

# Students' Experiences of a Women-Only Automotive Service Technician Pre-apprenticeship Program

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## Abstract

A career in the skilled trades offers women many benefits, yet efforts to recruit women into this career path have had limited success. A longitudinal study was conducted to explore students' experiences with a women-centered Automotive Service Training pre-apprenticeship program that included innovations designed to support women entering this skilled trade. The women-only program provided a gender-sensitive classroom environment, and holistic program content to meet the needs of women holding multiple roles, as well as social and personal supports in the form of coaching, mentoring and advocacy. Results of the study indicate that participants made gains in key workplace competencies and were very satisfied with the program. The program provided several advantages: it helped students to decide if this was indeed the career for them, prepared them for the work world, and gave them the confidence and skills they needed for success.

Women are a largely untapped source of labour for the skilled trades, however, efforts to recruit them have had limited success. This is unfortunate as women can make a much-needed contribution to the general Canadian workforce by alleviating the chronic labour shortages in the skilled trades (Construction Sector Council, 2010). Though women made up slightly less than half of the total workforce in 2001, they accounted for two-thirds of the overall labour force growth during the 1990s. There is one notable exception: this growth is not seen in the skilled trades. In 2004, only 7% of workers in transportation, trades and construction were women. In 2003, just 9.7% of registered apprentices and 10.6% of completed apprenticeships were held by women (Canadian Council on Learning, 2006).

A career in the trades offers wage benefits; as much as double or triple the wages earned in a traditional female job (Greene & Stitt-Godhes, 1997). While there are numerous opportunities for job training and advancement and job mobility, women frequently encounter workplace barriers to their career development. The 2004 Canadian Apprenticeship Forum (CAF) summit report, *Accessing and Completing Apprenticeship in Canada*, included a special report on women's perceptions of workplace barriers. The Forum report noted that, despite policy priorities that support greater and more consistent participation of women in non-traditional occupations, little progress has been made over the past decade and little research or evaluation has focused specifically on issues relating to recruitment, training and career development.

The CAF consultation described seven barriers reported by women. Three barriers, negative attitudes toward apprenticeship and the trades, a lack of information and support in the secondary school curriculum, and investment in community resources to promote apprenticeships and training for women, speak to broader social trends which often limit women and other under-represented groups who are considering trades and apprenticeships. While some improvement has been noted over the years, most of the other barriers identified in the CAF report reflect the culture of non-traditional workplaces and training settings which makes those sites less welcoming to women. This is reflected in biased or discriminatory hiring practices, unequal pay for comparable work, sexual harassment, and isolation of women at the work or training site. The Ontario Overview Report of the National Apprenticeship Survey (Ménard, Chan, & Walker, 2007) noted that nearly 9% of women, compared with 2% of men, reported harassment, discrimina-

tion, dispute, conflict of interest, or not getting along at work as reasons for discontinuing their apprenticeship studies.

WOMEN-CORE, a European consortium concerned with women in industry and construction, attempted a comprehensive scan of qualitative research in those fields in 2006 (WOMEN-CORE, 2006). They identified an important research gap regarding women in industry and construction. Accordingly, the team extended the scope of their research to include women in science, engineering, and informatics, and other disciplines in which women are relatively under-represented. Their analysis identified several systemic barriers to skilled trade careers. They also identified factors that support retention of women in the non-traditional workplace. Where social conditions support women's participation, where management actively promote women, or where government, educators, employers and unions provide leadership on family-sensitive social and labour policy, women are successful in these non-traditional occupations at essentially the same rate as men.

Canadian groups have also been working to identify initiatives that support women in the trades. Women Building Futures (WBF) is an initiative that has been active in Edmonton since 1998. They have been successful in increasing the recruitment and retention of women in the construction trades to address persistent labour shortages in that province. A partnership between Edmonton Social Services and the North Alberta Institute of Technology led to the development of a 16 week Journeywoman Start program which combines academic upgrading, hands-on learning, work experience and job retention support for women entering the construction trades (Women Building Futures, 2009).

In 2006, the Women Building Futures group evaluated their approach



from an economic perspective. After tracking graduates for two years, the author of the WBF report (Bubel, 2009) estimated that the initial investment of approximately \$100,000 in the pre-apprenticeship training of 11 women in 2006-07 resulted in a net value of \$53,000 per participant. This included \$515,000 in increased income and assets for participants, approximately \$130,000 to government in tax revenue and reduced health and social benefits for these clients, and almost \$225,000 in reduced costs in recruitment and training for employers.

While these initiatives are exciting and appear to have merit, there are several research gaps. Although numerous consultations with women and other equity groups on access to the skilled trades have identified the difficulties of navigating the culture of the non-traditional workplace for women, little work has been done to determine the value of specific women-centred programming in helping women build the networks needed to sustain them through the apprenticeship period. The need for efficacy-based academic interventions is considered very important for 'at risk' students and those who face challenging school/workplace environments (Hackett, 1999).

To address that research gap, the School of Transportation in an Ontario community college was funded by the Ministry of Training, Colleges and Universities to offer a one-year, women-only, Automotive Service Technician (AST) pre-apprenticeship program.

### The Automotive Service Technician Pre-apprenticeship Program

The Ontario Ministry of Training, Colleges, and Universities supports and funds pre-apprenticeship programs at several Ontario colleges to address barriers faced by potential trainees, and is normally designed as three, 12-week semesters. The first semester focuses on academic upgrading, the second provides lectures and labs and the third semester includes a work placement with an approved employer.

The innovative AST pre-apprenticeship curriculum piloted in this study included content and learning activities identified in the literature as beneficial

for women apprentices. The new program provided a women-only admissions policy, a gender sensitive classroom environment, holistic program content and social and personal supports for women trainees in the form of coaching and mentoring on family and work issues (Government of Yukon Women's Directorate, 2005). Other curriculum innovations that were tested included:

- Trading UP, a specialized vocational assessment tool used in recruiting which focuses on women's skills and orientation for entry to trades and includes an information session, tour of facility, an assessment test in mathematics and English and an interview with the program coordinator;
- A four-week module integrated at the end of the academic upgrading semester called "Busting the Barriers Career Readiness," that develops women's workplace confidence by building personal and inter-professional skills in communication, assertiveness training and personal safety prior to beginning work in the automotive service workplace, followed by a 12 week program in AST Theory;
- Trained, gender-aware instructors, trainers and job coaches and a women-only classroom/lab environment;
- Work placements of 12 weeks, selected and monitored to promote and maintain a positive learning experience;
- Coaching and mentorship until the end of the Level 1 Apprenticeship;
- Access to a network of collaborative relationships with employers who recruit women apprentices to facilitate the best possible work experience for both the women trainees and employers.

### Research Objectives and Approach

The purpose of the study was to explore the impact of the program innovations on women's pre-apprenticeship experiences and their self-efficacy as they progressed through the year-long program in this early and critical part their career development process.

A participatory research (PAR) design was selected as this approach addresses real world problems and results can be applied rapidly. PAR is a well-established research methodology aimed at improving practice by changing it (Stringer, 2004). PAR requires that project participants introduce a change or innovation, actively participate, and work collaboratively to evaluate the innovation. The PAR design is particularly appropriate as a tool to accomplish our project goals and appeals to educators as a rigorous method where the results translate into action more quickly than traditional research (Cave & Ramsden, 2003).

The theoretical framework for the study was based on self-efficacy theory, developed by Bandura (1977) as part of his social-cognitive theory, which fits well with PAR. Self-efficacy is the belief that one has the knowledge, skills and capability to undertake and complete those actions required to manage a given situation. Those feelings of self-efficacy in turn influence a person's behaviour and degree of perseverance. Bandura suggested that psychosocial skills are a more important component of career success than occupation-related technical skills and that higher levels of self-efficacy are associated with better functioning in the workplace (Bandura, 1994).

### Sampling

All students who enrolled in the new AST program were invited to participate in the study ( $n = 17$ ). The study was approved by the Community College Ethics Review Board. All participants gave written informed consent at the start of the study and were reminded of the consent process at each subsequent data collection point.

### Data Collection and Analysis

To explore the career development process, a mixed methods, longitudinal approach was used. Data were collected from students at three points over eight months using surveys and interviews. Descriptive statistics, such as means, and measures of central tendency, were calculated using SPSS for the demographic survey items, program satisfaction survey, and self-efficacy survey to provide a



profile of participants and survey results. The interviews were taped, transcribed and analyzed using a content analysis approach (Lincoln & Guba, 1985). The transcripts were coded using each participant statement as a unit of analysis. The researchers began by reviewing the overall data and developing a categorization scheme then progressed to identifying key themes, variations in experience and recommendations for change.

**Demographic Survey**

Four surveys were administered to students: a demographic survey, a general self- efficacy survey, a pre-post workplace self-efficacy survey and a program satisfaction survey. The demographic survey, administered at the start of the course, was developed by the researchers to provide a profile of the learners that included age, education, job experience and reasons for enrolling in the program. It also included a section that measured student satisfaction with the different aspects of the Busting the Barriers Career Readiness curriculum.

**General Perceived Self-efficacy Survey**

The General Perceived Self-efficacy Survey consists of 10 items related to personal confidence, problem solving and resiliency and provides a profile of participants' overall feelings of general self-efficacy at the start of the program. Learners use a four point Likert scale in their responses where 1= strongly disagree and 4 = strongly agree. The survey has been extensively tested for validity and reliability (Schwarzer & Jerusalem, 1995).

**Workplace Self-efficacy Survey**

A pre-post workplace self-efficacy survey was used to measure learners' perceptions of change in their self-efficacy regarding eight competencies that were identified as unique outcomes of the women-only program. The survey items were developed by members of the evaluation team under the guidance of the program coordinator to enhance item validity.

The survey included a seven-point Likert scale to measure participants' perceptions of their competency in program outcomes skills where 0 = 'cannot do it at all' and 7 = 'certainly can do' in

relation to each item. Sample items include using ergonomics and safe work practices to promote personal and professional safety, using critical thinking, listening and questioning skills to analyze and evaluate issues of power, privilege and equity in the workplace, and establishing a personal and professional support network to strengthen access to opportunity in the workforce. The Cronbach alpha for the Workplace self-efficacy survey was .92 in this study; scores over .70 are considered acceptable evidence for reliability of survey items (Polit, 2010).

**Program Satisfaction Survey**

The Program Satisfaction Survey was used to measure learners' satisfaction with the overall program, and was administered at the end of the program. The survey was modified from an existing survey developed by Ryan, Campbell, & Brigham (1999). The survey consists of 11 items that measure satisfaction with program outcomes, content and learning activities with a view to improving the curriculum for the next student intake. Respondents use a four-point Likert scale ranging from 'Strongly disagree' to 'Strongly agree' to respond to survey items. The Cronbach alpha for this survey was .85 in this study, providing further evidence for the reliability of these items.

**Interviews**

An understanding of women's experiences and recommendations for the program was gained through in-depth interviews conducted at three points,

timed to capture women's experiences and perceptions at key points in their educational journey:

- Twelve weeks after the program started, at the end of the Busting the Barriers/Career Readiness Training unit;
- Six months after the program started, after completing the Level 1 theory;
- On program completion: during or after the 12 week workplace placement.

**Results**

**Demographic Survey**

All participants (n = 17) completed the demographic survey. The mean age was 28.8 (SD 8); ages ranged from 21 to 48. Ten (58.8%) women had completed high school and 7 (41.2%) had completed college. Regarding their ability to speak English: 1 (5.9 %) said it was 'poor', 1 (5.9%) said 'fair', 2 (11.8%) said 'good' and 13 (76.5%) said 'excellent'. The participants came from 13 different ethnic backgrounds.

**Academic Upgrading and Busting the Barriers Career Readiness Survey**

The students were asked for their feedback on the different components of the academic upgrading portion of the program they had just completed, referred to as "Busting the Barriers". This component builds students skills in English, mathematics, computer literacy, self-awareness, communication, assertiveness training, finances and personal safety (Table 2).

**Table 2. Mean scores for Academic Upgrading and Busting the Barriers Career Readiness Survey items (maximum score is 5)**

Item	Mean (SD)
Computer literacy	4.5 (.51)
English	2.9 (1.3)
Math	4.8 (.37)
Interview	3.1 (1.1)
Resume building	3.6 (1.1)
Lab	3.6 (1.1)
Team skills	3.8 (1.2)
Busting the Barriers helped prepare for next stage of the program	4.0 (1.2)
Busting the Barriers Career Readiness was important for success in AST pre-apprenticeship program	4.1 (.93)



The mean scores were high for items related to computer literacy and mathematics. The scores on the items related to the utility of the Busting the Barriers Career Readiness module were also high. Students reported time spent building job preparation skills such as preparing for interviews and resume building as less helpful. The item for English upgrading had the lowest mean score of 2.9 and reflects different opinions regarding the need for English upgrading.

**General Perceived Self-efficacy Survey**

Participants also completed the General Perceived Self-efficacy survey at the start of the program to measure their perceptions of their overall confidence. Mean scores for each individual item were high, all were greater than three out of a possible four. The mean score on the total survey was 34.1 (SD 3.9) or 85/100 and ranged from 67.5/100 to 100/100. The Cronbach alpha for this survey was .90 providing evidence for the reliability of survey items.

**Results: Pre and Post Course Scores on the Workplace Self-efficacy Survey**

Thirteen students completed the Workplace Self-efficacy Survey at the start and at the end of the program to measure their perceptions of their confidence regarding key competencies critical to workplace success. The survey included a seven point scale where 1 = 'Cannot do at all' and 7 = 'Certainly can do' (Table 3).

The mean score on the total pre-program survey was 43.3 (SD 8.3) or 77.3/100. Scores ranged from 51 to 100/100. The mean score on the total post-program survey was 50 (SD 6.0) out of a possible 56 or 89.2/100.

**Course Satisfaction Survey Results**

All 14 students who completed the program were surveyed at the end regarding their satisfaction with different aspects of the program. The mean score for the total Course Satisfaction Survey items was 37.5 (SD 4.8) out of a possible 44 or 85.2/100 and scores ranged from 59/100 to 100/100.

**Table 3. Pre and post mean scores on the Workplace Self-efficacy Survey items**

Item	Mean ± std PRE COURSE	Mean ± std POSTCOURSE
Use psychological and physical skills for personal safety	5.7 (1.2)	6.5 (.96)
Establish a personal and professional support network to strengthen access to opportunity in the workforce	5.5 (1.0)	5.8 (1.5)
Use problem solving, listening and questioning skills to analyze and evaluate issues of power, privilege and equity	5.4 (1.2)	6.3 (1.0)
Use ergonomics and safe work practices to promote personal and professional safety	5.5 (1.2)	6.0 (1.1)
Make informed decisions about a career in the skilled trades	5.5 (1.4)	6.3 (.96)
Create and implement a plan for professional success	5.4 (1.5)	6.0 (1.1)
Communicate clearly, verbally and in writing at work	5.2 (1.5)	6.6 (.65)
Analyze your current financial supports for maintaining current career path.	5.0 (1.3)	6.23 (1.2)

All survey items had a mean score of 3.0 or greater out of a possible 4, indicating that most students felt the program had been useful and their time had been well spent. Items with the highest scores were, "The program provided information that is useful" (mean of 3.8) and, "I would recommend the program to other women" (mean of 3.6). The two items with the lowest mean scores were: "The amount of practice time in the lab was enough to prepare me for apprenticeship" (3.0) and, "The women only learning environment was helpful" (3.1).

**Interviews**

**Week 4: busting the barriers-career readiness.**

Three rounds of interviews were held during the eight month program. The first were held four weeks after the program started, with 14 (82%) students to describe their early program experiences and to capture their impressions of the Busting the Barriers Career Readiness curriculum.

All students reported that their experience to date had been positive, and that the program was worthwhile. They noted that the program coordinator and faculty provided invaluable support in supporting their decision to enroll and then to stay in the program when the workload increased. Some students

were very enthusiastic, describing the program as 'life changing'. One student commented,

Now I realize how valuable this is and if you can get skilled...women have the potential to have a lot of growth in this industry; they could do really well. And so I totally opened up that different side to it and sort of un-cloud those myths about what this industry is like.

Response to the women- only aspect of the program was positive for most students. One of the benefits was that the program provided the opportunity for students to become familiar with the cars and tools in a 'safe' environment. Some students noted that they would have been equally comfortable enrolling in a co-ed program; their reason for applying was not strictly because of the women-only focus, funding had been a critical factor as well. These students felt there would be some value to studying with men at least part of the time to prepare them for the work world.

The Busting the Barriers Career Readiness module was cited as helpful by almost all the students. They reported that the content on self- defense, personality testing, financial planning, the his-



torical perspective of women in the trades and managing harassment in the workplace had been helpful. The opportunity to pro-actively discuss challenges that students might face in the workplace was viewed as particularly useful. Some students, however, were impatient with the amount of classroom time; they were keen to "get to the cars". This view was balanced by students who recognized the value of taking time to reflect before going forward in the trade. One student commented,

I'd say yes, that Busting the Barriers was really helpful to us. So, although sometimes we all want to be working on cars, that's the most anxious part. But when you actually sit back and look at it, you say okay, knowing a bit about yourself actually can help you in a career later on if you want to start your own business, whether its mechanics or anything else its good to know those things about yourself.

A small number felt that more time should have been spent learning with men. One student commented, "I think we should work with the guys more often, like even if it's just two days out of the week, because they're trying to teach us to work with men, right?" Some students felt that their shop activities had been crowded, that there hadn't been sufficient opportunity for hands-on practice.

#### Four months: level 1 theory.

Interviews were held with 11 (79%) students at four months, to gain insight into their experiences with the Level 1 automotive theory and their readiness for their automotive placement. The students felt that the program supported women in the trades, they had learned a lot from their teachers, the program coordinator provided valuable support and that the program should continue. One student commented, "...this is a wonderful program. I think it is a great opportunity and I feel like this has been a life changing experience. I would recommend it anybody interested in the automotive industry".

Some students were not satisfied with certain aspects of the program and

felt that less time should have been spent preparing for gender issues in the workplace and more time building hands-on skills than allocated in the standard 12 week unit provided in the Ministry guidelines. One student noted, "If you've ever worked with a male in any industry before you came into this one, you'll know that, you know what I mean- they're not that bad," and, "We could have been doing much more educational things other than busting barriers."

Students were asked to comment on their experience with the automotive theory part of the program. Responses ranged widely from very positive to very dissatisfied. The majority of students said they had had a very positive, although at times, overwhelming experience. They noted that they had improved their knowledge of vehicle parts, operations and maintenance. Some students were less satisfied; they were frustrated that some students were not taking the program seriously. One commented, "You can tell who's serious about being a mechanic and getting focused and people who were just kind of here to see what was happening."

#### Time 3: eight months in- the workplace experience.

Students were interviewed for a third time, at the end of their program, during the scheduled work placement. Thirteen (93%) students participated. At the time of the interviews seven students had completed or largely completed their placement, four were part way through and two had not yet found a placement. Most students reported that they had had a good or great experience. A great experience was one that students described as a busy auto shop and where the co-workers and boss were supportive. Two students specifically commented that the staff had been great. One noted, "Anytime I'm struggling with something or I can't do something, if I asked them for help they were more than willing to help me".

Some negative feedback was shared: one student had heard that a customer had made derogatory comments about a woman working in the shop. Another student started a placement but found it too slow and changed to a large chain where she was ultimately hired. One

student had a placement but left after one month. She said that it had not worked out, "There were a lot of head games with the service guys". One student was frustrated with her placement experience; she felt she was being given minimal hands-on experience and spent her time moving and washing cars and quit. Another student described her placement as good but added that there was not a lot of hands-on work so far and that although she was 5 feet 8 inches tall she struggled with heavy work such as taking off tires. One older student who had not yet been placed felt that her age and gender were barriers.

#### Program experience.

Students were asked to describe their experience with the pre-apprenticeship program; all were positive and said they would recommend it to others. One commented, "It gets you ready for the real world". They felt that the automotive theory gave them an advantage in the workplace. Another student described the program as a personal journey. She felt that she had received a lot of academic and personal support through that process, particularly from the program coordinator. Some students commented that the academic upgrading component had been very useful. Several students commented that they were grateful they had the opportunity to participate in the program. One remarked,

"This program made me feel better about doing my apprenticeship in the automotive workplace by providing exposure to this field and helping me to gain some experience with different vehicles. As a petite, female, minority, it would be difficult for me to enter this profession without some type of training. Who would hire someone with this type of body structure to perform a job that requires strength and with no knowledge or experience in this field? It's extremely beneficial for the employee to have the knowledge needed to fix and maintain vehicles."

Most students said the program had helped by boosting their confidence, teaching them not to give up and about



the need to be responsible on the job. Several students commented that the hands-on skills they had learned such as oil changes, working on brakes and suspension system, tire repairs and battery checks had really helped them make a successful transition to the workplace. Others students felt the program had less impact. The reasons for this were that they felt under-prepared in some skill areas. They also realized that it takes time to adjust to the workplace.

The students' reflections, when looking back to the Busting the Barriers Career Readiness component, varied. Three students felt that it had been very helpful by increasing their confidence in asking questions at work and helping to cope with workplace issues. Some students commented that gender had not been an issue. Students reported that program staff had been very supportive, their coaching and mentoring was appreciated. Staff in the workplace were also viewed as supportive and the students, by striving to be reliable and well prepared, reported that they had had a good experience.

**Student recommendations.**

Students were asked if there were any recommendations they would like to make regarding their program. These included:

- More lab practice time;
- Devote more time to job search skills (interviews, approaching an employer);
- Add a midterm break to make the program more manageable for women with families;
- Move the component 'Workplace Practices' forward, before going into lab, so students are more comfortable handling tools;
- Monitor the workplace placements to ensure they provide a worthwhile experience;
- Add a body mechanics component to prepare the students for physically challenging work

Students were asked to share their thoughts on the women-only program. All students were supportive of the program, however, the majority recommended that a co-ed component be

introduced earlier in the program. One student noted, "I think if we do this again there should be an interchange where we're in the lab with the men, just so that we get a feel of how it's going to feel to work with the men, because, it's a man's field, so we're going to be seeing a lot of men."

**Discussion**

This study was one of the few identified that explored women students' perspectives as they prepared for an automotive apprenticeship. The use of both surveys and interviews added to the depth and validity of study results. The students were a very diverse group, coming from 13 different ethnic backgrounds. They also started the program with a wide range of academic skills, and English language skills, in particular. This variation in skills has implications for improving screening and streaming for the English upgrading part of the program. Upgrading in computer literacy and math were valued as essential for today's workplace.

Participants completed the General Perceived Self-efficacy survey at the start of the program to measure their general sense of confidence or ability to manage situations. The mean score for the total survey was 85/100. This suggests that most participants came to the program with a healthy perception of self and confidence in their ability to manage life's eventualities. This finding was also reported in an earlier study of women in agricultural education, another area where women are traditionally under-represented (Kelsey, 2007). The women in Kelsey's study reported that they felt they needed to prove themselves and were confident that they could. These results are encouraging as women entering non-traditional occupations have the resiliency that will support them in their career choice.

The workplace-specific self-efficacy survey indicated that students made gains in their workplace competency scores during the program. This result provides evidence for the value of supportive programs for women embarking on non-traditional careers.

Interviews were conducted with students at three points over the eight month program and provided an inter-

esting picture of their development over time. Results from the interviews held with students four weeks after the program started indicated that most students were initially anxious and that they were enthusiastic about the women-only program. Key success factors identified by the students included the coaching and mentoring they received from the program coordinator and faculty, many of whom were women with automotive service expertise.

Some students were impatient with the amount of classroom time and content, however, this view was balanced by students who recognized the value of taking time to reflect and build professional skills before going forward in the program. That said, several students recommended less time be spent on self-reflection activities and more time on the body mechanics and finance management activities to prepare for work. Students were interviewed a second time, four months after starting the program. The need to build car skills was a persistent theme and reflected in the varying levels of readiness or confidence students expressed regarding the next stage- their workplace placement. A final round of interviews was conducted eight months after the program started, after the workplace placement. Several students were very enthusiastic about their work placement; the effort taken by the coordinator to secure student friendly learning environment had been worthwhile. Students had been productive and staff had been very supportive. Challenges related to gender were not raised by these students. This could be the result of working in shops that had been 'vetted' to provide a positive experience. This finding could also reflect the gradually changing workplace where there is an increasing acceptance of women. Some students reported an unsuccessful placement where things did 'not work out'. It is difficult to tell if the issue was related to gender or to the student's attitude and lack of work skills.

Students reported that the program had been worthwhile and had physically and mentally prepared them to work with men, a finding reported in an earlier study of women in a similar skilled trades program (Bower, 2007). The program helped them decide if this was in-



deed the career for them and gave them the confidence and skills they needed for success. Thinking back on the Busting the Barriers Career Readiness component, many reported it as interesting and helpful, however, after their placement they made a strong recommendation for more time in the lab and more hands-on practice with automotive skills. Interestingly, while expressing strong appreciation for the women-only program, most students recommended that the program keep that component but also provide opportunities to work with men, earlier in the program, to better prepare them for work. Earlier studies have suggested that female students perform better and are more comfortable in a single-gender setting (Burke & Murphy, 2006; Warrington & Younger, 2001). The findings from the present study suggest, however, that while students found support in the women-only program, they also feel that it is critical to spend some time learning with men to prepare them for work.

The interview results were supported with results from Course Satisfaction Survey where students indicated that their time had been well spent. The two items that pulled down the mean related to the amount of time in lab and the women-only learning environment. Lab time was crucial for the women in this study, the majority of whom have not had the years of car experience or automotive field role models that many of their male counterparts have had. The amount of lab time is partly regulated by the Ministry of Training, Colleges and Universities curriculum guidelines; feedback regarding an increased need for lab time needs to be conveyed to the Ministry. The second item with a lower score related to some participants' wish to have some learning time with men which was also heard in the interviews. This finding suggests that a program modification, where students spend some time learning with men in the first year of the program, might be worthwhile.

Threaded throughout the interviews was the theme that the coordinator plays a key role in recruiting, coaching and supporting students, reducing attrition and acting as the 'glue' that holds the program together. A critical component

to the ongoing success of the program is ensuring a coordinator is in place who understands the needs of women students in AST, has a strong background in AST and who liaises well with employers.

#### Study Limitations

It should be noted that the results generated from the qualitative interviews in this study are not intended to be generalized. Further, the study's sample was small and self-selected and may not be representative of the larger population of woman students learning a skilled trade. A further limitation is that self-report measures were used to measure students' program competency gains. That said, the numerous data collection points enabled the research team to validate their findings with the participants at each data collection point. The finding that students want more time practicing 'hard' skills is important, however, it needs to be viewed in the context of the new graduate. Recent graduates often only recognize the importance of communication and other 'soft skills' as they mature on the job (Martin, Maytham, Case, & Fraser, 2005). It might be too soon to accurately evaluate the impact of this part of the program. A longitudinal study that follows students several years after program completion is recommended.

#### Conclusion

There is a critical need to encourage greater numbers of women to enter the skilled trades. The women-only program provided a secure, collegial environment that encourages learning and program satisfaction. The study suggests that both psychosocial skills and occupation-related technical skills are needed for career success. Lessons learned from the study may be of interest to other skilled trades programs for women and for programs that serve other under-represented groups.

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#### References

- Bandura, A. (1994). Self-efficacy. In V.S. Ramachaudran (Ed.), *Encyclopedia of Human Behavior* (Vol. 4, pp. 71-81). New York: Academic Press.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 181-215.
- Bower, L.M. (2007). *The experiences of five women in a skilled trade apprenticeship program*. Unpublished doctoral dissertation, University of Nebraska-Lincoln. Paper AA13242157.
- Bubel, A., Kain, J., & Kerr, K. (2009). *Journeywoman Start Program—Social return on investment analysis*. Edmonton: Women Building Futures.
- Burke, L & Murphy, E. (2006). Female students' experiences of computer technology in single-versus mixed-gender school settings. *USQ Australia. E-Journal of Instructional Science and Technology*, 9, 1. Retrieved January 20, 2011 from: [http://www.ascilite.org.au/ajet/e-jist/docs/vol9\\_no1/papers/full\\_papers/burke\\_murphy.htm](http://www.ascilite.org.au/ajet/e-jist/docs/vol9_no1/papers/full_papers/burke_murphy.htm)
- Canadian Apprenticeship Forum. (2004). *Accessing and completing apprenticeship in Canada: Perception of barriers. A consultation report*. Ottawa: Government of Canada Sector Council Program.
- Canadian Council on Learning. (2006). *Apprenticeship training in Canada*. Retrieved March 21, 2009, from <http://www.ccl-cca.ca/CCL?Reports/LessonsInLearning/apprenticeship-LinL.htm>
- Cave, A., & Ramsden, V. R. (2003). *Participatory action research*. Retrieved July 2, 2008, from <http://www.cfpc.ca/cfp/2003.Oct/vol48-oct-resource-3.asp>
- Construction Sector Council (2010). *Construction Looking Forward, An assessment of construction labour markets from 2009 to 2018*.



- Retrieved January 22, 2011 from:  
[http://www.csc-ca.org/english/whatsnew\\_2.html](http://www.csc-ca.org/english/whatsnew_2.html)
- Government of Yukon Women's Directorate. (2005). *Yukon women in trades*. Whitehorse: Government of Yukon.
- Greene, C., & Stitt-Godhes, W. L. (1997). Factors that influence women's choices to work in the trades. *Journal of Career Development, 23*(4), 265-278.
- Hackett, G. (1999). Self-efficacy in career choice and development. In A. Bandura (Ed.), *Self-efficacy in changing societies* (pp. 232-258). Cambridge, UK: Cambridge University Press.
- Kelsey, K.D. (2007). Overcoming gender bias with self-efficacy: A case study of women agricultural education teachers and preservice students. *Journal of Agricultural Education, 48*(1), 52 – 63
- Lincoln, Y., & Guba, E. (1985). *Naturalistic inquiry*. Newbury Park, California: Sage.
- Martin, R., Maytham, B., Case, J., & Fraser, D. (2005). Engineering graduates' perceptions of who well they were prepared for industry. *European Journal of Engineering Education, 30*(2), 167-180.
- Ménard, M., Chan, C.K.Y., & Walker, M. (2007) *National Apprenticeship Survey, Ontario overview report, 2007*. Ottawa: Statistics Canada, retrieved February 2, 2010 from <http://www.statcan.gc.ca/pub/81-598-x/81-598-x2008004-eng.pdf>
- Polit, D.F. (2010). *Statistics and data analysis for nursing research*. 2<sup>nd</sup> ed. Upper Saddle River, N.J: Pearson.
- Ryan, M., Campbell, N., & Brigham, C. (1999). Continuing professional education and interacting variables affecting behavioral change in practice: Instrument development and administration. *Journal of Continuing Education in Nursing, 30*(4), 168-75.
- Schwarzer, R., & Jerusalem, M. (1995). Generalized Self-Efficacy scale. In J. Weinman, S. Wright, & M. Johnston, *Measures in health psychology: A user's portfolio. Causal and control beliefs* (pp. 35-37). Windsor, UK: NFER-Nelson.
- Stringer, E., & Genat, W. J. (2004). *Action research*. Princeton, NJ: Pearson Education Warrington, M. & Younger, M. (2001). Single-sex classes and equal opportunities for girls and boys: perspectives through time from a mixed comprehensive school in England. *Oxford Review of Education, 27*(3), 339-356.
- Women Building Futures. (2007). *Report to the community, 2007*. Retrieved March 18, 2009, from [www.womenbuildingfutures.com](http://www.womenbuildingfutures.com)
- WOMEN in Construction scientific Research (WOMEN-CORE). (2006). Assessment of the state of the art of qualitative data on women in industrial and construction research, report D-4. Bilbao: European Commission.
- Women Building Futures: Report to the community (2009). Retrieved January 18, 2011 from: <http://www.womenbuildingfutures.com/cms/>