this period.

2. Service delivery members identified challenges with the need for participants to complete another Level 1 Certification if they chose a trade outside of millwright despite Common Core courses required being the same across skilled trades.

3. Apprenticeship process very convoluted even for those in the skilled trades for decades.

4. The partnership service delivery model was identified as being effective in bringing together relevant stakeholders.

Recommendations

The recommendations fall into two categories focusing on changes needed to support women as they transition into the skilled trades (1–5). The other set of recommendations focuses on employer engagement and support (6–8).

1. There needs to be policies in place that support the successful integration of women in trades including providing incentives to redesign shop floor infrastructure, accepting placement, and facilitating employment support for women while they undergo full-time in-class training.

2. There is a need for continuous monitoring and evaluation of the program to increase program completion and transition to placement and certification.

3. Continuous review and supervision of placement sites are required to ensure adequate accommodation of women on the shop floor.

4. Create opportunities to increase women's understanding of the work dynamics by increasing exposure to shop floors prior to work placements through employer tours or job shadowing opportunities designed to expose women to the workplace culture and tradesmen to diversity in the workplace.

5. Greater support needs to be given to single women with children and families as they seek to balance work and family. This may require changes in work rules, and child and family care policies.

6. The current program takes a demand-side approach. Increasing the supply of women while fostering demand may hasten more widespread inclusion of women in the trades.

7. Employer participation needs to be increased through networking even as they acknowledge the value of women in trades. The participation would require a support system for cement.

8. Opportunities need to be created for employers who participated in placements and made the necessary accommodation to their workspaces and shops to share their experiences and lesson learned from hiring women.

Introduction

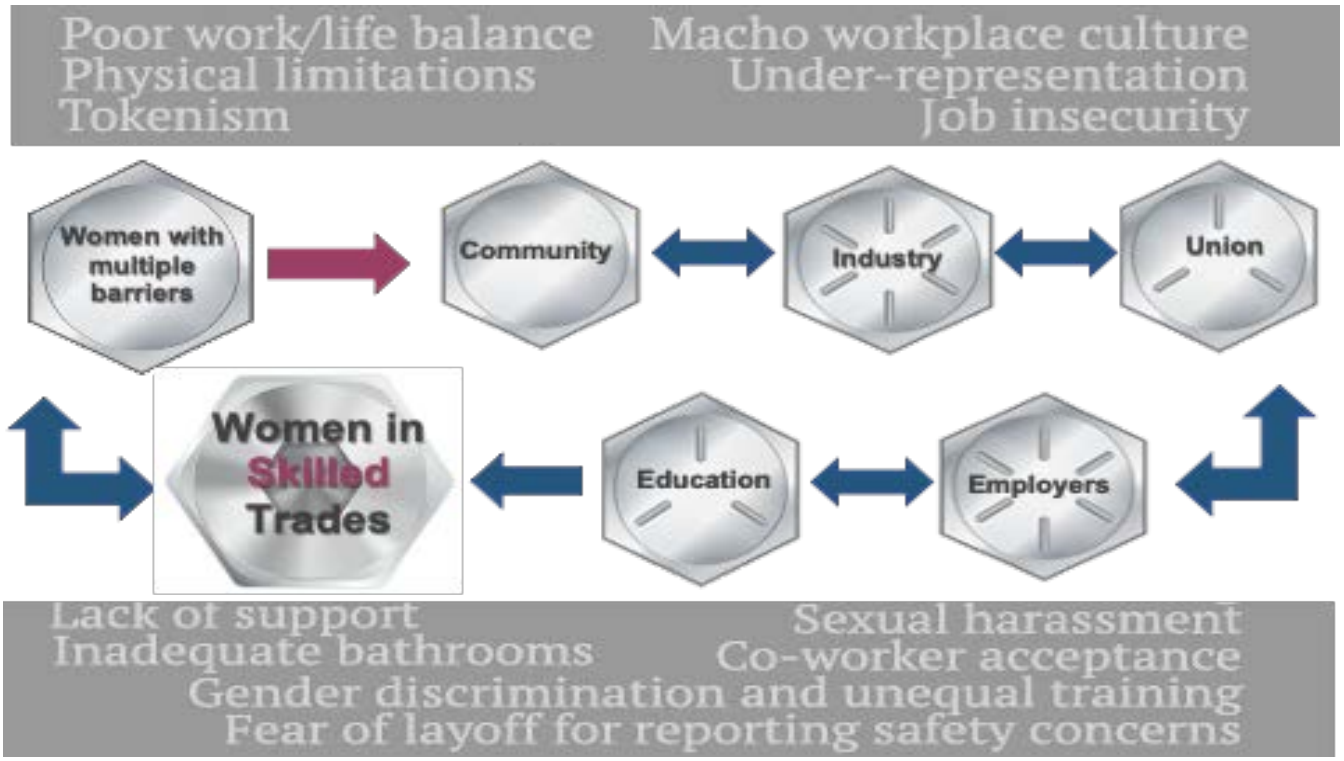
The Women in Skilled Trades (WIST) CNC Mechanical Millwright program was built on a partnership between the community, labor union, education, and employers to bridge the gaps and break down the barriers that limited the ability of women to enter and be retained in the skilled trades in the Windsor-Essex region. Working with community organizations and school boards, WEST actively recruited diverse women with multiple barriers to employment.

Program Overview

Windsor-Essex County, nestled between the Great Lakes in South-Western Ontario, has for more than a century been an automotive capital with many skilled workers who support this industry. However, it is currently undergoing a structural transformation. One exceptionally troubling issue that has been recognized in the community is a mismatch between the abilities and talents of the currently unemployed workforce and jobs that need workers with a skill set. This is of concern given that most of the unfilled jobs are in traditionally male-dominated occupations. With women making up less than three percent of the skilled trades (Statistics Canada, 2011), the belief was that a program designed to meet the needs of women in the community would assist low-income women in securing in-demand and industry jobs meeting their human resource needs. The main objective of this program was to produce qualified women to meet current labor shortages and address local industries' specific labor needs.

Partnership Logic Model

The program was a partnership between the community, labor union, education, and employers to bridge the gaps and break down the barriers that limit the ability of women to enter and be retained in the skilled trades in the Windsor-Essex region (Figure #). Working with community organizations and school boards, WEST actively recruited diverse women with multiple barriers to employment. Applicants were referred to appropriate community services based on needs. WEST employment counselors worked with participants to secure childcare and ensure transportation arrangements were in place before starting the program.



As part of the awareness and screening process, the local union, UNIFOR, provided a 1-week “Women in the Skilled Trades Program” that provided women with hands-on experience in trade-related skill sets. Helping to build the confidence of interested female applicants who met the minimum criteria of the program, participants were able to network with tradeswomen from various skilled trades.

Participants attended St. Clair College to participate in 15 weeks of training for the Level 1 Industrial Mechanic Millwright Apprenticeship in-school curriculum and 70 hours of hands-on” CNC Practical Skills with General Machinist concepts.

Employers partnered with the program in various capacity from being advisory council committee members to placement hosts. The advisory council committee was formed to define best practices to ensure women success in the skilled trades; assist in designing a program inclusive of the barriers facing women in our community; assist in developing a marketing strategy: develop an employer 'tool kit' filled with resources and practice to support employers; foster relationships and collaboration in the community with industry leaders; fostering a diverse and inclusive environment, and raise the profile of women in the skilled trades. Employers also provided work placements, industry tours and participated in mock interviews.

Participants were provided with an 8-week work placement arranged by WEST in partnerships with the Employment Ontario network. WEST contacted local employers on behalf of participants to secure paid/ unpaid

work placements in the professional areas of interest for which the participants are qualified.

Site visits were conducted before participants' placement to ensure that the workplace was conducive to the needs of women and that the workplace policies and procedures supported inclusive environments for women. The site visit will also ensure employers were compliant with the Occupational Health and Safety Act, Employment Standards Act, Ontario Human Rights Code, and the Accessibility of Ontarians with a Disabilities Act 2005 (AODA) and its regulations. An employer's "Tool-Kit" was provided on an as-needed basis to help support employers in the community.

Evaluation Purpose & Objective

The general purpose of this evaluation was to determine how well the WIST program was implemented, what was accomplished in terms of human and social capital gains, and the strengths and weaknesses of the program itself. Within this broad purpose, the objective of the process evaluation was to describe problems, solutions, and best practices demonstrated in the implementation of the WIST partnership model. The evaluation examines the elements of the WIST model to determine what methods of service delivery or implementation strategies are linked to the successful implementation of the model.

Box 1. Participant Story

A highly educated newcomer, they faced gender inequality in her new country. They have a master's in IT and many years of professional experience in their field. After unsuccessfully trying to find a job in IT, they joined the WIST program. They were able to complete the program and secure employment in the skilled trades so they could financially support their family. A part of them still wanted to do something in the IT field. They decided to pursue their passion and opened a coding club for black boys. They continue to support the WIST program as an inspirational guest speaker. They speak on the challenges women face when working in an underrepresented field. Completing the WIST program gave them confidence and pushed them to pursue their passion. Being part of the program made them feel accepted and gave them a sense of accomplishment that propelled them forward.

Methodology

Using qualitative and quantitative data, this report evaluates Women in Skilled Trades program quality, assesses participant experiences in moving from unemployment to work, and provides recommendations for enhancing the program. Research in both provinces address outcomes such as satisfaction, specific fields of employment, and how they vary across demographic and program characteristics of apprenticeship completers (e.g., gender, age, program, and teaching method).

Sample

The evaluation examines the three intakes of the Women in the Skilled Trades program, 2018–2021. The sample consisted of participants who participated in one of the three intakes of the WIST program and employers, industry representatives, and program administrators who were actively involved with these intakes. 70 women participated in the WIST program during that time.

Data Collection

Data collection included surveying stakeholders and conducting interviews with program partners and participants. Based on the partnership model that structures the Women in Skilled Trades program, data were collected from the following stakeholders:

1	Program Delivery Staff	Includes all staff and instructors directly involved in the delivery and administration of program deliverables at all partnering institutions.
2	Program participants	Individuals who expressed interest in the program and accessed and/or completed some aspect of the training.
3	Industry specialists	Advisory Committee Members consisted of employers from diverse trades.
4	Placement Hosts	Employers and industry representatives who assisted with work placements.

One-on-one interviews were conducted over 3-4 weeks using topic guides designed for specific purposes and particular groups. The first set of interviews were with direct program staff responsible for the oversight and implementation of key program elements. The second set of interviews were held with members of the advisory group. The interviews focused on what worked well in the delivery of the program, adjustments that were made to the program, strategies employed to improve program outcomes.

Surveys were developed and distributed to participants, instructors, and employers to capture qualitative program performance data, learn their perspectives on factors that contribute to program success, challenges faced, and inclusion of gender-based approach to instruction, and inclusion of women on the shop floor. Secondary document review of participant's in-class evaluation survey results and employer feedback forms collected after each intake and work placement was conducted.

Data Analysis

Three approaches to data analyses were used. First, descriptive statistics (counts, mean, standard deviation, percentages) to describe the various perspectives on the benefits and challenges associated with participating in (participants, employers) or implementing (service deliverers, industry council members) the WIST program. The mean rating was used to examine the relationship between survey respondents' perceived benefits, as measured on a 10-point numeric scale, and program completion.

The second analytical approach involved predictors that measured the likelihood of attaining Level 1 Certification (age, education level, children, pre-math score, pre-program employment status). The dependent variable was whether participants completed the WIST program (in-class training and work placement). Participants included in the analyses were from Intake 1 and Intake 2. The histogram and scatter plots of the residual indicated that the assumption of normality, linearity, and homoscedasticity were all satisfied.

The final approach was qualitative content analyses of the open-ended survey questions and open-ended comments, as well as the interview transcripts. To conduct the analyses the researcher examined the open-ended comments and interview transcripts in random order to search for repeating underlying themes.

Data Limitations

All qualitative research has inherent limitations (Creswell, 2017). Because the primary data sources for the analysis are usually project staff who have a personal stake, respondent bias is a factor in the objectivity of the data. The evaluation methodology addresses this factor by linking discussions about services to WIST data as often as

possible through the triangulation process. This technique not only anchors respondents' remarks to another data source but also provides a means for validating the accuracy of WIST reports.

The WIST program was altered due to the COVID-19 pandemic that closed businesses and schools. The closure interrupted receipt of the full measures of the WIST program activities for this intake. Placements for Intake 2 were interrupted and suspended by most employers at the onset of the pandemic in March 2020. As industry re-opened, Intake 2 participants were assisted by the WIST staff and Employment Service with employment assistance.

Intake 3, which was delayed by three months due to the pandemic, started in November 2020. Classes, however, were suspended in mid-December 2020. The participants are expected to tentatively resume in-class training in May 2021. The job developer was able to assist some participants with opportunities for placement completion during the waiting period, and other participants will complete a placement after the in-class training. Staff will continue to look for placement opportunities for the remaining participants.

Additionally, the last intake involved a different delivery model, testing the challenges and benefits of online vs. in-person service delivery. Participants in Intake 1 and two received the full scope of the program, the analysis of outcomes-focused on these two intakes. The ongoing pandemic has also limited the types of data collection that were feasible. There were no site visits pandemic safety measures that were in place.

Box 2. Participant Story

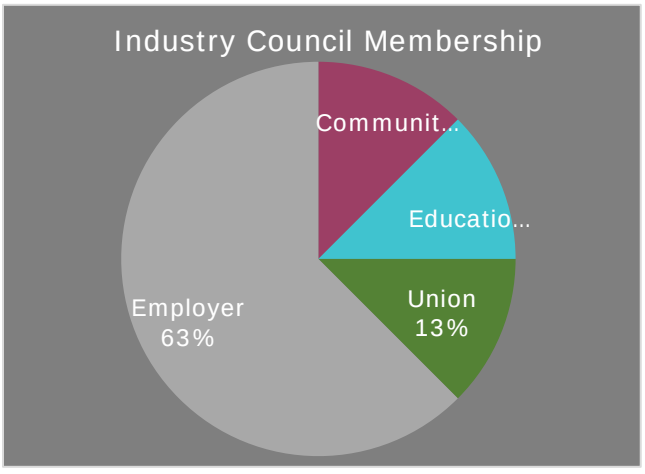
The participant was a single mother who worked as a waitress. Their family discouraged and tried to convince them that the skilled trades was not for women. They went against their family and took the opportunity to participate in the program. Throughout the program, they faced many financial and family obstacles. While participating in the program, they had to go on social assistance. They were able to complete the program successfully and now works in the field for which they were trained. Currently, they are the spokesperson for encouraging women to veer off the normal path for women and pursue their passion.

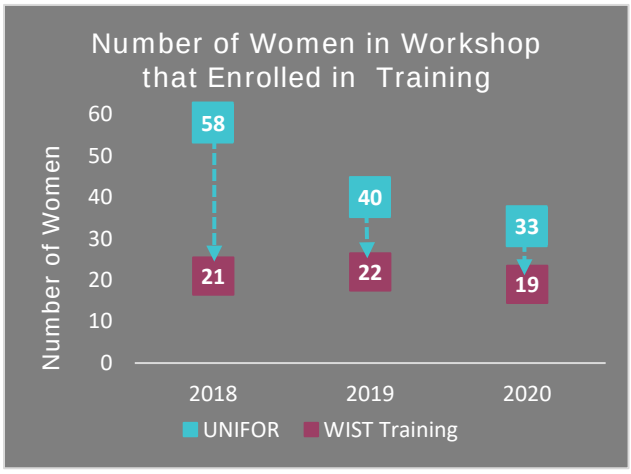
Results

The program implementation model uses a partnership approach that draws on the knowledge, skills, and expertise of those in industry, education, and the non-profit sector. Direct responsibility for service delivery is held by WEST, as the lead applicant. WEST manages the program in consultation with industry representatives (labor unions and employers) and educators (local college) who are members of the Industry Council. The Council meets quarterly, with Council members and partners taking an active role in the implementation of the program.

The Industry Council helped to steer the delivery of the WIST program through quarterly meetings. Members of the Council were predominately employers from various industries including manufacturing, electrical, construction, among others. Employers make up 63 percent of the Council, and the remaining 27 percent of members are representatives from project partners – WEST, UNIFOR, and St. Clair College.

Between 2018 and 2020, as part of the recruitment process, 131 women participated in the UNIFOR Women in Trades one-week workshop. Fifty-eight women attended the UNIFOR workshop in 2018, 40 women attended in 2019, and 33 women attended in 2020. The UNIFOR workshop was a central component of the recruitment and selection process. Of the workshop participants, 47.3 percent (n=62) enrolled in the WIST training. Intake 1 had 25 women enrolled, 21 of which were workshop participants. Intake 2 also had 25 enrolees, of which 22 participated in the UNIFOR workshops. With a reduction in class size due to the pandemic, Intake 3 cohort had 20 participants, of which 19 participated in the UNIFOR workshops. See Appendix A (pp. 31–32) for participant demographics.





Wraparound Supports

Using a wraparound planning process, supports were provided to students and their families to address emergent needs. The WEST team worked with participants to identify and implement strategies that helped participants to meet their needs. The WEST team worked with participants in an ongoing capacity to track progress and adapt the plan based on participants' circumstances.

For Intake 1, 9 students were provided with monthly bus passes, 10 students with parking passes during the in-class portion of the program, and others used carpooling options. There were two students who needed childcare support that received the financial support for childcare. One student was also provided with assistive device to help with their disability and another student was supported with prescription safety glasses.

Similarly, wraparounds supports were provided to participants in Intake 2. There were 10 students who were provided with monthly bus passes and 15 participants with parking passes during the in-class portion of the program. Additionally, 5 participants who needed childcare support received the financial support for childcare.

In the last Intake, 5 students were provided with monthly bus passes and 15 students with parking passes during the months of November and December when classes were running. There were two participants in Intake 3 who needed childcare that received the financial support for childcare, others were eligible for subsidized childcare service. All students were provided with $100 grocery gift card, and a $100 gas card after the onset of the pandemic. Students from this intake also received a rolling backpack to carry their items to and from the school, because the school was not allowed to assign lockers to them due to the COVID restrictions.

Program Outcomes

The WIST program was designed to provide employment training and supports to low-income unemployed or underemployed women through gender-sensitive in-class and on-the-job training that prepared them for employment in the manufacturing sector. To measure the impact of the program data were collected on work placements, 6-month employment outcomes, the number of women who attained Level 1 Certification, and program-associated costs.

Level 1 Certification

Students who completed the in-class training and work placements were able to attain a Level 1 Certification in Millwright. In in-take 1, 44 percent of students (n=11) were able to attain their Level 1 Certification. However, with Intake 2, only 24 percent of participants were able to attain their Level 1 Certification (n=6). The difference between groups may be

explained by the challenges placed on the second intake to complete work placements once COVID-19 closure occurred.

The demographic characteristics of participants were used to predict the likelihood that they would attain Level 1 Certification upon completion of the program. The predictor variables included in the model were participants' baseline characteristics – age, education-level (secondary or post-secondary), having children, mathematical aptitude measured using pre-program math score (>70), and being employed prior to starting the program) (see Table 1).

The model was able to correctly classify 83.3 percent of those who participated in the WIST program and 47.7 percent of those who did not, for an overall success rate of 68.3 percent. The model explained 17.4 percent of the variance (Nagelkerke R^2) in program participation. WIST participants who were employed before starting the program were 5.07 times more likely to attain Level 1 Certification than those who were not employed before starting the program.

Cost Benefits Analysis

To avoid the common pitfalls associated with focusing solely on inputs, such as spending and outputs, such as participants' long-term outcomes, this section uses the metric cost per employed day (CPED) to determine the program's cost-effectiveness. The CPED metric was used to measure value for money, not just cost (Mourshed & Jaffer, 2018).

As outlined in Table 2, the CNC Mechanical Millwright program was awarded $965,383 in government funding over a 3-year period. An additional cost of $387,530 was contributed by employers and other government funding. Employers'

Table 1: Logistics regression of pre-program participant on likelihood of attaining Level 1 Certification

	B	S.E.	Wald	β
Age 16 to 29	.00	.78	.00	1.003
Secondary education	.28	.82	.12	1.322
Children (Y/N)	.78	.77	1.02	2.179
Pre-Math Score (>70)	.72	.83	.76	2.055
Pre-program employment (Y/N)	1.62	.83	3.85*	5.073
Constant	-2.02	1.03	3.88*	.132

*$p < .05$

participation in Industry Council, Tours, and placement hosts were in-kind contributions. Several participants hired directly from the program did not use the wage incentives. Eighteen participants were hired directly after completing the in-class training. While completing the training, program participants received assistance through several government financial assistance programs (e.g., Ontario Works). The total cost of the program was $1,352,912.

It is important to note that the total program cost does not consider the $705,758 loss in annual income experienced by those participants who were employed prior to starting the program. For Intake 1, five women reported a total annual pre-employment income of $158,901. For Intake 2, nine women reported a total annual pre-employment income of $263,050, and for Intake 3, five women reported a total annual pre-employment income of $283,807.

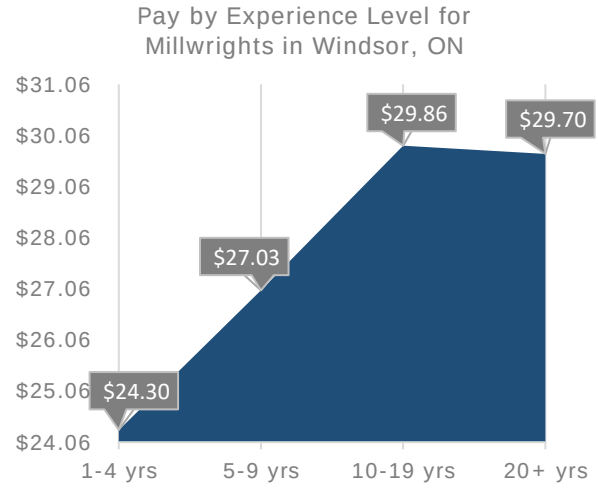
Table 2. Women in Skilled Trades Program Lifetime Costs, in Constant Dollars

Fiscal cost to agency	YR1	YR2	YR3	Total
Program expenditures (i.e., recruitment, marketing, insurance)	$31,634	$29,496	$6,989	$68,119
Wraparound supports (i.e., childcare, transportation, food)	$13,957	$14,147	$7,211	$35,315
Facilities	$26,960	$39,158	$39,703	$105,821
IT / Tech support	$6,846	$5,371	$7,154	$19,371
Program Staff	$219,040	$212,284	$175,342	$606,667
Student expenditures (i.e., tools, books, wage subsidy)	$39,088	$56,610	$32,460	$128,158
Legal/ audit	$0	$476	$1,456	$1,932
Total Fiscal Cost to Agency	***$337,525***	***$357,542***	***$270,315***	***$965,383***
Fiscal cost to community				
Work Placement Incentives - EO	$4,500	$3,000	$0	$7,500
Employer contributions	$14,400	$14,400	$11,200	$40,000
Government Assistance (OW, EI, CPP)	$120,639	$94,034	$132,857	$347,530
Family support (spouse, friend, etc.)	-	-	-	-
Total Social Cost to Stakeholders	***$139,539***	***$111,434***	***$144,057***	***$387,530***
TOTAL COSTS	**$477,064**	**$468,977**	**$414,372**	**$1,352,912**

*Industry council (4/yr*2hrs), Mock interviews (2/DYS*3hrs), Tours (2/yr*2hrs)

For the 2018–2021 program year, the WIST Program served 70 participants at a cost of $19,327.32 each, or $1,352,912 total. For Intake 1 and Intake 2, 66.7 percent of the participants were employed after completing the WIST program. For Intake 1, nineteen of the twenty-three participants were employed in the trades 6-months after completing the program. While for Intake 2, eleven of the twenty-two participants that completed the program were working in the skilled trades. In total, 38 participants from Intake 1 and Intake 2 completed a work placement (a 76% "job placement" rate) and remained employed for an average of 126 days in the first six months. That adds up to 4,788 days on the job, at a cost of $282.56 per employed day.

A first-year millwright works an average of 50 hours per week, making an average base hourly rate of $16.5 per hour in Windsor, Ontario (Payscale.com, 2021). That adds up to a daily rate of $165 per day, which is $117.56 less than the training cost per employed day. The projected earnings growth in the first 4 years for a Millwright on average is $24.30 per hour. A mid-career Millwright with 5-9 years of experience earns an average of $27.03 per hour. An experienced Millwright with 10-19 years earns on average $30 per hour (not controlling for market fluctuations). The estimated future earnings for those who completed the program are moving towards an equal value for money over time.



Source: payscale.com, 2021

While this section focused on increased earnings post-training, other documented benefits can result from the completion of the WIST program. Research shows that occupation-based training results in faster entry into the labor force for young workers and increases their likelihood of becoming a professional or manager. Vocationally trained workers also have higher labor force participation rates and experience lower rates of unemployment than workers with only high school diplomas. Other potential socioeconomic benefits can accrue to the province because of reduced reliance on public services (e.g., unemployment insurance and welfare benefits).

Participants' Perspective

This section uses descriptive data (counts, means, percentages) from the participants' survey. There was a total of 40 survey respondents, a 57 percent response rate. Of the total respondents, 45 percent were from Intake 3 (n=18), 27.5 percent from Intake 1 (n=11), and Intake 2 (n=11), respectively. About 42.5 percent of respondents completed a work placement (n=21), 42.5 percent were still waiting on a placement (n=17), and 5 percent did not want to do a placement (n=2).

Reason for Participation

The skilled trades have been promoted as a viable career opportunity for women and youth who face multiple barriers to employment. There are several reasons for joining the WIST program identified by participants.

The most common reason indicated by 29 percent of participants is seeking new job opportunities. As mentioned by one respondent, "I needed a new kind of job; cooking wasn't cutting it." There was 25.8 percent of participants who were seeking a new career.

According to one respondent, they are *"a single mother, on assistance, trying to start a new career."* Another respondent mentioned they joined the WIST program because there was *"no chance to pursue my university degree."*

While there were several women, 22.6 percent, who wanted to enter the trades but lacked the experience or network to do so. As mentioned by one respondent, *"I was stuck and couldn't get my foot in the door in the trades. WEST got me the experience I needed to thrive as an operator, and we aren't even done yet."*

Another participant commented, *"Wanted to work in a shop, didn't know what I wanted to do, this course had a little bit of everything to choose from."*

Perceived Benefits

The survey used single-item measures of the program's impact on participant network building, employability, and appreciation of own strengths. Participants were provided with a 10-point numerical rating scale, not at all (1) to strongly agree (10). Participants were asked to rate their level of agreement on the extent to which the training (i) introduced them to new people and organizations that supported their well-being; (ii) increased their knowledge and skills to better equip them for employment or self-employment; and (iii) increased their appreciation of their strengths and capabilities.

An independent t-test was used to understand whether participants who completed the training and those who did had different perceptions of the

program. The Mann-Whitney U test showed no significant difference (U = 186.0, p = .789) in participant perception of increased employability between respondents who completed the program compared to those that had not completed the program. The median rate for participants was 9.00 for those who completed the program compared to a rating of 7.00 for those who had not.

The test also showed no significant difference (U = 180.5, p = .676) in participant perception of network building between respondents who completed the program compared to those that did not complete it. The median rate for respondents who completed the program was 8.00 compared to a rating of 6.50 for those who had not.

As noted by a participant, *"It is a good initiative, but WIST needs to do better by factoring things that can improve a student well-being to succeed."*

Similarly, there was no significant difference (U = 1 73.0, p = .527) in participant perception of their strength and capabilities for respondents who completed the program compared to those that did not. The median rate for respondents who completed the program was 8.50 compared to a rating of 8.00 for those who had not.

The test results suggest that completing the WIST training did not affect participants' perception of the program as increasing their knowledge and skills for employment or self-employment, building their network, or increasing their strength and capabilities.

Training Challenges

Participants were asked, "What were some of your major challenges with participation in the training program?" Analysis of this open-ended question revealed four main challenges across the 20 participants who responded: coursework rigor, COVID-related challenges, financial, and finding a work placement.

The main challenge that participants highlighted was the rigor of the program. It was reported by 26.9 percent of participants that the coursework was challenging. Though challenging, the participants found the work to be beneficial. As noted by one participant, *"learning so much in this time could be challenging at times, but definitely worth some struggle."*

Another aspect of the program found to be challenging was completing the program during the COVID-19 pandemic. The pandemic having an impact on their progress was reported by 26.9 percent of participants. Participants recognized that the challenges caused by the pandemic were outside of the control of the program administrators. As mentioned by one respondent, *"COVID restrictions and lockdowns,*

nothing to do at all with the program."

The lockdown impacted how participants received the training, shifting service delivery to an online model. Besides, those who were able to complete the in-class training faced delays in securing a work placement. This delay created added frustration and financial burdens on several participants as they waited for the program to resume.

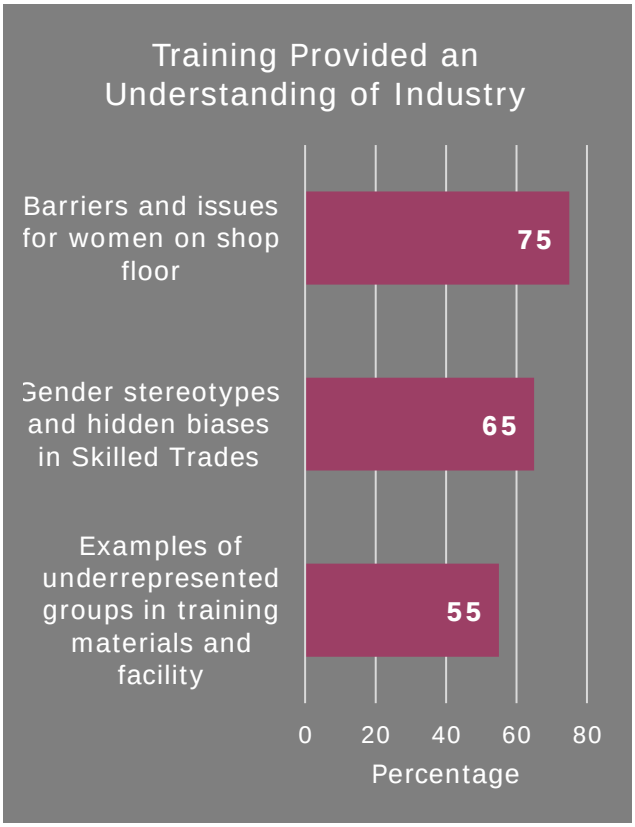
Respondents also highlighted financial challenges that emerged due to participation in the program. Participants could not be fully employed while enrolled in the program. For 19.2 percent of respondents, participation in the program meant "*not being able to support myself adequately during the program (joining meant I had to find cheaper living situation because I couldn't have a full-time job).*"

Concerns related to being able to find a work placement was mentioned by 15.4 percent of participants as a challenge. As one student noted, "*I was mainly concerned with not being able to find a job due to my age and not being able to find a job with strictly day shift so I can maintain a relationship with my kids*."

Understanding Culture of Trades

Program participants were asked to rate their level of agreement with statements relating to women's representation in training material and facility, workplace culture, and existing barriers. 20 respondents provided feedback on whether the program prepared them for the gender divide that exist in the skilled trades.

In terms of representation, 55 percent of respondents reported a level of agreement with the statement that *there were examples of underrepresented groups evident in training materials and throughout the training facility at the College*.

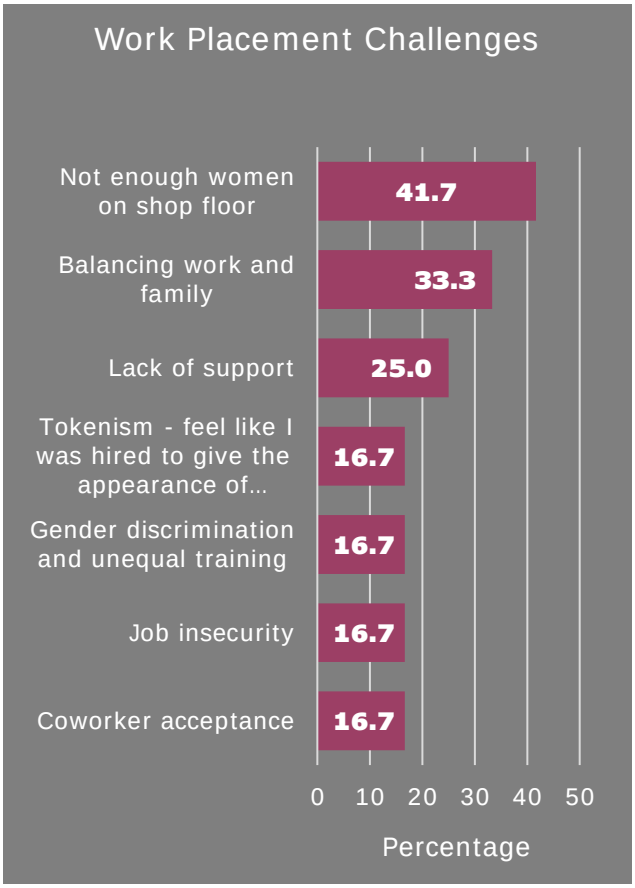


When asked whether the training provided them *with an understanding of the gender stereotypes and hidden biases that exist in the skilled trades*, 65 percent indicated *agree* or *strongly agree*. Similarly, 75 percent of participants *agree* with the statement that the training provided them with an understanding of the barriers and issues specific to women that exist on the shop floor (i.e., co-worker acceptance, inadequate washrooms, balancing work, and family).

Work Placement Challenges

Those participants who completed work placements were asked *What are some challenges they faced working in the skilled trades?* Of the 24 respondents who completed work placements, 50 percent responded to this question.

For 42 percent of respondents, not enough women on the shop floor were identified as a challenge. Balancing work and family were identified as a challenge by 33 percent of respondents. For 25 percent of respondents, there was a lack of support. Seventeen percent of participants indicated that they felt they were hired to give the appearance of gender equality (tokenism), job insecurity, or co-worker acceptance.



Service Deliverer Perspective

This section used content analysis from the open-ended survey and interview questionnaires with representatives from the service deliverers' network (employers, teachers, delivery staff). The survey and interview included several questions relating to the challenges service deliverers faced with implementation, recommended improvements to the program, and overall experience supporting the WIST program. There were 9 surveys received and 9 interviews conducted via Microsoft Teams. Those involved with the delivery of the WIST program have done so for an average of 3.7 years (min=1, max=7).

Program Challenges

When asked about major challenges encountered in delivering the program,

there were several emergent themes related to employer engagement and readying the workspace, participant retraining, financial barriers, and Covid-19 lockdowns.

Covid-19 pandemic lockdowns

As with participants, stakeholders involved in direct service delivery found that having to navigate the learning environment with the limitations placed by the pandemic was a critical challenge to recruitment and training.

Having switched to an online platform limited the recruitment of various populations. Service providers observed a reduction in the number of visible minorities, indigenous women, and women living with a disability for Intake 3 despite increased efforts to reach out to these subpopulations of women.

Over a quarter of WIST participants were identified as visible minorities. In Intake 1, 24 percent of participants were visible minorities (n=6), 44 percent in Intake 2 (n=11), and 25 percent in Intake 3 (n=5).

Though the program was quickly able to transition to an online platform, service deliverers highlighted challenges with ongoing participant engagement in a virtual learning environment. There was a recurring theme that selection for the program should not be based on eligibility but the likelihood to succeed. The change in delivery mode created additional challenges for a certain population of women.

Participant characteristics

The reality is that there needs to be work done to help employers and educators ready their spaces for the inclusion of women. The skilled trades training program design was based on the needs of employers and the learning style of those who have traditionally entered the field – men. There are gender differences in how men and women learn and potential differences in pre-program exposure to various standard tools and equipment. The WIST program has started to address this by amending the program delivery. There has been an increase in the academic assistance provided in each course.

"I have found that the participants in this program generally require more hands-on support due to so few of them having any prior exposure to working with machine equipment and the confidence that can come from that."

Though there are changes in the family structure, there are differences in responsibilities women face outside of work, especially single mothers. The WIST participants are not traditional participants and, therefore, have more challenges than the average student.

"Some participants in this program have many more challenges than the typical post-secondary participants… and could benefit from additional supports outside of the school environment. Within the program, I believe the class schedule can impact a number of these issues."

These challenges do not remain in the classroom but follow participants to the work placement. With these added responsibilities, the average WIST participant would have additional employment barriers for which employers will need to provide accommodation.

As one employer noted, a key challenge is *"managing the flexibility required in single mother's schedule, also, like anyone new, managing expectations. Women are new to our industry and managing expectations is complicated."*

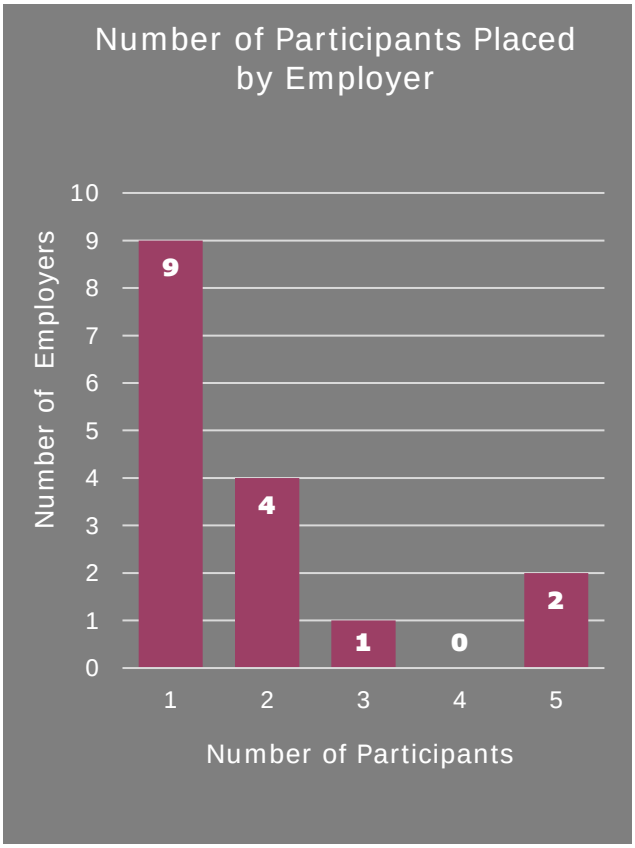
Despite their many challenges, the consensus across groups is that women, WIST participants, are assets to the industry.

Employer engagement

One of the biggest challenges identified was getting employers involved. Members of the service delivery network acknowledged ongoing success with raising awareness of the benefits of a career in the skilled trades among women. However, they have identified increasing employer engagement as a challenge.

Sixteen employers accepted WIST placements between 2018 and 2021. Most employers, 56 percent, accepted one WIST participant for a placement (n=9). Four employers provided placements for two participants. One employer had provided placements to four participants. Two employers accepted five participants for placements during this period.

Employer engagement and training has been identified as a systemic issue when recruiting and hiring in the skilled trades. Senior tradespeople are



reluctant to train their replacement. This challenge is faced irrespective of the population being trained (Bridges, Wulff, Bamberry, Krivokapic-Skoko, & Jenkins, 2020).

"It's not even just women…it's indigenous or underrepresented groups... You get interested people; you get them involved in the program and everything else, but it's getting the employers to join in and buy-in."

For many companies, the policies are not in place to support the successful integration of women. A common theme across the interviews was the need to not only recruit more employers to hire women but support employers in readying their space for the integration of women on the shop floor.

As noted by the employer, *"Owners do not want to admit they are not ready. They do not want to admit they do not have policy, physical environment, or their employees are not ready."*

Approximately 30 percent of employers highlighted that there was an infrastructure issue, not having washrooms on the shop floors for women. To support the hiring of women, they had to install a women's washroom or make changes to the space to accommodate the few women they had hired.

We had to segregate one of our shop washrooms to "Women's" which created fewer washrooms for the remainder of the shop."

Box 3. Participant Story

The participant has a child with special needs. She decided to join the WIST program so that she could build a better life for her child. WEST assisted with securing childcare and childcare subsidy for special needs children. The WIST in-school training was suspended due to Covid-19, and consequently, their childcare was canceled. She interviewed for a local newspaper sharing her story. An employer read the article and reached out to offer them employment until the course resumed. Everything happened because she tried to do the program despite the barriers they were facing. Several community organizations stepped up to provide additional assistance. The participant intends to continue the program once it resumes because it will open doors and create a better future for their child.

For others, the challenges are associated with the mindset of managers and owners. Some employers who hired participants from the program act as advocates trying to encourage other employers to consider doing the same. However, they encountered resistance attributed to antiquated views of women's labor.

As mentioned by an employer,

"A lot of people will tell me; you have women they have too many problems. They come with too much baggage. They get married, have kids, and now it's up to 17 months for parental leave. You now must keep on rehiring. Why are employers just blaming women? Now they're making it easy for both parents to take time off.

Respondents expressed a need to change the mindset of employers. Education is needed to counter negative perceptions or assumptions of challenges presented with women working in the skilled trades.

Employers are encouraged to take advantage of the WIST program and incentives because women are a viable workforce. The challenge is how to package the message so that other employers will open their workspaces to hiring women. Employers who support the WIST program say they do so because it is time to open opportunities to women in the skilled trades.

"It is needed, and it is the right thing to do to integrate women into our industry."

Another employer commented,
"It is a wonderful program bridging the gap between genders when it comes to "traditionally" male-dominated trades."

Retraining and Apprenticeship

The CNC Mechanical Millwright training would lead to a Level 1 Certification if participants secured employment as a millwright. However, many participants worked in other areas of the skilled trades, which meant they would need to re-do their core courses for Level 1 Certification in the trades in which they were employed.

For some interviewees, since the Level 1 Certification covers the Common Core., it should not matter what skilled trades program. Irrespective of the skilled trades program, participants were learning the same Common Core content. However, in actuality, those WIST participants who did not secure employment as a millwright and employed as a machinist were required to re-do their Common Core courses at the college.

"It just didn't seem fair. We had cases of women that were complaining about the same thing. They say we did this program with you and now we're being told this."

The WIST program was an eight–week college program that was expanded to 32–weeks to allow women enough hands-on training, experience, and wrap-around supports to thrive in the skilled trades. To do another pre-apprenticeship training would take another 8–weeks.

Additionally, the apprenticeship process was perceived by respondents as very convoluted for experienced tradespeople and even more so for novice skilled tradeswomen. In addition to increasing the number of women in the trades, a recurring theme was the need to make the pathway to apprenticeship clearer, especially for groups that traditionally did not enter the skilled trades.

Box 4. Employer Testimonial

Some of my best apprentices are women. They do so well; it is uncanny. You wonder, sometimes, if it is because they try to prove that they belong there, which they should not have to, but you know they try to go that extra mile. They put so much into the course and the work; it is fantastic. They are some of the best employees.

"The government needs to play a key role in getting us through to completions. Completion rates in apprenticeships are not great. I'd say a lot of times it's financial or employers. It's hard to get an employer to sign up for a full four and a half for five years."

Participants struggle with being able to negotiate with employers to register as apprentices, as well as knowing the experiences they should be receiving to fulfill their apprenticeship. Without the proper support to understand the pathway to complete an apprenticeship, the average apprentice tends to not complete.

Financial Barriers for Participants

One of the central challenges to the WIST program identified by participants and reiterated by stakeholders is the financial costs associated with participating in the program.

"Financially those women that are enrolling in these programs how do they ensure they have livable income; how do they pay for their childcare during the time of the program."

Pre-apprenticeship programs are fully funded by the Ministry of Training,

Labour, and Skills Development. Anyone who participates in this program receives free tuition, books, health, and safety equipment, entry-level toolbox. The pre-apprenticeship program covers all the costs associated with the training. The challenge for WEST participants is that the program is full-time and does not cover cost-of-living expenses. For many, including single mothers, single adults, or someone living in poverty, this creates a huge barrier.

Program Strengths

The program is seen as being successful due to the partnership model. The WIST program implementation model is built on partnerships between employers, labor unions, education, and community organization through the Industry Council.

"The most successful component of the program is that all key stakeholder groups were brought together. They were able to get all the people around the table to produce all the things in the program from soft skills to UNIFOR workshops. Windsor created a community-based program that was developed by the community, implemented by the community."

Each Industry Council member was viewed as being vital to the ongoing success of the program. However, WEST was identified across stakeholders as being the 'glue' that held the program together. While employers were involved, having the right employers was identified as key to ensuring there were employment opportunities for participants once they completed the program.

"WEST made the greatest difference because were it not for WEST as an organization and the specific and very particular services that they provide geared to the female population here in Windsor Essex, I wouldn't think that the program would be a success."

Next Steps

The initial focus of the program was to raise awareness among women about the viability of the skilled trades as a career option. Interviewees felt that there was a shift in mindset, women were seeing the trades as a viable career option. As noted by one interviewee,

"Promoting the skilled trades to women, we have done that. We have an ongoing list of women who want to participate in the program. So, it's not worth spending more money on awareness. We're not evolving fast enough with what is

happening. We should be going on to the next step."

For some interviewees, the next step, now that women are entering the trades, is to understand why they are not staying. This would require doing a deep dive backward and finding out from WIST graduates why they stayed and why they left.

"As an employer, we did not do an excellent job looking back and understanding why women did not stay in the industry and why the industry did not embrace the fact that women are not staying."

Another employer noted:

"Maybe eight years ago West looked at young women/girls and their awareness about the trades, but it might be time to measure it again to see how far the needle has moved."

One recommendation by interviewees and survey participants was the need to re-allocate employer incentive dollars to offering financial incentives to participants while they are completing the in-class portion of the training.

Additionally, while the industry has been actively involved in the delivery of the WIST program, respondents have identified that there is a need for increased employer participation. As mentioned by an interviewee, *"How we educate and inform more employers to join the program and to hire women is something industry council is working on."*

It was recommended that increased employer engagement could be attained through formal networking sessions that provide an opportunity for employers that have diversified their workforce to share their experiences and lessons learned with employers considering hiring women. Another way to increase employer involvement is to identify employers who are committed to providing tours of their facilities. This will allow for the program to increase the number of industry tours, as was identified by both participants and Industry Council members as being essential.

Before the pandemic, an intake would have the opportunity to participate in two industry tours over the course of the 32-week program. An increased number of tours across more diverse types of industry settings would allow participants to get an idea of the various industry settings and types of opportunities available.

"One of the things that they'll tell me is, well, this is different from the shop. These shop classes are supposed to imitate an industry but it's different."

Participants also felt that they needed to have more exposure to the shop floor before the work placement so that they can be better prepared for their work placements. While participants were able to complete shop class as part of the training at the college, it did not provide them with a good sense of the dynamics of the shop floor.

Additionally, there was a common consensus across participants that improved monitoring of work placement sites was needed to support women as they transitioned from the classroom to the workplace. As a participant noted, *"Enhanced mediation between employers and placements."*

Increased supervision of workplace sites would provide an opportunity to not only support women transitioning from the class to the shop floor but would provide support to employers as they transition their companies to accommodate women. Though those employers involved with the program have highlighted a commitment to diversifying their workplace, as the program tries to reach additional employers, it may be beneficial to create a support system or resource to enhance the experience of beneficiaries (employers and participants).

Discussion

The WIST program is part of a growing trend in technical or applied education, which is becoming increasingly popular as an essential pedagogy for skilled trades education. The competence of an applied education program is in imparting to its participants the necessary expertise to practice professionally in the industry (Arain, 2020). This includes connecting participants with a network to facilitate their entry and maintenance in high-skill, high-demand jobs. The trades hiring practice is based on a network (Graham & Tracey, 2015; Graham, Hachem, & Gallant, 2013).

Increasingly, research has identified non-cognitive skills (social and emotional learning and mindset) as a key factor in improving the participation of girls and women in underrepresented occupations (Cheng, Kopotic, & Zamarro, 2017). Individuals "with strong motivation and drive, a desire to achieve goals, a belief in their capacity for success, the ability to reflect on their learning strategies, and a willingness to persist in the face of obstacles can overcome specific shortcomings in … content knowledge or obtain the knowledge necessary to succeed" (Conley & French, 2014, p. 1019).

The WIST program implementation model uses a network approach that

draws on the knowledge, skills, and experience of industry, education, and the non-profit sector. Direct responsibility for service delivery is held by WEST, as the lead applicant. WEST manages the program in consultation with industry representatives (labor unions and employers) and educators (local college) who are members of the Industry Council, which meets quarterly. Each Council member or partner has taken an active role in steer heading the WIST program.

Barring the Covid-19 disruptions, the program provided women with employable skills. Most participants found work placements and on the account of employers. The program demonstrated the potential for increased earnings for women. The program would have to consider increasing the number of employers willing to participate in job placement, while potential employers would have to provide relevant accommodations for women. In addition, the program should consider financial support for women, particularly single mothers because of the job loss or opportunity cost incurred to pursue the program.

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Appendix A:

Participant Overview

There were 70 women with multiple barriers to employment that participated in the 31-weeks WIST program between 2018 and 2021 (Appendix A, Table 1). Most WIST participants were considered 'hard to employ,' in that they faced multiple barriers to employment. These barriers included disability, single parenthood, domestic violence, indigenous, newcomer, member of a visible minority group, etc.

Over a quarter of WIST participants were identified as a visible minority. In Intake 1, 24 percent of participants were a visible minority (n=6), 44 percent in Intake 2 (n=11), and 25 percent in Intake 3 (n=5). The participants were over 30 years old, 64 percent in Intake 1, 56 percent in Intake 2, and 60 percent in Intake 3. The second intake had the largest number of participants living with a disability, 24 percent compared to 4 percent in Intake 1. Single parents comprised 16 percent of Intake 1 (n=4), 32 percent of Intake 2 (n=8), and 30 percent of Intake 3 (n=6). More than half of WIST participants had children, 26 percent had one child (n=18),

Table 1. Characteristics of WIST participants, 2018-2020

	Intake 1		Intake 2		Intake 3	
	n	%	n	%	n	%
Total	25	35.7	25	35.7	20	28.6
Age 16 to 29	9	63.0	11	44.0	8	40.0
Age 30 to < 65	16	64.0	14	56.0	12	60.0
Secondary School	13	52.0	12	48.0	8	40.0
Post-Secondary	12	48.0	13	52.0	12	60.0
Visible minority	6	24.0	11	44.0	5	25.0
Immigrant	1	4.0	4	16.0	4	20.0
Indigenous	1	4.0	2	8.0	-	-
Living with a disability	1	4.0	6	24.0	-	-
Single parent household	4	16.0	8	32.0	6	30.0
Survivor domestic violence	-	-	9	36.0	9	45.0
Number of children						
0	13	52.0	11	44.0	8	44.0
1	5	20.0	6	24.0	7	35.0
2 to 4	7	28.0	8	32.0	5	21.0

Source: Student intake database (2018–2020)

and 29 percent had more than one child (n=20). The educational level for the groups was either secondary school or post-secondary, with 53 percent of participants having a post-secondary diploma and 47 percent a secondary school diploma.

The majority of WIST participants at the start of the program were employed full-time or part-time, with 48 percent of Intake 1 and 57.1 percent of Intake 2 being employed (Appendix A, Table 2). However, with Intake 3, most participants were unemployed, with 65 percent being unemployed. The average annual income for participants before starting the program was below the poverty line of $65,000. Participants in Intake 1 reported a pre-program annual income of $18,066, for Intake 2 $19,669, and Intake 3 $16,919. In Intake 1, 24 percent of participants (n=6) received some form of government assistance (Ontario Works, ODSP, Employment Insurance, CPP).

In-Class Training

The pandemic impacted program completion for Intake 2 and Intake 3. Participants in Intake 1 and Intake 2 completed the in-class training. Of the 25 participants in Intake 1, 92 percent of participants completed the in-class portion of the program (n=23). Three participants withdrew from the program.

Similarly, 88 percent of participants in Intake 2 completed the in-class portion and four participants withdrew from the program (n=22). Of the 20 participants in Intake 3, 95 percent are waiting for the in-class portion of the program to resume and only 1 student withdrew. Participants in Intake 1 had the highest number of absences, with an average of 11.6 days absence compared to 8.6 days for Intake 2 and 2.6 days for Intake 3.

Table 2. WIST participants income breakdown prior to starting program, 2018-2020

	Intake 1		Intake 2		Intake 3	
	n	%	n	%	n	%
Source of Income						
Employed PT/ FT	12	48.0	12	57.1	5	25.0
Family Member (spouse, parents)	3	12.0	-	-	-	-
Government (OW, ODSP, EI, CPP)	6	24.0	-	-	-	-
No Income	2	8.0	-	-	-	-
Unemployed	-	-	8	38.1	13	65.0
Unknown	2	8.0	1	4.8	2	10.0
Mean annual income ($)	23	18,066	20	19,669	19	16,919

Source: Student intake database (2018–2020). Income source at start of program.
Note: Four students from intake 2 dropped out of the program during the training phase (n=21).