Interpreting Inclusivity in Male-dominated Apprenticeship Classrooms

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Abstract

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This research aims to illuminate the experiences of women in male-dominated apprenticeship programmes to inform faculty practices that support inclusivity in these classrooms. The purpose of the study is to address concerns expressed by former apprenticeships students.

According to the literature, women in male-dominated workplaces experience discrimination and implicit gender bias, a gendered environment, and sex-based harassment. The literature also reveals that the work-place environment is mirrored in male-dominated apprenticeship classrooms, making them non-inclusive for women. This research contributes to literature focused on the classroom experiences of women in male-dominated apprenticeships.

Using a qualitative methodology informed by interpretive phenomenology, this study employs Benner's (1994) approach to interpretive phenomenology to develop a research design A theoretical perspective of post-structural feminism is also used to inform methodology through feminist research praxis and provides perspective to the discussion of the research findings and proposed solutions. The data collected is both a background statement from participants to provide context to the interpretation of their classroom experiences, and a semi-structured interview to gain an understanding of the lived experience in the classroom. Data analysis consists of the interpretation of paradigm cases, themes, and exemplars as per Benner (1994). Appropriate action was taken to protect the identities of the institution and the participants.

The findings indicate that faculty behaviours such as setting expectations for the class regarding inclusivity, practicing teaching immediacy behaviours, and support from male classmates as part of a community of practice are experienced as inclusive by participants. Alternatively, sexist comments, the use of male pronouns, social exclusion, the requirement to prove oneself, and the establishment of learned coping behaviours indicate a non-inclusive environment for participants. Two significant correlations also add insights to the literature. First, that all non-inclusive experiences can be connected to microaggressive behaviours, which can be further interpreted from the post-structural feminist perspective as the language through which a non-inclusive discourse is enacted. Second, all the participants described a background or upbringing in male-dominated environments and it can be argued that this prior experience has enabled them to be successful in a non-inclusive environment.

To inform teaching practices, a pedagogical model from post-structural feminist pedagogy explained by Tisdell (1998) is developed, which is adapted for inclusivity in apprenticeship classrooms. The model represents a pedagogy that can address non-inclusive behaviours including microaggression in the classroom, as well as further support teaching immediacy and a community of practice. It provides new solutions to the challenges faced by women in male-dominated apprenticeship classrooms.

Keywords: *gender microaggression, women in trades, male-dominated apprenticeship, Patricia Benner, inclusive classrooms*

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Thank you all very much.

Dedication

For women in trades.

"It's going to be tough and it's going to suck sometimes and you're going to go home crying and you're going to want to quit and that's always going to be a thing that comes with trades, I don't think that'll ever change. The work is hard, you're gonna get dirty, you're gonna break a couple of nails, but don't give up, because the reward is always far better than the hard work you put into it. The harder you work the better your reward will be." (Liz - participant)

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Chapter 1 – Introduction

> We wondered if the women who were obviously benefiting from the system were succeeding because the institution had adapted to accommodate them. On the other hand, they might be particularly skilled at what one observer has called intellectual cross-dressing, that is, skillfully clothing themselves in the ideas and modes of expression that are the passport to success in a male-orientated institution. (Blackwell, 1998, p. 61)

Judith Blackwell makes this comment concerning the experiences of women undergraduates in a Canadian university. Typically, male-identified individuals tend to be overrepresented in the student population in sciences, technology, engineering, and math (STEM) programmes (Atkinson, 2020). Since tradespeople (such as welders, automotive technicians, and electricians) are also overwhelmingly men (Struthers & Strachan, 2019), it is unsurprising that the same goes for trade apprenticeship programmes in Canada (Frank & Frenette, 2019). Reflecting the language used in the literature (Wright, 2016), these programmes are referred to as 'male dominated' to reflect not only the overrepresentation of men in these programmes, but also their dominating effect on the culture in and experience of those programmes, and this term is widely accepted across research investigating the experiences of women in academic and trade settings (Alves & English, 2018; Ferm & Gustavsson, 2021; Waltemeyer, 2018). Even 20-plus years after Blackwell's comment on 'intellectual cross-dressing', women who are successful in such male-dominated apprenticeship programmes continue to be described in the literature as those who can either develop what many refer to as a 'thick skin' or learn to be 'one of the guys' (Jones et al., 2017; Smith, 2013; Struthers & Strachan, 2019; Taylor et al., 2015) to cope in non-inclusive environments.

In 2011, Florian and Black-Hawkins describe the word 'inclusive' as a broad term not well-defined regarding education, and since then various definitions have been established in the literature. These definitions vary from a narrower focus on generating learning opportunities that are accessible so that all learners can participate in the classroom community (Black-Hawkins, 2017) to some that explicitly add the facilitation of positive social experiences (Nishina et al., 2019) and then to very complicated definitions that include multiple communities engaged with curriculum and the complex ways communities and systems can connect (Association of American Colleges and Universities, n.d. as cited by Carpenter, 2022). For ease of understanding and to provide a definition that includes both inclusion and the active avoidance of marginalisation, this thesis considers inclusivity in the classroom and the associated pedagogy as that defined by Pantic and Florian (2015). They define inclusive pedagogy as "an approach that attends to individual differences between learners while actively avoiding marginalisation of some learners and/or the continued exclusion of particular groups" (p. 334).

This thesis investigates the experiences of women studying in male-dominated apprenticeship classrooms in a Canadian polytechnic institution. The overarching goal of this research and for professional practice is to inform practice for equity, diversity, and inclusion (EDI) at the classroom, institution, and ideally also trade levels. The goal of the researcher as a doctoral candidate in the Doctor of Education in Higher Education Administration programme at the University of Liverpool is to demonstrate research competency by placing a practice-based, or real world, issue at the centre of an inquiry (Taylor & Hicks, 2009). The remainder of this chapter overviews the background of apprenticeship in Canada, including women's participation and relevant barriers to their inclusion, and outlines the research context and problem as well as the purpose, questions, and significance of the research. Details about the use of gender-related

terms throughout this thesis are also provided before concluding the introduction with a summary of each chapter.

1.1 Research Background

To provide the relevant context for this research project, this section provides background information concerning apprenticeship in Canada, followed by a discussion on women's participation in apprenticeship.

1.1.1 Apprenticeship in Canada

Apprenticeship in Canada is the educational model used to acquire skills and knowledge to become a competent tradesperson. Typically lasting three to four years, progression through the apprenticeship system is industry driven and combines on-the-job training with formal academic training. Competency is recognized by journeyperson certification, which is often required to confirm the status of the journeyperson who is applying to perform the work in question, such as a welder or an automotive service technician (Sharpe & Gibson, 2005; Sweet, 2003). Individual companies play a large role in the apprenticeship system by hiring apprentices and providing them with on-the-job training at a reduced wage (Frank & Jovic, 2017). A person who wants to train for a trades occupation and earn journeyperson certification will typically find an employer who will sponsor them as an apprentice. The apprentice works at the adjusted wage, usually a set percentage of a journeyperson's rate. During this work experience, apprentices receive training from certified journeypersons and engage with an academic training component, normally in a government-funded programme delivered at a post-secondary institution within the same province. The length of this academic training component ranges between four to 12 weeks per year, with most apprentices taking this portion of the training in three or four blocks of eight weeks per year (Frank & Jovic, 2017; Gunderson & Krashinsky, 2016; Sharpe & Gibson, 2005). Following the completion of both academic and on-the-job training, an apprentice earns the

designation ‘journeyperson’, and receives the appropriate certification (such as being certified as a welder or automotive technician) that represents their competence.

The Canadian apprenticeship system is decentralized, with each of the 13 provinces and territories tending to their own jurisdiction (Gunderson & Krashinsky, 2016). Occupational designations for apprenticeship are managed by the provinces, with industry playing a significant role in setting standards for journeyperson competencies. In the province where this research is situated, industry stakeholders made recommendations to a board of skilled trades, which in turn advises the corresponding provincial government officials. Compliance in the system is administratively supported by an apprenticeship and industry training division, which represents government (Sharpe & Gibson, 2005).

Although the federal government has decentralized apprenticeship training across the provinces, it promotes apprenticeship to support national priorities regarding labour market requirements (Sharpe & Gibson, 2005). Vulnerabilities of the system, such as low completion rates and a low level of female representation, are not in line with current labour market realities (Sharpe, 2003). A 2012 House of Commons report identified that Canada is experiencing and will continue to experience labour shortages in STEM, information and communication technology (ICT), health occupations, and skilled trades due to an ageing population (Komarnicki, 2012). This concern is exacerbated by low apprenticeship completion rates despite current registrations in the system (Gunderson & Krashinsky, 2016; Laporte & Mueller, 2013). Laporte and Mueller (2013) report declining completion rates for both males and females from 2000 to 2007, with rates in 2007 being half those witnessed in 1995. Female participation in apprenticeship is also identified as a concern by multiple authors (Arrowsmith, 2016; Sharpe, 2003; Sweet, 2003) and is discussed further here.

1.1.2 The Participation of Women in Canadian Apprenticeship

Female participation in the trades in Canada remains low, and in traditionally male-dominated trades, female participation is less than 5% even though the total labour force in Canada is 47% female (Arrowsmith, 2016; Komarnicki, 2012). While there has been a shift by women into more male-dominated professions in general, apprenticeships seem to be the exception and remain segregated by sex (Sweet, 2003). In their work with Canada's 2015 National Apprenticeship Survey, Frank and Frenette (2019) defined male-dominated programmes as those where the number of males was 75% of the total number of apprentices, and similarly a female-dominated programme was defined as those with 75% female apprentices. Programmes that were not dominated by at least 75% of one gender were considered mixed programmes. Drawing on the 2015 survey, Frank and Jovic (2017) determined that 13.6% of the total number of apprentices in Canada were female and of those, only 20.7% were enrolled in roles in male-dominated trades, such as carpenters, welders, electricians, and automotive service technicians during the time covered by the survey. This leaves 79.3% of the women enrolled in more female-dominated programmes, such as hairstylists, childcare workers, and food service workers.

Reviewing the 2007 National Apprenticeship Survey (NAS), Laporte and Mueller (2013) determined that the number of females in male-dominated apprenticeship programmes also experienced slower growth and lower completion rates than their male counterparts. While the number of females who were participating as registered apprentices increased dramatically, sometimes by more than 200%, the number of males participating also increased significantly. Thus, the overall percentage of female apprentices in the male-dominated occupations only grew by an average of 1% between 1995 and 2007. In addition, while completion rates for both males

and females declined during this time, female apprentices were still less likely to complete their programme than male apprentices (Laporte and Mueller, 2013).

Though an additional National Apprenticeship Survey was completed in 2015, it did not differentiate between the numbers of females in male-dominated occupations and those in female-dominated ones. By accessing the Registered Apprentice Information System (RAIS) supported by Statistics Canada (https://www150.statcan.gc.ca), the researcher was able to verify similar statistics regarding the growth in the number of females in male-dominated apprenticeship programmes up to 2018. Table 1 shows the calculated percentages of the numbers of male and female apprentices in male-dominated trades for six different years spread five years apart and ranging over 25 years from 1993 to 2018. A few occupations have seen more growth than others regarding female participation over the years, such as automotive service workers, electronics and instrumentation workers, machinists, metal workers, and welders. However, female participation as apprentices in these male-dominated trade occupations remains low, ranging from 2% to a maximum 8% of the total number of apprentices in these occupations.

Table 1: Participation of Women in Male-Dominated Trades 1993-2018

	1993		1998		2003		2008		2013		2018	
	M %	F %	M %	F %	M %	F %	M %	F %	M %	F %	M %	F %
Automotive Service	98	2	98	2	98	2	96	4	95	5	95	5
Carpenter	98	2	98	2	98	2	97	3	97	3	96	4
Electrician	99	1	98	2	99	2	97	3	97	3	96	4
Electronics and Instrumentation	97	3	96	4	95	5	92	8	91	9	92	8
Exterior Finishing	99	1	99	1	99	1	99	1	99	1	98	2
Heavy Duty Equipment Mechanic	100	0	99	1	99	1	99	1	98	2	98	2
Heavy Equipment and Crane Operators	98	2	97	3	97	3	98	2	98	2	97	3
Machinists	97	3	98	1	98	2	97	3	96	4	95	6
Metal Worker (other)	96	4	98	2	99	1	98	2	97	3	95	5
Millwright	99	1	99	1	98	2	98	2	98	2	97	3
Pipe Trades	99	1	99	1	99	1	98	2	98	2	97	3
Refrigeration Mechanic	99	1	99	1	99	1	99	1	99	1	98	2
Sheet Metal Worker	99	1	99	1	98	2	98	2	98	2	97	3
Welder	99	1	98	2	96	4	94	6	93	7	92	8

Note: from Statistics Canada (https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3710002301.).

In her report *Women and Apprenticeship in Canada* for the Canadian Apprenticeship Forum, Arrowsmith (2016) identifies participation barriers for women in the trades by referencing various government agency reports and statistics. Arrowsmith discusses recruitment barriers such as a lack of awareness and basic information about apprenticeship not being available to women who could potentially engage in male-dominated apprenticeship programmes. Parents and teachers generally encourage young women to engage in more traditional female roles and these young women do not have information about programmes that would expose them to apprenticeship opportunities. The report also identifies family obligations, lack of facilities (female restrooms on work sites are an example), a lack of mentorship, and unwelcoming workplaces as additional barriers. Arrowsmith also states that it can be difficult for a woman to find an employer for a male-dominated apprenticeship. An employer sponsor is generally a requirement of entering an apprenticeship, and “more women than men reported discrimination as an issue when trying to find an employer sponsor” (p. 11). While this information provides an overall context to women’s participation in apprenticeship, it does not

explain what is really happening in male-dominated apprenticeship environments that may be affecting women, and an in-depth review of the literature concerning women's experiences in male-dominated apprenticeships is included in chapter two of this thesis.

1.2 The Research Context

The institution where this research is situated is a polytechnic in Western Canada and is not named in this thesis to protect its identity. Students in apprenticeship programmes typically attend the institution for an average of eight weeks per year for the formal instruction portion of their apprenticeship programme, as described in Section 1.1. Throughout its history, the institution has taken pride in the fact that instructional staff are experienced in industry and come straight from industry to teach there. The faculty in the apprenticeship programmes are journeypersons who are recruited from the industry trades they will be teaching. Within their first year of teaching, they are required to participate in a faculty development programme focused on teaching and learning. Topics covered in this training include adult learning, preparation for the first class, classroom management, and instructional techniques, as well as legal responsibilities as an instructor. One learning outcome in the programme is dedicated to fostering an open classroom and positive learning environment, and another one concerns reflection on the impact of instruction on learners.

1.3 The Research Problem

Through personal communications with former female apprenticeship students, specific challenges relating to a non-inclusive classroom environment in male-dominated apprenticeship programmes were identified. These are described in the following paragraphs and include pressure to be 'one of the guys' rather than build personal confidence, an implicit competitive

environment among the women in the programme, and offers of help that were perceived as pointing out that a female student was different in some way or didn't quite belong.

Some women in male-dominated apprenticeship programs may become more focused on fitting in and being 'one of the guys' than on their studies, having possible negative effects on their work. According to Smith (2013), women in apprenticeship engage in "contradictory gender embodiments in order to maintain and sustain their position at work" (p. 862), and Tanggaard (2006) argues that identity for apprentices is linked to "gendered being or 'doing'" (p. 221) in apprenticeships that are dominated by a specific gender. This includes adjustments by women to how feminine they may appear to their classmates (Blackburn, 2017). Smith (2013) argues that these behaviours and adjustments are often felt by women as an overall drain on their energy and that often as a result they will leave trade occupations.

An additional challenge is a competitive environment with other women in a male-dominated apprenticeship programme which is not openly acknowledged. Rhoton (2011) explains that some women in male-dominated fields pride themselves on their success in becoming one of the guys and "overcome their femininity" (Rhoton, 2011, p. 703); they refuse to associate with other women because they are afraid of being labelled a feminist (Byrd, 1999; Rhoton, 2011). It seems that after some women have worked very hard to be accepted into a male-dominant culture, they then adhere to the ideals of the culture and demonstrate solidarity with it (Rhoton, 2011). These women may distance themselves from other women, deny the existence of biases, and justify the actions of their colleagues, equating hegemonic behaviours with those relating to the occupation rather than to gender (Moir, et al., 2011; Rhoton, 2011).

Finally, an offer of help in the classroom can be perceived as pointing out that a female student is different or doesn't quite belong. Gender bias in the classroom can be expressed

through paternalistic attitudes, which can make women feel incompetent by undermining their ability because of highlighting their presence and adjusting professional standards (Denissen, 2010a; Makarova et al., 2016). Becker and Wright (2011) also describe benevolent sexism as "an affectionate or chivalrous expression of male dominance" (p. 63). This has also been described as a form of "spotlighting" (Jenkins et al., 2018, p. 280). According to Byrd (1999), spotlighting occurs when closer attention is paid to women so that womens' ability to perform the work, or their gender, can be scrutinized.

This research explores whether the challenges for female students are ongoing in male-dominated apprenticeship classrooms within the institution. Women in male-dominated environments can be required to embody dispositions that the male culture demands, as the culture has disciplinary ways to dictate attitudes, beliefs, and values as well as how one should act (Colley et. al, 2003). Learning in this environment means negotiating gender-related identities and new ways of behaving (Tanggaard, 2006), and female students will implement behavioural strategies to embody a person who is more accepted (Smith, 2013; Taylor et al., 2015; Whitehead, 2001). These strategies have a negative effect on the self-efficacy and self-perceptions of female students studying in these classrooms (Ponton et al., 2001; Vogt et al., 2007). Women's perceptions that they are unwelcome in a classroom can also affect belonging, motivation, and ultimately success in their apprenticeship programme (Ahlqvist et al., 2013; Rattan et al., 2018).

1.4 Research Purpose, Questions, and Significance

The purpose of this research is to illuminate the experiences of women in male-dominated apprenticeship classrooms at the institution to inform practices for faculty that support inclusivity in these classrooms. By interviewing female students who are studying in male-

dominated apprenticeship classrooms, their experiences in this environment can be interpreted to understand what it means to be a woman in a male-dominated apprenticeship classroom, incorporating the meaning the participants attribute to their experience as well. Understanding the lived experience of female students involved in the study gives a voice to their reality and uncovers subjugated knowledge about the diverse experiences of women in our classrooms that can inform best practices and initiate any required change (Hesse-Biber, 2014a). As a result, faculty teaching in these classrooms can be informed regarding which teaching practices are working well and are experienced by women as inclusive. Alternatively, practices which are not experienced as inclusive can also be illuminated so that these approaches can be ceased, which would support the adoption of inclusivity. To facilitate this purpose, the following research questions are addressed:

1. What meaning can be attributed to the lived experiences of women as they study in male-dominated apprenticeship programmes in a Canadian polytechnic institute?
2. How can the accounts of women in male-dominated apprenticeship programmes inform inclusive practices of faculty teaching in these programmes?

This research has the potential to have an impact on more than one level within the institution. It concerns participants who are directly involved with the study, the researcher as practitioner, and faculty teaching in these programs, as well as the institution and industry more broadly. This research gives participants an opportunity to voice their experiences. As is standard in most feminist research, only women are interviewed to amplify the minorized voice of the female students in the programmes. Fisher (2010) describes this voice as representative of feminist praxis and a symbol of "awareness and expression, empowerment, agency and representation" (p. 84). Another potential impact is that participants can gain more awareness of

themselves and their environment by being involved in this study. The research also contributes to the institutional strategic plan as well as the diversity and inclusion strategy through informing policymakers on what changes may be required to support inclusivity in programming beyond solely apprenticeship.

As a practitioner, it is meaningful to understand inclusivity (or a lack thereof) in these classrooms and how it translates to the institutional culture. As a leader, the researcher can influence the organization by informing faculty concerning inclusive apprenticeship classrooms. Faculty will have an opportunity to gain an insight into the impact of their practices pertaining to inclusivity after hearing the experiences of female students. The findings of this research will be shared with faculty through specific presentations as well as via the institution's centre for faculty development. This centre comprises faculty champions who disseminate best practices in teaching and learning to various faculty in the institution and facilitate faculty training and mentorship.

This research will also contribute to wider Canadian perspectives noted by the Canadian Research Council and the Canadian Apprenticeship Forum. The findings will inform the answer to a question posed by the Canadian Research Council: "What new ways of learning, particularly in higher education, will Canadians need to thrive in an evolving society and labour market?" (Government of Canada, 2017, n.p). Educators, by increasing their influence to include women studying in male-dominated programmes and by setting an example for gender inclusion in their classrooms, provide ways of learning that allow their students to thrive. The Canadian Apprenticeship Forum (CAF) also released a National Strategy for Supporting Women in the Trades (2020). This strategy calls for educators to "create inclusive classrooms" (p. 9), faculty to be trained regarding "more supportive learning environments", the monitoring of "classroom

behaviours", and apprentices to be trained regarding "respectful classrooms" (p. 9). Other Canadian institutions delivering apprenticeship programmes can benefit from this research, as well as those in other countries with similar models. Knowledge that is specific to women's experiences in male-dominated apprenticeship classrooms is also advanced through the experiences and perceptions of the women studied.

1.5 Gender Terminology Used in the Thesis

Here and in the remainder of the thesis the words female, woman, and women have been used when articulating the literature and describing the demographics of the participants in this study, and the words male, man, and men are used in a similar manner. The words female and male have been used to represent demographics that differentiate potential participants for the study and that articulate the make-up of the class or programme in terms such as 'male-dominated' and 'female participants'. They represent a sex category a student would put themselves into at registration for their programme, and these categories reflect a "categorization established and sustained by the socially required identificatory displays that proclaim one's membership in one or the other category" (West & Zimmerman, 1987, p. 127). Further, woman or women is used to reflect the gender they perform (or not), as performing femininity may cause someone to be othered by their male classmates or other men in the room. Man or men is also used to articulate gender performance. West and Zimmerman (1987) define gender as "the activity of managing situated conduct in light of normative conceptions of attitudes and activities appropriate for one's sex category" (p. 127).

1.6 Organization of the Thesis

This thesis is comprised of six chapters, and a synopsis for each is presented here.

Chapter 1: Introduction. Chapter one reviews the research context, the research problem, and the purpose, questions, and significance of the research, as well as clarifies gender terms. It concludes by outlining the structure of the entire thesis.

Chapter 2: Literature Review. A review of the experiences of women in the male -dominated apprenticeship workplace is followed by a discussion of women in male-dominated classrooms as well as best practices for inclusivity. Chapter two also discusses a theoretical perspective to support a formal investigation of women in male-dominated apprenticeship classrooms.

Chapter 3: Methodology and Methods. A research design informed by interpretive phenomenology and supported by post-structural feminist praxis is presented. Qualitative methods are explained including the data collection and analysis, reflexivity, ethical considerations, and validity and reliability of the research process.

Chapter 4: Presentation of Findings. The findings are presented in keeping with the methodology and methods discussed in chapter three. Paradigm cases present the overall experiences of individual participants, followed by themes emerging among and across participants. Exemplars are included in both areas as quotes illuminating aspects of the experiences of the participants.

Chapter 5: Discussion. The first research question is explored through a discussion and analysis of the participants' experiences and what they mean. The second question is then addressed through an introduction of a model to support an inclusive culture in male-dominated apprenticeship classrooms.

Chapter 6: Conclusion. The concluding chapter incorporates limitations to the research, recommendations for future study and implications for practice before adding a personal reflection and making final remarks.

Chapter 2 – Review of the Literature

As discussed in chapter one, non-inclusive experiences of female apprenticeship students including gender bias, the need to prove oneself, and the pressure to 'fit in', infer that these classrooms may not be as inclusive as they could be. Implicit gender biases and the resulting behaviours that occur in the classroom, often demonstrated and/or supported by faculty, may ultimately affect the ability of women in male-dominated apprenticeship classrooms to succeed in their chosen field (Ponton et al., 2001). As a result, many women leave apprenticeship programmes and do not have the same opportunities to do what they consider meaningful work (Smith 2013). Alternatively, inclusive practice can remove barriers to allow students to achieve their potential, establishing belonging through a respectful environment (Moore-Cherry et al., 2016).

This literature review discusses inclusivity for women in male-dominated apprenticeship classrooms. After describing the literature on challenges faced in the workplace, the review focuses on literature regarding male-dominated classrooms to assess whether in fact a similar environment exists to that of the workplace; it then focuses on how the literature informs an inclusive classroom. A theoretical perspective that would effectively support a formal study of women in male-dominated apprenticeship classrooms at the institution is then discussed before the chapter is concluded.

2.1 Inclusivity Regarding Women Apprentices in Male-Dominated Workplaces

Also discussed in chapter one, the apprenticeship system in Canada is structured so that apprentices complete a level of on-the-job training as well as formal in-class training each year until they can be considered as having journeyperson status in a trade occupation. Because students spend a large proportion of their training in the workplace, it is conceivable that

informal workplace structures and expectations can be translated to the classroom environment (Tanggaard, 2007). Institutions are often structured according to androcentric patterns (Blackburn, 2017; Parson, 2016) and entry into the culture is governed by rules and norms that have been established by the majority. There can be a high tolerance of inappropriate behaviours such as bullying, aggression, and objectification of women (Jones et al., 2017). According to Jackson et al. (2014) attitudes can become embedded across the domain, and even those who have egalitarian beliefs may find themselves engaging in biased behaviour.

Women apprentices, similar to men, experience gratification from, as well as pride in, their work and enjoy doing it (Butler, 2013; Dabke et al., 2008; MacIsaac & Domene, 2014). However, the literature on women in apprenticeship workplaces presents various ways in which women experience a non-inclusive environment. Challenges described in the literature include discrimination, implicit gender bias, and the gendered expectations experienced by women in apprenticeship training, as well as sex-based harassment. The consideration of each of these topics in this review also includes a discussion about how these challenges are typically managed by the women who encounter them. This area of review concludes with a discussion about the call for solutions to the challenges women face in the workplace.

2.1.1 Discrimination and Implicit Gender Bias

While the literature concerning women in apprenticeship does not focus solely on discrimination, specific examples are apparent. Women in apprenticeship workplaces are reported as experiencing both overt discrimination as well as acts that discriminate in a more subtle way and are motivated by implicit gender bias. Discrimination can occur both directly and indirectly (Khaitan, 2018), and Khaitan helps distinguish between these by describing direct discrimination as “disparate treatment” (p. 35) and indirect discrimination as having “disparate impact” (p. 35) regardless of motive or intent. Using the groundwork done by Jolls and Sunstein

in 2006, Bates et al. (2019) define implicit gender bias as “unintentional and automatic mental associations based on gender deriving from norms, traditions, values, and culture” (p. 298). Berndt Rasmussen (2020) further connects implicit gender bias to discrimination by arguing that implicit bias can cause people to discriminate against another based on their implicit biases, and this, similarly, has a ‘disparate impact’ on an individual.

Discrimination, both direct and indirect, produces a workplace that is not welcoming for women. Women are told outright that they are not welcome in the workplace, as reported by Kelly et al. (2015), and in Byrd’s (1999) study it was confirmed in interviews with construction contractors that “employers were unwilling to hire [women] strictly because of their gender” (p. 12). One participant in MacIsaac and Domene’s (2014) study was told that she was hired as a “joke” (p. 17) when she did gain employment and she ended up quitting after moving halfway across the country for the work. In their 2017 report, Gyarmati et al. identified a lack of sanitary toilet facilities for women, poorly fitting protective equipment, and inflexible workplace practices as barriers women experienced in the workplace. A participant in a study conducted by Taylor et al. (2015), Sarah, describes having reservations about her career choice due to the lack of support provided by her company for workers with family obligations. In the Jones et al. (2017) study, a participant also describes a co-worker having work hours accommodated because he lost his driver’s licence due to a Driving Under the Influence (DUI) charge, but the participant could not have similar type accommodations regarding work hours due to her caring responsibilities.

Implicit biases also include the “myth” (Shewring, 2009, p. 12) that women are physically unable to do a particular type of work. They have been described as not having the “God-given ability” (Agapiou, 2002, p. 701), and in the Jones et al. (2017) study, participants

were belittled when they didn't do the work the same way as a man. A sense of not believing that women will be able to do the job is expressed in the workplace by co-workers, managers, and customers, as reported by Makarova et al. (2016). As a result, women experience discrimination when they are given easier tasks and those that are 'more suited' to their gender. A participant in the study conducted by MacIsaac and Domene (2014) describes being assigned to the parts washer because "women are supposed to clean" (p. 14), a woman in the Tanggaard (2006) study was restricted to jobs considered more feminine in nature, such as cleaning the floor, and in Agapiou's (2002) study, women were prevented from doing jobs that were considered less safe, like operating the machinery.

Some women might normalize their experience and dismiss biases as a part of the environment that must be accepted (Byrd, 1999; MacIsaac & Domene, 2014): as a participant from the Kelly et al. (2015) study states, "you just sort of have to put up with it, because 'boys will be boys'" (p. 432). Women also feel the need to constantly prove themselves by working harder than their male counterparts (Agapiou, 2002). One way a woman in a study conducted by Denissen (2010b) chose to prove herself was to accept the undesirable tasks that her male colleagues refused to do, because "if she accepts the tasks, she proves she can work like a man" (p. 1060). Regardless of how long they may have been in the trade, once a woman is in a new work group, it is often initially assumed that they can't do the work because they are a woman, so they need to prove themselves repeatedly through the course of their career as they move from project to project and work on different teams (Brockmann, 2020; Denissen & Saguy, 2014). Denissen and Saguy (2014) explain that women apprentices in construction trades often move to different job sites so must continuously prove themselves without the benefit of their prior work or abilities being acknowledged.

Although examples of discrimination (mostly indirect) can be found in all of the studies discussed here, only three of them outwardly characterise relevant experiences as discrimination (Byrd, 1999; Kelly et al., 2015; Makarova et al., 2016). Controversially, Agapiou (2002) makes a claim that "It would appear that resistance to women is based largely on folklore, fears and fallacy" (p.704), and the word discrimination does not appear in his article although examples can be seen in the work. While most other authors suggest that a change in culture is required to address barriers that can be characterised as discrimination, actionable solutions are generally not provided.

2.1.2 The Gendered Environment

In male-dominated environments, women also find themselves in a complex situation while performing gender, that is, having to modify or construct identities at work to manage gender expectations (Butler, 2013; Denissen & Saguy, 2014). This can be referred to in the literature as the requirement to be 'one of the guys' or 'one of the boys' (Bridges et al., 2019: Jones et. al, 2017; Smith, 2013; Taylor et al. 2015), and research by Denissen (Denissen 2010a; Denissen, 2010b, Denissen & Saguy, 2014) focuses on the dilemma. According to Denissen (2010b), men regularly identify with their gender through meaning found in the work itself and will subsequently hold each other accountable for working in masculine ways. One participant in Denissen's (2010b) study describes being told to "'Do it like a man', 'hammer it like a man', or 'stomp it like a man'" (p. 1056). In addition, entry processes are often centred on masculinity (Moir et al., 2011), demonstrated by another of Denissen's (2010b) participants being told by the boss: "That lipstick's got to go" (p. 1056). For men, the occupational norm and the gender norm are masculine, while for women the occupational norm is masculine and the gender norm is feminine, even though the actual competencies required to do the work have nothing to do with perceptions of gender (Moir et al., 2011).

Women are held accountable to perform the work in masculine ways while retaining their femininity. Failure can result in accusations of being a lesbian if they are not feminine enough, as reported by Denissen (2010b), or if they are perceived as being too feminine, their competency to do the work might be debated (Denissen & Saguy, 2014). In the study by Denissen and Saguy (2014), women reported that their sexual identity was called into question (being too much like a man) for outperforming a man or simply for wanting to do the work that is considered a 'man's' job. A heterosexual woman tradesperson in this study was accused of being a lesbian when she outperformed her male colleague. Smith (2013) also describes a woman who was treated badly because she had apparently not been feminine enough and "was trying to be a man" (p. 866). Denissen and Saguy (2014) explain that men will keep their gender identity intact by asserting that the women they work with are not fully women, thus affirming the trade as masculine. Women are caught in a double bind where different workspaces often call for different gender performances (Denissen, 2010b), making it difficult for women to fit in as their authentic selves.

Women cope with this difficulty by balancing the embodiment of male gender norms with their femininity (Brockmann, 2020; Smith, 2013; Tanggaard, 2006). Denissen (2010b) discovered in her study of women in male-dominated building trades that women apprentices have been successful due to their ability to manipulate gender rules and engage in reflective gender displays that are the most appropriate for given workplace situations. She states that "it may be more useful to think about gender as a 'tool' or a practice that is constituted exactly in response to the gender constraints and double binds that women encounter" (p. 1054). For example, in Tanggaard's (2006) study, a woman apprentice felt the need to teach herself the masculine discourse to survive the working environment by learning to have to have conversations about "hunting, cars and sex" (p. 230). And a participant in the Denissen and

Saguy (2014) study grew her short hair long so that she was not perceived to be too masculine or a lesbian.

Denissen and Saguy (2014) also explain how women are isolated by men through the threat of being labelled as a lesbian. Individual responses to barriers are not enough to provide the transformation or lasting change that is required, however when women try to organize or even associate with one another they are called lesbians. Denissen and Saguy identify the gendered environment as a barrier for both individual women and collective agency, and the cooperation of men will be needed for women to be successful. The work by Denissen (2010b) and Denissen and Saguy (2014) goes much further into the complex problem of gender identity then the other literature and provides understanding of how being 'one of the guys' is a substantial barrier for women in these environments.

2.1.3 Sex-Based Harassment

In addition to the strategies employed by women in apprenticeship to manage gender expectations, it can be seen in the literature they are also required to cope with various forms of sex-based harassment (Butler, 2013; Byrd, 1999; Kelly et al., 2015; Moir et al., 2011; Whitehead, 2001). Butler (2013) describes it as follows:

> Women are negotiating masculinities in so far as they perform and embody certain aspects of masculinity while accepting their second-class status in the yard. Their status is reinforced by sexual banter and harassment which reinscribes the gendered boundaries and sexual difference. (p. 1317)

Berdahl (2007) also argues that sex-based harassment is motivated by the desire for a person to protect their sex-based social status and defines it as "behaviour that derogates, demeans, or humiliates an individual based on that individual's sex" (p. 644). Berdahl further explains that a male-dominated social system assigning higher status to a particular sex creates a

greater incentive to defend one's status, and women who threaten sex distinctions are also more likely to encounter sex-based harassment.

In the literature harassment includes sexual comments (Denissen 2010a; Kelly et al., 2015; Jones et al., 2017). A participant in the study conducted by Kelly et al. (2015) talks about things men would say that are "just too nasty to repeat" (p. 427), and in the Jones et al. (2017) study, the experience of a participant called Jennifer included sexist comments made by co-workers that caused the manager to laugh along with them. Participants also reported unwanted sexual attention that included being asked for dates as well as physical grabbing or touching (Kelly et al., 2015). Denissen's (2010a) participant Elena states, "He was really perverted. When I was taking my sweater off, he would talk about my chest. Or if I would bend down he would talk about my ass" (p. 316). In Denissen and Saguy's (2014) study, women reported open hostility and violence when they refused to engage in sexualization activities, including electrical wires they were working on having power applied, and tools being dropped on them. Kelly et al. (2015) use the term "good old boys club" (p. 435) to describe a culture in which sexism is pervasive, management laughs at the jokes (Jones et al., 2017), and women understand this as a part of the culture that must be endured (Byrd, 1999; Kelly et al., 2015; MacIsaac & Domene, 2014).

What is described as a "thick skin" by Jones et al. (2017, p. 19) is an approach used by women in apprenticeship to cope with harassment. Having a thick skin constitutes putting up with the behaviour and making yourself mentally 'tougher' to survive the environment (Bridges et al., 2019; Jenkins et al., 2018; Smith, 2013). Jenkins et al. (2018) report that women in their study felt they were expected by their colleagues and employers to "toughen up and not cause too many problems" (p. 281). Women might walk away to keep themselves from showing their

anger, as noted in Taylor et al.'s (2015) study or try to not to give men the reaction they might be looking for, as reported by Kelly et al. (2015). Fitting in is described as being able to take the joking and harassment by both Agapiou (2002) and Butler (2013), and Maria, a participant in a study conducted by Smith (2013) states, "You have to be mentally tough to put up with the guys. You have to be" (p. 865). Tradeswomen in the Denissen (2010a) study also stressed that they had to be willing to "accept, ignore, or go along" (p. 321) with situations that were uncomfortable for them, and Bridges et al. (2019) identified that women who do use appropriate channels to address harassment can be further victimised by colleagues.

Kelly et al. (2015) point to a consistency across the literature regarding the way harassment is dealt with by women on an individual basis which "maintains systematic inequalities" (p. 435), and argue that these inequalities must be dealt with on a structural instead of an individual basis. While every study reviewed contained experiences of some form of harassment (even if not always identified as such), the literature did not distinguish experiences where harassment was positively managed in the workplace. Denissen (2010b) cites the work of Miller (1997) explaining that regardless of policy "processes of gender inequality can be created and sustained at the level of interaction" (p. 1052). This would suggest that structural change may need to be enacted and enforced in day-to-day interactions rather than only policy.

2.1.4 The Call for Solutions

The literature demonstrates that male-dominated apprenticeship workplaces are not inclusive for women. The similar barriers women face, and the specific ways women have learned to apply coping skills and abilities to be successful are consistently highlighted across the literature. Many authors included in this review call for a transformation of the underlying culture as a solution (Jones et al., 2017; Colley et al., 2003; Taylor et al., 2015), however the literature does not include empirical studies that discover ways to make this shift (Bridges et al.,

2020). In their review of the literature, Bridges et al. (2020) assert that suggested changes to improve the culture in male-dominated occupations have not been successful and that the same issues have continued to be raised for the past 20 years.

By relating organizational resilience to the barriers women experience in male-dominated workplaces, Bridges et al. (2023) argue that individual resilience practised by women in response to barriers is not sustainable without additional support. For Bridges et al. (2023), the transformation of the culture alluded to in the literature on women in apprenticeship would require organizational support in addition to the individual commitment of the women in these environments. Menches and Abraham (2007) also propose that top-down agents, including governments and funding bodies, need to be included as advocates for change. In the National Strategy for Supporting Women in the Trades report, the Canadian Apprenticeship Forum (2020) also suggests educators can be agents for change in apprenticeship.

The studies examined in this area of review contain various examples of the way women in male-dominated apprenticeship workplaces experience discrimination, a gendered environment, and sex-based harassment, although these examples are not always characterised as such by the authors. An issue the studies do not address however, is the intersectionality between gender and class as well as the influence of the patriarchy in these environments.

In her book, *Theorizing Patriarchy*, Sylvia Walby (1990) argues that even though women have gained rights and privileges in a patriarchal society, patriarchy has not necessarily weakened. Instead, it has found alternative ways to oppress women, manifesting itself in more subtle forms. Walby notes that although women are present in the paid workforce today, they remain subordinated within it (p. 180). This subordination can be described in apprenticeship as being subjected to hegemonic masculinities performed by working-class men.

Hegemonic masculinities are those that legitimize an unequal relationship between men and women, masculinity and femininity, and among masculinities (Messerschmidt, 2016, as cited by Messerschmidt & Messner, 2018, p.41). In a study by Hondagneu- Sotelo and Messner (1994), the social locations of men were connected to their ways of expressing masculinity. They found that men who are socially and economically underprivileged, including working-class men, enact hegemonic masculinities to express power over others. Walby (1990) also alludes to this type of behaviour in her discussion of violence, stating that "men at the bottom of the class hierarchy are violent towards women as a result of their frustration generated by their circumstances" (p. 132).

According to Messerschmidt and Messner (2018), transforming gender display is not enough to address patriarchy's deeper concerns, such as poverty and class within the social structure. An intersectional perspective could refine "understandings of inequality, recognizing gender, race, class and other characteristics as structures reflecting power and inequality, providing new blueprints for social change" (Misra, 2018, p. 112). Understanding the barriers faced by women in apprenticeship may require considering class and its relationship with hegemonic masculinity as an additional perspective and form of inequality influencing these workplaces.

More work is also needed to understand whether barriers experienced by women in apprenticeship workplaces translate to a classroom environment. Because apprentices are in the classroom for just 8–12 weeks per year, it is relevant to understand whether the male-dominated apprenticeship classrooms in the institution in this research promote an inclusive culture to support learning, or whether the hegemonic masculine culture of the apprenticeship workplace pervades. Bridges et al. (2022), acknowledge that there has been little attention as to whether the apprenticeship classroom may be a “problematic space” (p. 4). The next area of review focuses on the literature regarding male-dominated apprenticeship classrooms to consider this further.

2.2 Inclusivity in Male-Dominated Apprenticeship Classrooms

Review of relevant literature reveals that there is limited research concerning women in male-dominated apprenticeship classrooms; only one Canadian study, that by MacIsaac and Domene (2014), includes the experiences of women in apprenticeship classrooms and these experiences represent a small portion of findings in a study about women in apprenticeship more generally, including the workplace. In addition to the MacIsaac and Domene (2014) work in Canada, four additional studies were located that include experiences of women in male-dominated apprenticeship classrooms as part of overarching studies about women in apprenticeship (Bridges et al., 2022; Byrd, 1999; Jones et al., 2017; Makarova et al., 2016). As a result, only five studies are highlighted in this section regarding key findings reported arising from classroom experiences. These are further supported in this discussion by other research about male-dominated classroom environments, such as STEM classrooms.

2.2.1 A Boys' Club

In a study published by Byrd (1999), women carpentry apprentices in the US were interviewed and invited to participate in focus groups. The male-dominated apprenticeship classroom was described by participants as a "boys club" (p. 16), overshadowed by students who had more experience and with faculty conceding to a prevailing culture that could include inappropriate language and disrespect. Students with more ability and knowledge were celebrated, making the atmosphere of the class more competitive. Bridges et al. (2022) report that women in their study felt that they were targets to be discouraged from continuing and experienced exclusion when students were to work in groups. This might suggest that the workplace culture was allowed to pervade the classroom experience in these studies to some extent, promoting a less than inclusive learning environment.

Faculty have often been employed in male-dominant cultures throughout their career and thus perpetuate gendered stereotypes in their classrooms (Colley et al., 2003). In a study of subtle biases in STEM classrooms, Hand et al., (2017) confirmed that the teachers believed that male students would perform better in male-dominated STEM disciplines. The teachers also attributed masculine characteristics to their fields, confirming their own gender role bias in their classrooms. While men teaching in male-dominated classrooms may have more negative attitudes towards women (Jackson et al., 2014), both male and female faculty in these classrooms will endorse stereotypes and implicit attitudes about the ability of women to do the work (Blair et al., 2017; Moss-Racusin et al., 2012). According to Moss-Racusin et al. (2012), both male and female faculty in male-dominated programmes have been reported to be more likely to mentor and hire male students as opposed to their female students with the same credentials.

Students, in addition to faculty, reportedly perceive that men belong better in STEM subjects (Cech et al., 2011; Hand et al., 2017; Seron et al., 2016), and women in STEM have reported feeling as if their male classmates do not consider them their equals (Vogt et al, 2007). Seron et al. (2016) describe a specific instance in a STEM classroom where the women members of a group were working on a mechanical project and once the men came into the room, the roles changed so that the women were doing more menial tasks and the men were doing the mechanical work. The women in their study did more of the reporting and project management, whereas the men completed the actual building tasks. Myers et al. (2019) report that male students in STEM see sex segregation as being "just how it is" (p. 653), normalizing the challenges that women face as part of a fixed order.

2.2.2 Proving Oneself

In 2014, MacIsaac and Domene reported that a display of confidence by women in male-dominated apprenticeship classrooms in Canada was considered as contributing to success for

women students. Showing others in the class that you are confident and capable was identified as significant. One participant describes volunteering to go first to complete a task in the classroom: “And I think from there, people are like: ‘Yeah she’s pretty confident. She’s doing this. ’[…] You gotta go hard, you know and get in people’s minds that this is what I’m doing” (p. 9). It is interesting to note that it could be perceived that this quote might also refer to the requirement to prove oneself, to show others through a confidence level that you are able to do the work, although the researchers did not interpret it in this way. Another participant in the same study specifically states, “There’s definitely a level of proving yourself … the guys don’t expect much from you because you are a girl. They don’t think you might know as much as they do” (p. 12). A fear of appearing weak also caused one female student in this study to overwork despite experiencing physical pain when completing a task. This need to prove oneself was also apparent in other studies about women in male-dominated apprenticeship classrooms (Bridges et al., 2022; Jones et al., 2017; Makarova et al., 2016). Bridges et al. (2022) identified as well that while outperforming peers does gain acceptance, it can also cause hostility in some cases.

Women in male-dominated STEM classrooms are also reported to feel as if they must prove they belong in defiance of biases (London et al., 2011). Many studies concerning male-dominated classrooms in STEM have identified that a common solution for women in these classrooms seems to be to simply work harder than their male counterparts to stop gender bias from being perpetuated (Kelsey, 2007; MacIsaac & Domene, 2014; Makarova et al., 2016; Robnett, 2016; Smith, 2013; Vogt et al., 2007). The Robnett (2016) study identified that the form of gender bias most experienced by the participants was this feeling of having to work harder than male classmates. Having to prove oneself implies a systemic lack of inclusivity in male-

dominated classrooms and is a response to a lack of belonging felt by the women who study in them (Blackburn, 2017; London et al., 2011; Marra et al., 2009; Smith et al., 2012).

2.2.3 Benevolent Sexism

Makarova et al. (2016) investigated young women completing apprenticeship training in Switzerland. The authors found that gender biases were more pronounced in the workplaces than in the classrooms, happening four times more often in the workplace; however, they reported higher levels of benevolent sexism in the classroom setting. Students were positively highlighted and patronized during their studies. One participant explains,

> What is just disturbing, is that … the teachers always refer to a man [as a professional] and then at the end: 'We are very excited that women are also present', they always underline this and that is sometimes a bit annoying. (p. 11)

Benevolent sexism can make women more complicit in gender inequality in their environment (Becker & Wright, 2011) and can negatively affect academic outcomes in male-dominated classrooms (Kuchynka et al., 2018).

Dardenne et al. (2007) demonstrated in their research that women who experienced benevolent sexism experienced "preoccupation with the task, self-doubt, and decreased self-esteem" (p. 774) which negatively impacted their ability to perform. In the Kuchynka et al. (2018) research examining the effects of hostile and benevolent sexism on women's outcomes in STEM classrooms, it was reported that for women who had a lower level of identity with STEM, benevolent sexism decreased STEM-related intentions, self-efficacy, and GPA. An apprenticeship instructor in the Jones et al. (2017) study in Australia blatantly calls the abilities of his female students into question with his comments, as recounted by a research participant:

> He said I hate to say it to you girls, please don't take offence, he said, but you're going to struggle in this course. He said it's just the difference between the way the male and the female mind work. (p. 31)

Benevolent sexism is considered more damaging than hostile sexism because women doubt themselves in the face of benevolent sexism rather than understand that the issue lies with a sexist perpetrator in the case of overt hostile sexism (Glick & Fiske, 2001).

2.2.4 Role of Faculty

Examining the ecosystem of women in electrical trades in Australia, the research of Jones et al. (2017) included the workplace, the community, the trade union, and the classroom. Women in this study generally considered the experience in the classroom portion of their training as having to employ less "survival skills" (p. 16) compared to those required in the male-dominated workplace; however, one third of the participants reported poor experiences.

An apprenticeship coordinator participating in this research who works with the faculty in the training organizations describes teaching practices in the classroom, including jokes about females on the worksites that were not reported until there were more females in the class who, together, were willing to stand up for themselves. She states,

> So we had to re-educate again quite a few of our teachers, just to say hey, guess what? It's actually not cool. We want more females in the industry, but if they're coming into your classroom they're not going to feel welcome, so why would they feel welcome in the industry if they don't feel welcome in your classroom? (p. 32).

Participants in the MacIsaac and Domene (2014) study described their instructors as supportive, but also revealed experiencing crude and sexist jokes. A participant from the Bridges et al. (2022) study describes how her instructor made "sexual comparisons

between equipment and womens' bodies for the entertainment of men in the class" (p. 13). These examples call into question whether faculty are truly aware of how they can support women in male-dominated apprenticeship programmes to a higher degree by adjusting their own behaviours and facilitating a more inclusive space.

In a study conducted by Blair et al. (2017), a feminist post-structural framework was applied to teacher identities and discourses on student gender equity in male-dominated STEM classrooms. The results of the study were separated into three different constructions of gender: gender blindness, gender acknowledgement, and gender intervention. In the discursive position of gender blindness, many of the faculty saw gender as a non-issue in their classrooms even though other faculty had seen issues with the same groups of students. By remaining gender blind, these faculty supported the continuance of systemic gender privilege and maintained traditional teaching practices. In the gender acknowledgement discourse, patterns of gender variation in performance as well as inequity were noticed; however, the faculty maintained that it was beyond their influence or responsibility to take any action in their classroom. The least prevalent discourse, occurring only 10% of the time, was that of gender intervention, representing those discourses where supportive faculty acted in their classroom.

The literature regarding women in male-dominated apprenticeship classrooms is limited in that none of it is focused entirely on the classroom. The classroom experiences are reported as a smaller component of a large study rather than there being any real delving into inclusivity in the classroom specifically. What it does exhibit, although to a lesser extent, is that the male-dominant culture permeating the workplace, and the requirement that women feel to prove they belong, does exist in the classroom setting. The literature demonstrates the possibility that male-

dominated apprenticeship classrooms may not be inclusive, and that faculty may not be aware of their role in facilitating a more inclusive environment.

2.3 Facilitating a More Inclusive Classroom

Colley et al. (2003) describe change as being difficult to perceive, much less implement in a classroom where faculty have themselves been immersed in the dominant culture before taking on a teaching role. Instructors at the institution in this study may not be an exception to this, as they are recruited straight from the industry that they represent to provide relevant and job ready training in the classroom. Research by Kopsen (2014) also suggests that faculty identity includes guiding students towards social practices associated with their occupation. So, in addition to the competencies they are teaching, faculty require knowledge of prevailing sociocultural norms and how they might be perpetuating those norms in the classroom (Kopsen, 2014). By empathizing with the social context of their students, instructors are better equipped to engage as necessary to influence belonging and success for all students, regardless of gender (Dewsbury, 2020).

Because research specific to the facilitation of inclusivity in male-dominated apprenticeship classrooms could not be located, this area of review discusses practices that facilitate more inclusive classrooms by referring to literature related to inclusivity in higher education classrooms in general. This literature suggests that women's negative experiences in male-dominated classrooms can be alleviated by interventions implemented by faculty to support a more inclusive learning environment (Clark et al., 2016; Walton et al., 2015). Clark et al. (2016) found that faculty interventions aimed at increasing inclusivity had a greater impact on women than men, highlighting the importance of interventions whose goal is to increase the participation of women in male-dominated fields. Faculty interventions described in the literature

include well-organized curricula and appropriate classroom management that supports relationships and aims to build a social and academic culture that empowers learning for all students. These are discussed further in the following paragraphs.

Faculty can take very specific approaches via a curriculum to promote inclusivity in classrooms (Dewsbury, 2020; Faulkner et al., 2021). McConlogue (2020) points out that male-dominated classrooms have traditionally been taught by a middle-class male demographic, and the influence of this group on the curricula may still exist. Hockings (2010) reports that if faculty lack knowledge about the demographics of their students, they may base their teaching on their own beliefs and assumptions about what students should be able to do. McDuff et al. (2020) further highlight the need for instructors to employ more student-centred pedagogies that are mindful of differences in the classroom to increase a sense of belonging for students. Examples include Blickenstaff's (2005) suggestion to eliminate sexist language and inappropriate cultural material from class materials, and advice from Dewsbury (2020) to include a code of ethics in the course syllabus outlining expectations regarding how students can contribute to a safe, non-discriminatory learning space. A participant in the Faulkner et al. (2021) study describes how such a code of ethics helps to facilitate difficult conversations relating to inclusivity.

Dewsbury (2020) also suggests that modifying learning outcomes throughout the term to suit the specific students of a particular class contributes to an inclusive classroom experience for students, and another participant in the Faulkner et al. (2021) study confirms that an inclusive classroom is one in which the instructors understand and support a co-production of knowledge. In an apprenticeship classroom, this could include leveraging the specific experiences of individual learners in the teaching, as all the learners in the class bring a diverse set of industry

experiences from their workplace. McDuff et al. (2020) also describe this type of approach as an accessible curriculum in which students can see themselves.

From a classroom management standpoint, Faulkner et al. (2021) argue that faculty have the most influence regarding helping themselves and others to be inclusive, and Hockings (2010) identifies a need for faculty to establish safe learning environments in which students are free to express authentic identities and ideas. In relation to male-dominated classrooms, Lufkin (2009) describes specific approaches to promoting equity through the management of classroom behaviours that include not tolerating sexist comments or jokes, not grouping students by gender, and intervening when male students make any kind of derogatory comments or gestures, as well as ensuring open communication with and listening to female students. Dewsbury (2020) further emphasizes the need for empathy in the classroom, which allows a safe place for students' vulnerabilities and for "authentically listening to their voices" (p. 175).

Students in apprenticeship programmes at the institution where this research takes place come to their classrooms with different experiences and backgrounds, some knowing more than others about a particular topic, and Hockings (2010) argues that all of them should be encouraged to reflect openly. In their paper on student self-efficacy, Ponton et al. (2001) also promote instructional strategies that foster student interactions which permit observation of each other's capabilities. Faulkner et al. (2021) stress the importance of these interactions being inclusive, and Blickenstaff (2005) specifically encourages working groups that are not segregated by sex.

Authors stress that relationships built between faculty and students as well as among the students themselves are an important component of inclusivity (Blickenstaff, 2005; Dewsbury, 2020; Faulkner et al., 2021; Freeman et al., 2007). Dewsbury (2020) defines "deep teaching" as

extending “beyond the superficial delivery of content knowledge, [moving] beyond inclusion and towards engaging in the social contexts of the students” (p. 173). According to Faulkner et al. (2021), faculty sharing personal information about themselves when relating to students and learning as much as possible about them demonstrates that they care about them as people and will increase how comfortable students feel in the classroom. Approachability and “pedagogical caring” (Freeman et al., 2007, p. 207) are also reported to be important factors in faculty–student relationships. Freeman et al. (2007) discovered that when instructors encouraged student participation and displayed warmth and organization, the sense of belonging for students was increased. Working with women in male-dominated STEM classrooms specifically, Lee et al. (2015) also reported that female students who experienced supportive social interventions had more positive attitudes about women in male-dominated fields and more friendships with their male classmates.

Except for Lee et al. (2015), none of the literature in this area of review dealt specifically with women in male-dominated classrooms, and the study by Lee et al. concerned STEM classrooms rather than apprenticeship. A gap exists in the literature regarding the support of inclusive classrooms for women in male-dominated apprenticeships and investigating the experiences of female students in these classrooms is an opportunity to address this gap. By interpreting experiences of women in these classrooms this research can inform faculty about current practices perceived to be inclusive versus those considered non-inclusive, thereby positively influencing these classrooms.

The need to influence change and transform the male-dominant culture in apprenticeship environments highlighted by the literature is aligned with the feminist commitment to produce knowledge that can make a difference in women’s lives through social as well as individual

change (Letherby, 2003), and cultural transformation has played a key role in every phase of feminism (Fraser, 2005). The next section of this review discusses how a feminist theoretical perspective can support this research.

2.4 Theoretical Perspective – Post-Structural Feminism

Creswell (2009) explains the use of a theoretical perspective, or lens, that maintains the orientation of qualitative research in areas of marginalization, including gender, by stating, "This lens becomes an advocacy perspective that shapes the types of questions asked, informs how data are collected and analysed, and provides a call for action or change" (p. 62). This section includes an explanation of the role a feminist theoretical perspective performs in the research process, followed by a discussion relating to post-structural feminism as a theoretical perspective for this research.

2.4.1 Role of a Feminist Theoretical Perspective

Investigating how women experience a male-dominated apprenticeship classroom at the institution where this research takes place, and whether androcentric or hegemonic norms that may be present in apprenticeship programmes produce challenges for these women serves to explore social transformation regarding these cultures. It also contributes to intentions inherent in feminist research (Hesse-Biber, 2014a). Hesse-Biber (2012) describes how the origins of feminist research "recognize the importance of women's lived experiences to the goal of unearthing subjugated knowledge" (p. 3). As such, post-structural feminist theory was investigated as a relevant perspective for this research. Framing the research with feminist theory supports social transformation by revealing the subjugated knowledge about the reality of women's experiences in male-dominated apprenticeship classrooms at the institution (Ramazanoglu & Holland, 2002; Hesse-Biber, 2014a).

Bloomberg and Volpe (2019) further describe the theoretical relationship to research as an essential component of good-quality research that provides a "meaningful way of seeing, thinking, and understanding" (p. 168) throughout the research project. Feminist researchers do not employ specific methods inherent to feminism but integrate traditional research methods with thoughtful consideration of the goals of feminist research (Devault, 2004). In her influential work on feminist research, Reinharz (1992) states, "Feminism supplies the perspective, and the disciplines supply the method. The feminist researcher exists at their intersection" (p. 243). Hesse-Biber et al. (2004) also explain that feminist research requires a commitment to social power structures, difference, and the inclusion of women's voices in knowledge generation, and therefore this research is conducted "for women" not "about women" (Hesse-Biber & Leckenby, 2004, p. 213). As a theoretical perspective, post-structural feminism informs the methodology of this research, including the research design, methods, and analysis (Creswell, 2009). It provides a vehicle through which to consider the significance and value of the findings as well as the steps that should be taken (Bloomberg & Volpe, 2019).

2.4.2 Post-structural Feminism

According to Pierce (2011), post-structuralism considers reality to be socially constructed rather than only discoverable by objective means and recognizes multiple truths and meanings depending on a person's perspective within the dominant discourse. The humanist tradition has built deep structures in our social and political worlds, and the post-structuralist critique seeks to deconstruct the current discourse and challenge whether it truly serves us. Post-structuralism does not seek to replace absolutes with new absolutes, but to examine every situation and find the 'truth' of that context, situation, or moment, which in fact may be different from the 'truth' in any other context, situation, or moment (St. Pierre, 2000). Williams (2014) emphasizes that it is more about perspectives and not absolutes. For this research, post-structuralism provides an

approach that allows for the individual truths of women based on their own perspectives in male-dominated apprenticeship classrooms.

Gannon and Davis (2012) explain that post-structural feminism re-evaluates relations and sees a community that is co-implicated in relationships and perspectives and less as individual agents separate from the rest of the world. A post-structural approach to women studying in male-dominant classrooms, then, would seek to see the ways in which the social world inhabited by the students is actively brought into existence by the collective, in this case a male-dominant culture. According to Gannon and Davis (2012), when dominant discourses that hold people in place can be disrupted, there is a possibility that modes of thought and existence can be shifted. By examining the experiences of the female students in these classrooms, non-inclusive teaching practices that support the current discourse can be called into question and changed, thus transforming the underlying culture and allowing for full participation of the female students as peers in the classroom community (Fraser, 2005; Lave & Wenger, 1991). Scott (1994) describes the essential components of post-structural feminism, including language, discourse, difference, and deconstruction. These components provide a means to articulate a post-structural feminist theoretical approach to this research. They are discussed here as they relate to this thesis.

Language

Scott (1994) clarifies the concept or term ‘language’ in post-structural theory as a system through which people can understand and represent who they are and how they relate to others. It is via language that cultural practices and beliefs can be articulated through relationships, that institutions are organized, and that collective identity is established in a socially constructed reality. Language can be broken up and analysed to determine how the current reality is constructed through binaries, habitual repetitions, and repeated storylines that are perpetuated as normality (Davies & Gannon, 2005). Feminist post-structuralists critique language and texts to

determine how language creates structures that can be damaging to women (St. Pierre, 2000). The impact for female students in male-dominated apprenticeship programmes may be social–cultural norms of non-inclusivity in the workplace that are perpetuated in the classroom through language used in the workplace context and considered 'normal'.

Discourse

Discourses are defined by Gannon and Davies (2012) as "complex and interconnected webs of being, thinking, and acting" that are "historically and culturally specific" (p. 73). A discourse is not so much a language or a text but a historically, socially, culturally, and materially constituted set of beliefs, terms, and structures that organizes how we think and act in the world (Gannon and Davis, 2012; Scott, 1994). Discursive practices hold the normative order in place, including power structures, institutions, and gender (Davies & Gannon, 2005). Feminist post-structuralists use discourse to examine patriarchy and the taken-for-granted assumptions about normative behaviours and structures that oppress women (St. Pierre, 2000; Davies & Gannon, 2005). Examining discourse builds understanding about how "knowledge, truth, and subjects are produced in language and cultural practice as well as how they might be reconfigured" (St. Pierre, 2000, p. 486). Various illustrations in this literature review have referred to the ways women have been treated because of their gender to maintain normative beliefs through discrimination and sex-based harassment. These are all examples of how the discourse around gender has impacted behaviours and perpetuated a fixed order.

Difference

Meaning is made through contrast, whether the contrast is implicit or explicit, and any definition of what something is, also implies what it is not (Scott, 1994). So, the analysis of meaning involves consideration of the negations or oppositions (or limits) to what Williams (2014) refers to as the 'core'. A discourse can often establish meanings that are beyond a more

structuralist definition, particularly regarding binaries that afford a certain primacy to the leading term. Authors refer to the man/woman binary as an example, as the meaning of both words is established in part through their contrast (Davies and Gannon, 2005; Gannon and Davies, 2012; Scott, 1994; Williams, 2014). Post-structuralists see them as interdependent; the second term is generated from the first, that is, you cannot establish the meaning of the word woman without understanding woman's relationship to man.

Deconstruction

The interdependence of terms is revealed through what post-structuralists refer to as deconstruction. Meaning is made by analysing the "operations of difference in texts" (Scott, 1994, p. 286). Deconstruction allows us to be critical of 'the way things are' and how ideas and meanings are normally expressed. It allows us to disrupt current discourse and redefine our worlds and our individual truths. Feminist post-structuralists analyse and make visible how structural binaries give normality and naturalness to the first term, considered the dominant term, and examine the resulting power structures (Davies & Gannon, 2005). For example, in the binary man/woman, man has historically been considered the leading term and subsequently woman is considered to be derivative and often weaker and is also associated with the other binary derivatives (rational/emotional, culture/nature, etc.). The call for transformation of the underlying culture in male-dominated workplaces and classrooms challenges the 'way things are' and calls for a redefinition of what should be considered normal behaviour.

St. Pierre (2000) argues that deep structures allow men and women to avoid responsibility for discourses in the name of normality; it is often argued that it is 'just the way it is', as if there is some absolute outside of ourselves that dictates our being in the world through a discourse that we have not bothered to disrupt, nor have we accepted the responsibility for disrupting it to make the lived reality better for all. Examining the experiences of female students

in male-dominated apprenticeship classrooms provides an opportunity to reveal some of the discourses that are enacted through language and actions employed by the faculty and students. By informing inclusivity, this research attempts to disrupt the normative discourses enacted in the classroom that may not appropriately support all students' learning through an inclusive culture.

2.5 Conclusion

This literature review demonstrates how women experience a lack of inclusivity in male-dominated classrooms and the negative effects this causes (Blackburn, 2017; Jones et al., 2017; Lee et al., 2015; Smith et al., 2012). The literature articulates various barriers that women face in male-dominated apprenticeship workplaces that to some extent also impact male-dominated apprenticeship classrooms. A call for transformation, however, is not currently supported by empirical research (Bridges et al., 2020). While some research exists as to how to influence inclusivity in higher education classrooms, there is little focused on the male-dominated classroom environment and no studies focused on male-dominated apprenticeship classrooms. A gap exists in the literature regarding the support of inclusive classrooms for women in male-dominated apprenticeships and investigating the experiences of female students in male-dominated classrooms at the institution in this research is an opportunity to address this gap.

Feminist theory constitutes a perspective that focuses on the experiences of women to influence social and individual change (Letherby, 2003), and the post-structural feminist theoretical perspective discussed in this chapter provides a lens through which to investigate inclusivity regarding female students studying in male-dominated apprenticeship classrooms. By interpreting the current experiences of women studying in these classrooms in the institution and

attributing meaning to these experiences, inclusive teaching practices can be informed, thus precipitating an environment which serves the success of all students.

Chapter 3 – Methodology and Methods

Yin (2003) describes research design as "the logical sequence that connects the empirical data to a study's initial research questions and, ultimately, to its conclusions" (p. 20). The results of this research can be influential as they can inform practice and support students in the institution going forward. It is therefore essential that the methods chosen cultivate reliable answers to the research questions, which are re-stated here.

1. What meaning can be attributed to the lived experiences of women as they study in male-dominated apprenticeship programmes in a Canadian polytechnic institute?
2. How can the accounts of women in male-dominated apprenticeship programmes inform inclusive practices of faculty teaching in these programmes?

This research utilizes a qualitative research methodology which is informed by interpretive phenomenology. According to Creswell (2009), qualitative studies often explore the meaning that individuals attribute to a social problem; data is collected in a natural setting, and analysis establishes themes or patterns. The nature of this research is to understand the experiences of inclusivity and its meaning for women studying in male-dominated apprenticeship classrooms and to provide insights to inform faculty about best practices going forward. Adams and van Manen (2008) describe phenomenology as the study of the lived meaning of individuals and the attempts made to interpret or describe meaning in ways that are shaped by our language, consciousness, sensibilities, and presuppositions or preconceptions. This also relates to post-structural feminist theory, as language is considered to shape meanings that are inherent in a socially constructed discourse that represents constituted beliefs about our social reality (Scott, 1994). Fisher (2000) argues "that feminism can look to phenomenology in seeking

an articulated framework for experiential accounts as well as a mode of expression for the issues of sexual difference and specificity that lie at the core of feminism" (p. 34). As the purpose of the research is to determine what it means to be one of these women by interpreting their lived experiences, it was appropriate that this study be phenomenologically informed.

This chapter first discusses a methodology informed by interpretive phenomenology as it relates to the intentions of the research and a post-structural feminist perspective. The qualitative methods used for data collection and analysis are set out next, followed by reflexivity of the researcher, ethical considerations, and the validity and trustworthiness of the research. It is necessary to note that the original research design was modified in response to the COVID-19 pandemic and the subsequent limitations experienced. The pandemic is referred to where applicable in chapter three and is also discussed as a limitation to the research in chapter six.

3.1 An Interpretive Phenomenological Approach

Phenomenological research practices generally follow one of two main approaches to phenomenology: descriptive (also called transcendental) phenomenology or interpretive (also called hermeneutic) phenomenology (Dowling 2007; Lopez & Willis, 2004; Neubauer et al., 2019; Reiners, 2012). While the premise of interpretive phenomenology is considered more suited to this study, as clarified below, it is important to understand descriptive phenomenology as well as the difference between the two approaches to phenomenological research to provide an appropriate context.

Edmund Husserl originated the movement of phenomenology in the early 20th century, arguing that the perception of a phenomenon by a person's consciousness was an important aspect of scientific study as opposed to an entirely positivist objective reality (Neubauer et al., 2019). He considered the lifeworld to be what people experienced before reflection or

interpretation, and it was the essence of a phenomenon that needed to be described before any reflection or explanation could take place (Dowling, 2007). This requires phenomenological reduction, where the world is reduced to only the phenomenon, free of preconceptions and the social construct within which we may interpret the experience. To achieve transcendence beyond what is termed the 'natural attitude' of everyday life, Husserl's methods call for 'epoche', or bracketing, to get to the essence of the phenomenon itself and to describe it as it appears in consciousness (Neubauer et al., 2019). This method is commonly known as transcendental or descriptive phenomenology. Typically, a research project would be approached with no attitudes, beliefs, presuppositions, or theories to guide it; the only need would be to understand what is happening in the consciousness of the participant as they experience the phenomenon. In descriptive phenomenology, biases and presuppositions are removed through a series of transcendental reductions (Dowling, 2007; Neubauer et al., 2019).

Heidegger, a student of Husserl, disagreed with Husserl's approach and felt it was not possible for a being to separate themselves from their lifeworld. Heidegger (1962) used the term 'being-in-the-world' to explain that the lifeworld refers to how we exist in a relationship with the world around us, and we cannot separate a phenomenon from the world or from our personal history or understanding. Essentially, our world and how we understand it are socially constructed and we cannot associate meaning with a particular phenomenon without consideration of the context or the lifeworld within which the phenomenon occurs. Heidegger applied hermeneutics, or the interpretation of an experience through its context, going beyond a description of the phenomenon (Lopez & Willis, 2004; Neubauer et al., 2019; Reiners, 2012), which is known as interpretive or hermeneutic phenomenology. Because hermeneutics presumes a prior knowledge, bracketing is not required (Reiners, 2012). Presuppositions, attitudes, beliefs,

and a theory about what an individual might be experiencing are acceptable (Lopez & Willis, 2004; Neubauer et al., 2019). In addition, the biases of the researcher are also considered, as it is those biases and the context of the researcher that bring the research question into being in the first place (Lopez & Willis, 2004; Reiners, 2012).

"Hermeneutic phenomenology studies individuals' narratives to understand what those individuals experience in their daily life, in their "*lifeworlds*" (Neubauer et al., 2019, p. 94, emphasis original). Heidegger's notion of 'being-in-the world' refers to the understanding that we are situated in a world of meaning and we cannot separate ourselves from the world around us (Heidegger, 1962). People live in a socially constructed reality and are influenced by the world in which they live (Benner, 2008; Tuohy et al., 2013), with a human understanding of our world coming from our interpretation of it (Reiners, 2012). In the case of this research project, 'being-in-the-world' is about the socially constructed discourse in the male-dominated classroom, including the positionality that both the students and the faculty bring, which is based on their own backgrounds and includes working in a male-dominated industry, their understandings and attitudes about male-dominated apprenticeship, and their past experiences which have informed these attitudes. The post-structural feminist theoretical lens applied to this research also recognizes multiple truths of personal construction which can highlight discourses shaping the experiences of women and inform change in social structures (DeVault, 2004; Frost & Elichaoff, 2014), making an interpretive phenomenological approach more suitable for informing the investigation of inclusivity in a male-dominated apprenticeship classroom.

Patricia Benner's (1994) interpretive phenomenological approach was chosen to inform this research as its approach to data analysis supports the post-structural feminist theoretical perspective of the research. While the data collection methods are similar to those of other

interpretive phenomenological approaches (Beck, 2021), the analysis of the data using Benner's (1994) method, which incorporates paradigm cases, themes, and exemplars through engagement of the researcher with the hermeneutic circle, better allows the individual voices of participants (Hesse-Biber, 2014a) to be clearly articulated in the analysis of the data and the presentation of the findings. This is contrary to interpretive phenomenological analysis (IPA), for example, as in IPA the interpretation of the data "cannot be traced back to a single person's account" (Larkin & Thompson, 2011, p. 112). Specific attributes of the research design informed by Benner's (1994) interpretive phenomenological approach to data collection and analysis are discussed in sections 3.2 (data collection) and 3.3 (data analysis).

3.2 Data Collection

Benner's (1994) interpretive methodology typically utilizes multiple data collection events or sources. More than one source of data and context is considered by Benner (1994) to "create a more naturalistic account and prevent an overly narrow perspective on the situation" (p. 13). Multiple semi-structured interviews are the most often used data collection method in research that utilizes Benner's methodology (Benner, 1994; Benner et al., 2009; Crist & Tanner, 2003). Benner (1994) describes semi-structured interviews as the researcher asking more general questions and then following-up with additional questions once the participant's initial response has been given and their direction is understood. Brinkmann and Kvale (2018) also describe the semi-structured lifeworld interview as a method for gaining descriptions of participants' worlds to interpret the meaning of a phenomenon. As the objective of the research questions in this research was to understand the meaning that could be attributed to the lived experiences of women in male-dominated apprenticeship classrooms, a semi-structured approach to the interviews was adopted. From a feminist research perspective, Hesse-Biber (2014b) explains that

the role of the interviewer is to uncover "the *subjugated knowledge* of the diversity of women's realities that often lie hidden and unarticulated" (p. 184, emphasis original). Semi-structured interviews afforded a consistent interview guide for comparative purposes (as opposed to unstructured interviews) while also allowing an opportunity for further discussion based on participants' responses (Mann, 2016), thus maintaining the opportunity to uncover subjugated knowledge important in feminist research (Hesse-Biber, 2014b).

Due to limitations resulting from the COVID-19 pandemic, the data collection for this research had to be modified so the research could be completed. An initial research design included a background statement to provide background context for the participants, similar to an initial interview in Seidman's (2006) in-depth phenomenological multiple interview method to provide background perspective. This was intended to increase the context for participants, as Benner (1994) explains "the phenomenon and its context frame the interpretive project of understanding the world of participants" (p. 2). The initial design also included journal entries that would be completed by participants during their programme and a semi-structured interview on completion of their programme, thus providing multiple sources of data in addition to the context provided by the background statement. In the spring of 2020, it was decided by the institution that classes for autumn 2020 would remain online due to COVID. To facilitate this research, the research design was modified to include the background statement to provide the additional context and semi-structured interviews with participants who had completed their training over the past (2019–2020) academic year and had experienced in-person classes. These are discussed in more detail in this section, which includes all aspects of the data collection process including sampling, recruitment, collecting data, and interviewing remotely.

3.2.1 Purposive Sampling

Purposive sampling was incorporated because the research is focused on a unique group of individuals, namely female students learning in male-dominated apprenticeship classrooms at a specific Canadian polytechnic institution (Cohen et al., 2011). According to Cohen et al. (2011), purposive sampling is used to access people who have in-depth knowledge of a particular issue, and Frechette et al. (2020) explain that purposive sampling is most used in phenomenological research, adding that for interpretive methods, maximum variation purposive sampling is preferred to achieve as much diversity as possible across the participants. Diversity is achieved through the researcher having the ability to purposely choose participants across diverse areas and stages of study to ensure all areas and stages are included in the research. This differs from other methods such as snowball sampling which would include participants that qualify for inclusion found by word of mouth (Cohen et al., 2011) and potentially recruit many participants from the same subject area or participants in the same stage of their programme. For this research the participants needed to be female students who have had some experience in a male-dominated apprenticeship classroom at the institution, and the initial goal of the research was to recruit a diverse group of participants from various programmes within the institution who attend male-dominated apprenticeship classrooms as well as in various stages of completion of study. The ability to achieve this goal was limited by the COVID-19 pandemic.

The COVID-19 pandemic that began in spring 2020 presented two challenges to the recruitment process: the size of the population and the timing of the recruitment of participants in relation to the time they were enrolled in their formal training programme. Due to programme cancellations in spring and autumn 2020 because of COVID-19, the actual population of female students for recruitment was substantially reduced. For the ethical reasons discussed in section 3.5.3, specific programmes under the influence of the researcher were excluded from the

research, resulting in an even lower final population. The original intent was to recruit participants during their formal training programme during the 2020–2021 academic year. But because of COVID-19 and the decision made in the spring of 2020 that classes would not be face to face in September 2020, participants were recruited who had taken their formal training over the preceding (2019–2020) academic year so the research could proceed.

Female students were identified as possible participants based on their enrolment in a male-dominated apprenticeship programme and if they had undergone their formal training between September 2019 and March 2020 in a face-to-face environment. When recruitment began in July 2020, the population of potential participants had finished their formal training for the 2019–2020 academic year between four and ten months earlier. Possible participants would have studied in one of the male-dominated apprenticeship programmes at the institution.

The goal was to have a minimum of 8 and a maximum of 12 participants in this study and to achieve the goal of maximum variation discussed above. Smaller sample sizes are typical in interpretive phenomenology (Frechette et al., 2020) and about 10 is common (Groenewald, 2004). In consideration of the challenges presented by the smaller population size as well as the fact that potential participants had already completed their programme for the year, anyone who met the criterion of studying in a male-dominated apprenticeship classroom was included in this study. The minimum of 8 participants was met for this research and each participant contributed a background statement and an interview in August 2020. The ages of participants ranged between 23 and 34 years. More specific details about each participant have not been provided due to the confidentiality concerns discussed in section 3.5.2.

3.2.2 Background Statement

The background statement provides fore-structure, or background and context, for each participant, informing the interpretation of meaning of their experience (Benner, 1994; Seidman,

2006; Tuohy et. al, 2013). Tuohy et al. (2013) identify fore-structure in interpretive phenomenology as also referring to "fore-conception" (p. 19), which stems from past experiences. While this is typically applied to the researcher, it can be argued that the past experiences and respective backgrounds of the participants also influence how they interpret their own experiences in male-dominated apprenticeship classrooms. In the in-depth three-interview method that Seidman (2006) uses for phenomenological research, he assigns a first interview to a focused life history that allows the researcher to "put the participant's experience in context" (p. 17), and Benner's (1994) methodology encourages the use of various media to provide additional context for participants and as sources of data.

A background statement was requested from each participant which provided a context for the experience of each participant in a male-dominated apprenticeship classroom. Its purpose was less about why they are in their current apprenticeship programme and more about how they came to be participating in the programme (Seidman, 2006). The guidance given to participants regarding the content of the background statement is included in Table 2. As to the format of the submission, the participants were told that the statement could be typed using a word processing software, typed in the body of an email, or audio-recorded and submitted to the researcher by email. Participants were asked to complete their background statement within two weeks. Seven participants sent a written version, and one participant sent an audio recording.

Table 2: Instructions for Background Statement

Please include any biographical data which you believe has led you to this point of participating in your apprenticeship program. This may include childhood interests, life events, discussions with mentors, or however else you may have encountered the trade.

You may also include any other information about you that you believe is important to helping me interpret your experiences, such as but not limited to your cultural background, professional experience, or upbringing.

3.2.3 Semi-Structured Interviews

While many authors describe types of questions and approaches for interviewers to adopt when conducting semi-structured interviews, Guest et al. (2013) provide a step-by-step detailed model for developing an effective interview guide. This model was followed as it facilitated an approach based on the objectives and questions of the research and assisted the researcher to be as effective as possible considering their level of experience in conducting research. To ensure that the research questions are appropriately addressed in the interview process, Guest et al. (2013) suggest reviewing the research objectives and answering the following questions:

> What are the main research questions that the interviews are intended to answer?
> What are the primary domains of content that should be covered in the interview?
> What types of data are needed to provide these answers (opinions, experiences, knowledge, attitudes)? (Guest et al., 2013, p. 127)

Table 3, adapted from the work of Guest et al. (2013), was used as a tool to chart the objectives of the research, starting with the research questions and the type of data required from participants. The fields in the left-hand column of the table distinguish information to be used to generate initial broad questions, probing questions, and follow-up questions. Working across the table, appropriate interview questions were generated and populated into a separate interview guide, keeping the interview in line with the goals of the research. It should be noted that with this type of interview, an interview guide is meant to ensure that the interview follows the appropriate path but does not act as a script. This separate, more detailed interview guide is included as Appendix A.

Table 3: Development Tool for Research Questions as Informed by Guest et al. (2013)

The main research questions to be answered	Primary domains to be covered in the interview	What types of data are needed?
What meaning can be attributed to the lived experiences of women as they study in male-dominated apprenticeship programmes in a Canadian polytechnic institute? (Initial broad questions) **Experience**	• What happened? • Personal experience of the classroom? • Opportunities for own ideas and/or opinions? • Were tasks always done the same way as other people did them? • Did background help with how to navigate phenomena? • Was there participation? • Relationship with instructors. • What was the expectation regarding how you completed tasks?	Experience
(Probing questions) **Meaning**	• How did it feel? • What does it mean? • Decisions to continue. • Actions taken in response. • How did you react? Silence? • Did you adjust your behaviour to cope?	Experience/ opinion Experience/ attitude
(Follow-up questions) How can the accounts of female students in male-dominated apprenticeship programmes inform pedagogical practices of faculty teaching in these programmes?	• What could have been different? • What works well? • If you were the instructor… • What types of experiences or attitudes would have helped? • Is there is anything you wish you were able to do differently?	List/knowledge/experience List/opinion Attitudes

3.2.4 Interviewing Remotely

Due to health and safety requirements resulting from the COVID-19 pandemic, all interviews were conducted online. According to Salmons (2012), videoconferencing software can best achieve the conversational characteristics of the semi-structured interview, and other authors argue that videoconferencing most closely resembles a face-to-face meeting, producing data that is as reliable as data gained from a traditional face-to-face interview (Deakin & Wakefield, 2014; Irani, 2019). Deakin and Wakefield (2014) also report higher participation rates as online platforms do not require travel and participants can engage from their home without having to juggle work and family commitments.

The Zoom platform was chosen as it was the most accessible for participants. Zoom allowed face-to-face videoconferencing, had a record function to provide a recording of the interview, and gave participants the option of having their video camera off if they did not feel comfortable being on camera. Participants could access the Zoom platform on their desktop computer, laptop, or smartphone, making it very usable. Zoom allowed the participants to join the interview via a link sent to their email account, so there was no cumbersome software to download (Irani, 2019).

3.3 Data Analysis

According to Benner (1994), "the aim of interpretive phenomenology is to use indirect discourse to uncover naturally occurring concerns and meanings" (p. 9). Benner's interpretive methodology utilizes three strategies to gain an understanding of practical worlds and embedded knowledge – paradigm cases, thematic analysis, and exemplars. These strategies are occurring simultaneously throughout the data analysis process as the researcher engages with the hermeneutic circle and moves between parts and the whole of the text (Benner, 1994). The

hermeneutic circle is a process of discovering meaning through the synthesis of the text with its context, as well as through the context of the participants and the researcher (Laverty, 2003). According to Reiners (2012), the hermeneutic circle of analysis in Heideggerian phenomenology includes a “continual review and analysis between the parts and the whole of the text” (p. 2) that builds understandings and interpretation through shared knowledge and shared experience. Schwandt’s (2007) ‘Hermeneutic Circle as a Method of Interpretation’ (n.p) depicts this back and forth within and among texts which represents researcher engagement with the hermeneutic circle.

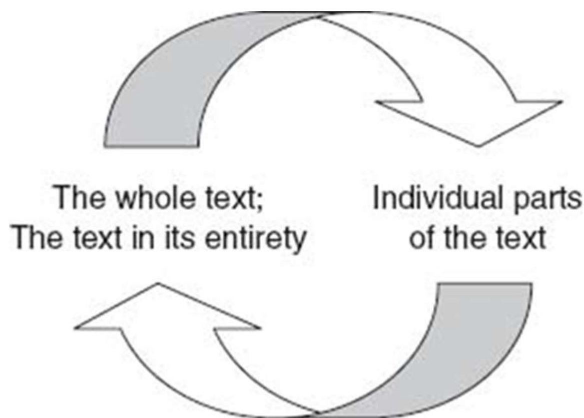

Figure 1: The Hermeneutic Circle as a Method of Interpretation (Schwandt, 2007, n.p)

Utilizing Benner’s (1994) interpretive phenomenological methodology, a phenomenologically informed analysis was conducted to interpret what it is like to be a woman in a male-dominated apprenticeship classroom at the institution. The data analysis was structured in a way that allowed the researcher to move between parts and the whole of the text while understanding the contexts of the participants and themself through background statements provided by the participants as well as the reflexive practice of the researcher. The following

sub-sections outline the procedure that was used to analyse the data as paradigm cases, themes, and exemplars through engagement with the hermeneutic circle.

3.3.1 Paradigm Cases

Paradigm cases are the point where the researcher enters into a dialogue with the text (Benner, 1994). Typically, a researcher begins with some analysis they feel they understand, but they may begin with a case they find puzzling. The researcher seeks to present the text as fully as possible and to confirm their interpretations with the participant wherever possible (Benner, 1994). Benner explains that using whole paradigm cases provides an opportunity for the reader to understand the practical world of the participants and their way of being in the world. After the first paradigm case is developed, a second case is developed and considered in light of the first case, and each subsequent case provides a way to identify similarities and contrasts with other cases (Benner, 1994). Paradigm cases are considered by Benner as a strategy for perception and recognition that is used to gain early understandings, but they can also be used as a strategy for presenting findings.

A paradigm is defined as “an outstandingly clear or typical example or archetype.” The word “traces to a Greek verb meaning ‘to show’ and has been used in English to mean ‘example’ or ‘pattern’ since the 15th century” (Merriam-Webster.com, n.d.). When considering paradigm cases, it needs to be “clear to the researcher why the particular paradigm cases are chosen and what contrasts and similarities are being made between the cases” (Benner, 1994, p. 11). As a feminist theoretical perspective also guides this research, the importance of individual voice and the of goal uncovering subjugated knowledge that is inherent in feminist research also needed to be considered (Hesse-Biber, 2014b). In addition, a feminist researcher must also consider their own power and authority in the decisions made during the research process (Bell, 2014), and according to Hesse-Biber and Leckenby (2004) they cannot ignore the power of the “ability to

grant voice to the 'othered'" (p. 215). In consideration of the requirements to include participant voice and consider the power of the researcher in decision making, each of the participants have been considered a paradigm case as a typical example of a woman studying in a male-dominated apprenticeship classroom, and interpretations of each of their experiences are included in the write-up of the findings.

The goal when studying paradigm cases is to understand the lived world of the participants. According to Benner et al. (2009), the text can provide important information about context as well as constraints and realities, and all cases are carefully examined for what they bring to the surface and clarify about a phenomenon. To analyse the relevant data for each paradigm case, steps were generated to maintain consistency in the interpretation. Once the interviews had been transcribed, the steps indicated in Table 4 were completed to build a paradigm case interpretation for each participant.

Table 4: Steps for Interpretation of Paradigm Cases

<table>
<tr><td>1</td><td>Read background statement from participant, as their perspective can be influenced by foreknowledge.</td></tr>
<tr><td>2</td><td>Listen to the interview again while reading the transcript to re-familiarize with the participant and fix errors in the transcript. Write notes about what to come back to and think about interpretations.</td></tr>
<tr><td>3</td><td>Read the transcript and fix errors in the soft version highlighted in Step 2.</td></tr>
<tr><td>4</td><td>Draft notes for preliminary analysis by reading the transcript once more to cue places where I wrote notes or where I might interpret what it means to be a woman in a male-dominated classroom. Review guiding questions, thinking about the meaning as a function of that question and then zoom out and write overall sense of the experience.
Guiding questions:
• "What is happening here? What do I know now or see that I did not expect or understand before I began?" (Benner, 1994, p. 101)
• "How did the participant respond to a specific situation?" (Frechette et al., 2020, p. 10)
• "How is the phenomenon being experienced in this encounter?" (Frechette et al., 2020, p. 10).</td></tr>
</table>

5	Make an entry in reflexive journal and record how the interview went, the decisions that were made, and the approach to the preliminary interpretation.
6	Redraft the preliminary interpretation (paradigm case) to be shared with the participant.
7	"a second case is examined in its own terms and in light of the first paradigm case" (Benner, 1994, p. 108). Once the first six steps have been completed, reflect and make notes regarding similarities and differences compared to other cases that have been completed.
8	Read the soft copy of each interview again and correct final errors before member checking. Have the hard copy at hand so that naming of themes can continue for thematic analysis during this step.
9	In addition to naming themes, record any thoughts or insights from the whole of what is being seen in the text as possible themes. Look for meaningful patterns and shared concerns of participants (Beck, 2021; Crist & Tanner, 2003).
10	Send transcripts and preliminary paradigm case interpretations for member checking.

Each participant was sent their paradigm case interpretation along with the full interview transcript. This allowed for member checking, their review of the initial interpretation, and the opportunity to raise any concerns or uneasiness. Participants were given two weeks to respond with corrections, questions, or concerns. Two of the eight participants responded to the email by confirming they had no issues, and the remainder of the participants did not respond.

3.3.2 Themes

A thematic analysis was also employed to determine distinctions across cases (Benner, 1994). Themes articulate "the broader understandings that arise from constant comparison and reading side by side of different paradigms cases and exemplars" (Benner et al., 2009, p. 449). According to Benner et al. (2009), a naming method is used to articulate themes instead of the typical coding of the text that occurs in qualitative research, and the goal of the naming process is to "capture examples of patterns of meaning in action, including salient text, that are evident in the text" (p. 452). Names are used to identify text with related meaning (Benner et al., 2009). In

this research, key meanings that emerged for individual participants were captured. As these meanings, central concerns, and categories become clearer, connections and shared meanings were identified across texts as themes.

At the same time as the preliminary interpretation, or synthesis, of the first paradigm case was being carried out, the thematic naming process outlined by Crist and Tanner (2003) also began by capturing and naming key meanings that emerged for the individual participant. As described by Crist and Tanner (2003) in their discussion of the use of Benner's (1994) interpretive phenomenological method, during the analysis of subsequent paradigm cases, new names were added to the list to reflect any additional themes emerging from the text. Beck (2021) describes Benner's approach as interpretation using the hermeneutic circle to analyse the whole text and parts of the text, and then to go back to the whole to "search for commonalities in meaning" (p. 83). As previously mentioned, paradigm cases, themes, and exemplars were generated in this research through engagement with the hermeneutic circle and to some extent occurred simultaneously.

The steps in Table 5 were generated to complete the thematic analysis of the data. Although themes were identified during the interpretation of the paradigm cases, once those had been sent for member checking, the interpretation of the themes which had already been identified as well as new themes that emerged during further engagement with the text became the focus.

Table 5: Steps for Thematic Interpretation

1	As further engagement with the text warrants during thematic interpretation, make notes on each page of the interview that will further refine the interpretation of paradigm cases for the final write-up.

2	At every session, make entries in reflexive journal concerning insights, decisions, and thought processes in the interpretation. Entries also include any biases or assumptions challenged by the data. Consider a question as a check to ensure minimal bias in the analysis: "If my research participants were reading my study, how would they feel? Would my findings and the way I have represented the site/setting and the participants themselves resonate with them?" (Bloomberg & Volpe, 2019, p. 258).
3	After sending transcripts for member checking, re-read hard copies of transcripts and again record thoughts and insights regarding the whole as well as parts of the text. In addition to capturing themes, consider data or voices that may be missing.
4	Build tables for themes. Use the tables to record the emergence of each theme across participants. Add quotes from transcripts that articulate each participant's experience regarding the theme.
5	Identify quotes as exemplars. Exemplars are a prominent example of the theme that articulates meaning across participants.
6	Read transcripts in their entirety again.
7	Record any new insights, changes, new thinking etc. in the tables as well as the reflexive journal. Think about "incongruities, concerns, and puzzling aspects" (Beck, 2021, p. 86).
8	Record remaining quotations in tables to use in the write-up of the findings.

3.3.3 Exemplars

Paradigm cases and themes may contain exemplars that articulate a common meaning within and across participants (Benner, 2008). "Exemplars convey aspects of a paradigm case or a thematic analysis" (Benner, 1994 p. 12), and according to Beck (2021), exemplars allow readers to more effectively make the distinctions apparent in the interpretations. An exemplar is further defined as "one that serves as an ideal model" (Merriam-Webster.com, n.d.). Exemplars were identified throughout the interpretive process. When patterns or meaning, common perspectives, and similar experiences were determined, exemplars were extracted from the text to demonstrate both similarities and contrasts among participants in the form of quotes**.** In the tables where experiences in the form of quotes were organized into themes, exemplars were identified to indicate their suitability for inclusion in the final write-up of the findings and those

quotes were used to highlight the explanation of themes. For paradigm cases, exemplars were added as quotes from participants, adding authenticity to what they had experienced and emphasising it.

3.4 Reflexive Practice

Reflexivity is an important tool used by researchers to evaluate subjectivities in qualitative research that can influence data collection and analysis (Finlay, 2002). This section describes the use of reflexive practice in this research project by first outlining the requirement for reflexive practice in interpretive phenomenology as well as feminist praxis, discussing the role of the research journal, and then providing a synopsis of the reflexive practice of the researcher in this research project.

3.4.1 The Requirement for Reflexive Practice

Because interpretive phenomenology considers the biases, assumptions, and theories of the researcher to be embedded in and required in the interpretive process (Laverty, 2003), reflexivity plays an important role in this type of research. According to Heidegger (1962), fore-structure refers to prior awareness, or what is known before interpretation, and Tuohy et al. (2013) describe fore-structure as stemming from prior experiences, theories, and assumptions. Horrigan-Kelly et al. (2016) point out that fore-structure should be declared by the researcher so that readers are clear about context, and Benner (1994) adds that the interpretive researcher reflects on their own biases as well as on their blind spots and makes assumptions explicit prior to and during the study. Benner maintains that the researcher must remain open to their assumptions being challenged or transformed throughout the research process. Priority is given to the new experience in interpreting the data, but it is important to note that it is difficult for the researcher to look at a new stimulus without a lens that reflects their own prior experience (Horrigan-Kelly et. al, 2016). Laverty (2003) also describes reflexivity as an additional way the

researcher engages with the hermeneutic circle in interpretive phenomenology, moving between parts and the whole of the text.

In addition to its importance in interpretive phenomenology, reflexivity also satisfies considerations for feminist research as well as research validity. Considered integral to feminist research practice (Hesse-Biber, 2012), reflexivity assists in recognizing and examining how the social background and assumptions of the researcher might intervene with the research process (Hesse-Biber, 2014b). Florczak (2021) argues that reflexivity provides insight for the reader of research, because the researcher filters the spoken word of participants and adds a lens to the findings, similar to how a different instrument of data collection, such as a questionnaire, adds validity to the research.

3.4.2 The Role of a Research Journal

Keeping a research journal or diary is a method of reflexive practice identified by various authors (Berger, 2015; Mann, 2016; Ortlipp, 2008; Smith, 1999). Boud (2001) describes a journal as place where experiences and ideas can be recorded for further processing and making sense of those experiences, thus providing a recognition for past learning as well as provocation for new learning. By facilitating learning, a journal provides an avenue for researchers to be reflexive about how they situate themselves in relationship to both their research and their participants, make ethical and methodological decisions, and contribute to the credibility and trustworthiness of the research.

Using a journal for self-reflection makes the positionality, attitudes, and assumptions of the researcher and the potential impact on the research project more evident (Mann, 2016; Ortlipp, 2008). Asselin (2003) warns that particularly with insider research, the researcher may fail to delve into the perspectives of participants because they feel they implicitly understand the culture. Taking stock of some of these perceived understandings and assumptions of the

researcher can assist in understanding their personal influence and positively impact the work (Watt, 2007). Berger (2015) describes the need to employ a level of rigour in separating the researcher's personal experience from the research project and be purposeful in not imposing that experience on that of the participants. The research journal becomes an important part of this process as it allows researchers to see their own desires and inclinations in relationship to the research and alerts them to their biases (Clancy, 2013).

Through journaling researchers can also reflect on their influence, cultural beliefs, and attitudes that might impact their approach to their research design and methodology (Draper, 2015) as well as ethics (Ortlipp, 2008). Ortlipp (2008) describes journal writing in research as increasing understanding of the role of a researcher through reflection on the research process and informing approaches to theory, ethics, and methodology. She also considers critical self-reflection in a journal as another effective way to support the research, from prompt and appropriate decisions throughout the research process to the consideration of power relationships with participants and how to navigate ethics. Exploring ethical dilemmas, including both issues and solutions to troublesome situations, is also explained by Mann (2016) as an effective use of a research journal.

In addition to basic project management activities, such as keeping track of events occurring during research to accommodate adjustments as necessary (Watt, 2007), journaling facilitates a level of record keeping during the research journey that "implies an open-minded and critical approach" (Bloomberg & Volpe, 2019, p. 30) as well and an "audit trail" for decisions (Bloomberg & Volpe, 2019, p. 116). Asselin (2003) argues that a well-kept audit trail regarding data collection and analysis, for example, would allow another researcher to "follow the process and concur with the findings" (p. 100). The transparency provided by such a record

contributes to credibility and trustworthiness of the research (Smith, 1999). Therefore, the capacity of a researcher for insightful reflection can be directly corelated with credibility and trustworthiness of a research project (Bloomberg and Volpe, 2019).

3.4.3 A Synopsis of Reflexivity Applied in this Research Project

According to Berger (2015), “reflexivity is demonstrated by use of first-person language and provisions of a detailed and transparent report of their decisions and their rationale” (p. 222), and this reflexive account is written from a first-person perspective.

The reflexive journey began when I completed a statement of positionality early in the research process, allowing me to explore my own stance towards the project and, according to Clancey (2013), also form the basis of my reflexive account. I answered the following questions formulated by Etherington (2004) to examine my own perspectives in this research.

1. How has my personal history led to my interest in this topic?
2. What are my presuppositions about knowledge in this field?
3. How am I positioned in relation to this knowledge?
4. How does my gender/social class/ethnicity/culture influence my positioning in relation to this topic/my informant? (Etherington, 2004, p. 11)

Answering the questions showed my strong propensity for this research, as I grew up with brothers, previously worked in male-dominated spaces as an aircraft maintenance engineer, and was the only woman in my department when I started teaching at the institution years earlier. I experienced many of the challenges faced by women in apprenticeship, and I feel strongly about women being able to get into these occupations and earn a decent wage. I was a single mother when I began my own journey, and it made all the difference regarding being able to provide for my family.

I learned a lot about myself as I completed the literature review for this research. I questioned some of the behaviours I had adopted to cope in a male-dominated environment and

whether I was still performing these behaviours. Delving into post-structuralist feminism afforded me a look into how my behaviours perpetuated my own oppression and that of other women. Beginning to see how post-structuralist principles had influenced my own journey through language and discourse, I became passionate about sharing this issue with women as well as men. Excited about what I had learned and seeing a different future for women in male-dominated apprenticeship, I knew that when conducting the research, I would need to be mindful of my influence on participants. Focusing on interview questions and the experiences of the participants, I was aware that I had to balance the need for a rapport and the co-construction of knowledge practised in feminist interviewing (Hesse-Biber, 2014b) with my own biases.

During data collection, I wrote in my reflexive journal, making an entry after every interview. Clancey (2013) discusses how a reflexive diary used during data collection allows thoughts about the data and the collection process to be contextualized during the data analysis process. Through this process I learned that there was a difference between my interpretation of an experience and my opinion about it.

Aside from allowing me to record my interpretation of the data, my reflexive journal also assisted in keeping track of my progress in becoming a more proficient researcher. Watt (2007) describes reflexive writing as leading to more understanding about research methodology as well as the reflexive process itself. Reflexivity allowed reflection on what had gone well and what had not, as well as on how interviewing techniques influenced each interview. I suggested to myself ways to improve throughout the process. One of these improvements was about probing participants for the meaning they attributed to their experience. It had been natural to probe when I received a negative response to a question; however, when everything worked well for the participant and their experience was great, it took a bit of learning on my part to probe further

and find out what this really meant. In my journal I wrote, “I did get better today in regard to probing questions when the response was positive. So, if the experience in the classroom was great, top notch, how did that feel? What did that mean to you?” (Personal reflexive journal, August 19, 2020)

I also added an entry to my reflexive journal for each participant once I had transcribed their interview. This reflection was about validating observations I had made after the interview about that participant’s experience as well as recording any new insights as I engaged with the text. This engagement with the text became part of the hermeneutic circle as the reflection on and critique of my fore-understanding and the revealing and adjustment of assumptions built new fore-understanding for me as the researcher (Finlay, 2008b). My reflection about one participant included the statement, “Interestingly it seems that the thick skin is a very real requirement and almost a source of pride” (Personal reflexive journal, October 18, 2020). I also thought about my own attitudes towards the interview, separating my experience of the situation and subsequent biases. This is described by Berger (2015) as recognizing and taking responsibility for the position or situatedness of the researcher and the effect one can have on the research process. The experience of the participant remained as the one I was interpreting as my findings. An excerpt from my journal illustrates this:

> I only say what goes through my head because these are my own reflective notes, and I should get them out in the open. I really need to be cautious in my interpretation to focus on her meaning and not what meaning I pick up based on my “vibes” about the participant. (Personal reflexive journal, September 29, 2020)

Moving into the data interpretation, I continued to use my reflexive journal as a safe space in which to record my biases and attitudes throughout the process. When I caught myself

typing an opinion, bias, or conjecture of some kind, I went to the reflexive space in my digital notebook and wrote it there. Berger (2015) cautions against "unconscious editing" (p. 221) caused by the researcher's own sensitivities, and I was careful in my interpretations not to use adverbs or adjectives in the writing that were not specifically used by the participant in some way, jotting the following down in my journal: "I find myself staying away from adverbs and adjectives unless they are actually used by the participant. Just the facts ma'am, just the facts" (Personal reflexive journal, January 30, 2021). I was cautious about changing the interpretation by making something stand out in some way if the participant hadn't made it stand out. There were also moments when I used my reflexive journal to vent my opinions. It was good to get those thoughts and feelings out, so they didn't cloud interpretations, and Finlay (2008b) writes that the reflexive researcher needs to be prepared to "probe their more disagreeable reactions" (p. 116). I wrote, "I try to let all of this out, so I don't bias my findings. I can put that stuff here" (venting about a participant's passivity) (Personal reflexive journal, February 8, 2021).

Following Clancey (2013) and Darawsheh (2014), my reflexive journal also involved a detailed and transparent rationale for the various decisions made as to how the data was interpreted, allowing me to remain consistent. An example of this is a note from my journal regarding the decision to start naming in the text to begin the thematic analysis while I was still interpreting paradigm cases.

> Not sure if I want the names in there yet but I feel like it will help me keep some type of track of all the information and I won't miss anything. If something strikes me now, I am not sure I will see the same thing the same way two weeks from now when I go through deeper analysis. (Personal reflexive journal, January 5, 2021)

Taking a reflexive approach to this research provided the opportunity for me to reflect on my own positions in the research, identify and have an opportunity to overcome biases, and provide a level of objectivity to the collection and analysis of data.

3.5 Ethical Considerations

It is important to have a balance between the goals of the researcher and the rights and values of the participants (Cohen et al., 2011). Social research has the potential to cause harm, anxiety, and negative consequences for participants (Robson, 2011), and according to Creswell (2009), ethics should be considered during all phases of the research, including data collection, analysis, and interpretation, and dissemination of the research findings. While conducting this research, the relevant guidelines as required in Canada by the research Tri-Council in their Ethical Conduct for Research Involving Humans (Secretariat on Responsible Conduct of Research [SRCR], 2018) were followed, and the online course required for all Canadian researchers was completed. Before engaging in the data collection process, ethical approval was obtained by both the institution where the study was conducted and the University of Liverpool. This information is included as Appendix B.

Creswell (2009) advises that by anticipating the potential effects of the researcher's actions on the people involved in research, any perceived ill effects as much as possible can be mitigated by putting protective actions in place beforehand. This section will discuss how ethics regarding voluntary participation, confidentiality, and reducing power imbalance and conflict of interest was managed.

3.5.1 Voluntary Participation

The recruitment materials specifically stated the voluntary nature of the project, outlined the commitment required, and provided information about what would happen to the personal information and privacy of the participants. Cohen et al. (2011) explain that the informed consent

process ensures that participation is truly voluntary, with participants having the appropriate knowledge of the project to make an informed decision about their participation, and the participants of this study were informed about the specifics of the research study. The voluntary nature of their participation was clearly outlined. The informed consent agreement also clarified the possible consequences and dangers of the research, the privacy of the participants outside of the research project, how the data will be stored throughout the project, and how it will be managed or destroyed after the research is complete (Cohen et al. 2011; Creswell, 2009).

Voluntary participation also means that participants can remove themselves at any point during the research data collection process (Robson, 2011), and Brooks et al. (2014) point out that researchers need to explain in their ethics documents how withdrawals from the project are managed. All email communications with participants included the following statement from the informed consent documentation: “You are free to withdraw from the study at any time up to the point of data anonymization (six months after data collection has ended), without explanation, and without incurring a disadvantage”.

3.5.2 Confidentiality

In qualitative research, the greater the sensitivity or risk to participants, the greater the obligation considered on the part of the researcher to maintain confidentiality (Cohen et al., 2011). Confidentiality is an essential element in educational research that ensures the protection of the privacy of participants (Brooks et al., 2014); however, it does not always serve the goals of feminist research (DeVault & Gross, 2012). Devault and Gross (2012) argue that feminist researchers can be flexible about confidentiality, stating that it “does not always serve feminist goals” (p. 226) when it comes to eliminating voices to protect them. They encourage respecting the wishes of participants in this regard, and Creswell (2009) also describes the preference of some participants in research to “retain ownership of their voices” (p. 90), which also aligns with

feminist praxis. In this research, the participants were allowed to choose whether to use their own name or a pseudonym, and the findings are reported with a mix of real names and pseudonyms. Regardless of their choice, other practices regarding anonymity in research apart from how participants are identified in the findings were followed so that the participants would be able to change their mind as the research progressed, particularly after member checking and reading the paradigm case interpretations of their experience. These are described in the following paragraph.

Procedures regarding confidentiality that were followed included ensuring that participants' names and other means of identification were not disclosed outside of the reporting of the findings if some participants chose not to use a pseudonym. According to Cohen et al. (2011), it is the responsibility of the researcher to ensure that participant identities are not discussed or known publicly. Data was collected confidentially and saved on the researcher's computer, which is password protected. All emails and digital documentation that reveal the actual names of participants are stored in a password-protected file located on a separate hard drive from that on which the collected data is stored. All collected data will be destroyed by appropriate deletion of digital data on all computers and recording devices within 14 days of the completion of the research project.

According to Henderson (2008), ethical concerns about educational research do not stop at informed consent but need to be revisited during collection and representation of the data, and one concern to do with faculty and confidentiality arose during the reporting of the findings. Some participants chose not to use a pseudonym, and as a result there were instances where the researcher felt the need to provide confidentiality for their instructors. Some of the experiences that participants shared were very specific to individual instructors, and if too much detail had

been described in the findings, such as a specific item that was said, the anonymity of an instructor could have been at risk. The decision was made to go into as much detail as might happen in a typical classroom and if something was said that was very specific to an individual instructor, it was described in a way that did not expose the identity of the instructor.

3.5.3 Minimizing Power Imbalance and Conflict of Interest

Brooks et al. (2014) state that it is necessary to consider the relationships and power dynamics between the researcher and the participants when aiming to establish a rapport and trust in the research process. To minimize power distance during the recruitment process, potential participants were first contacted by an administrative assistant who is familiar with working with students in the institution. The researcher was presented as a doctoral researcher, and the names of both the institution and University of Liverpool appeared in the text. At the start of each interview, the researcher's professional role was discussed with the participants, as well as the relationship of that role to the research and the fact that the researcher's relationship with the participants was purely as a researcher. After this part of the conversation, each participant was asked whether they felt comfortable to continue.

Because of the professional role of the researcher at the institution some programmes were excluded from the research. This was a concern highlighted by the ethics review panel in the institution during the ethics approval process. While any concerns of power imbalance with participants can often be mitigated in research techniques, there was a worry that participants in the programmes under the researcher's influence may disclose information about the faculty who work within these programmes, which may cause professional bias for the researcher. Ethics review involves making decisions to balance the good coming from the research against the potential harm to participants or others involved, such as the faculty in this case (Brooks et al., 2014).

3.6 Validity and Reliability in the Research Process

Validity and reliability are prominent components that speak to the quality and trustworthiness of research (Creswell, 2007; Robson, 2011). Qualitative research, and as such phenomenological research, does not necessarily define a single truth but “rather a coherent and legitimate account that is attentive to the words of the participants” (Pringle et al., 2011, p. 23), and Davies and Gannon (2005) argue that post-structural feminist research values the socially constructed experience of the individual that is situated in a specific context. Creswell (2007) explains that in qualitative research it is important to closely follow chosen methods to maintain the validity and reliability of the research. While another researcher may not be able to recreate the same findings when they repeat this research, grounding it in specific methods provides a common level of understanding for readers. Cohen et al. (2011) argue that in addition to the consideration of methods, the most practical way to achieve more validity and reliability in qualitative research is to minimize bias as much as possible, and Benner (2008) describes rigour as staying true to the text in interpretive phenomenology. Following the chosen qualitative methods (Creswell, 2007) and staying true to the text (Benner, 2008) were important elements in conducting this research to achieve validity and reliability during data collection and analysis. In addition, reflexive practice and member checking were employed to minimize bias (Cohen et al, 2011).

Linda Finlay (2002) discusses reflexivity as a tool that researchers can use “to analyse how subjective and intersubjective elements influence their research” (p. 531) so they can establish trustworthiness. She relates reflexivity to hermeneutic phenomenology as well, in the sense of the hermeneutic approach to fore-structure and previous judgements informing our understandings (Finlay, 2008b). By engaging in reflexive practice, the researcher was able to

challenge their own assumptions and decision making, as well as check personal biases and opinions. The following excerpt illustrates how the researcher identified an issue early in the process and began to recognize the difference between writing about their opinion and writing about the experiences of the participants.

> I started to write my reflections in the preliminary analysis, and I realized I was making my own interpretations or really giving my own opinion of what did or may have happened there. I deleted it and I will make those reflections here instead. (Personal reflexive journal, January 5, 2021)

In another instance, the researcher used their reflexive journal to vent, keeping personal biases separate from their interpretations. In their journal, the researcher wrote, "Not sure what to do with this as it is so thin. I decided to vent here so that I could get these thoughts out and come at the actual interview with some objectivity" (Personal reflexive journal, January 23, 2021).

According to Clancy (2013), reflexive practice also provides an audit trail of the decisions made during data analysis. The next excerpt is an example of a decision the researcher made in the interpretation process.

> Part of the data interpretation literature mentions examining each paradigm case in relation to the other or the previous, so I think I will add this to the checklist and do a little write up while things are more fresh every time I finish a paradigm case. This will be an opportunity to connect some of the naming labels that I have attributed to the transcripts for each and build that common story from some of these items. (Personal reflexive journal, February 13, 2021)

While the interpretations of the researcher may be different from those of different researchers, the decision-making audit trail provided through reflexive practice adds the context for interpretations, making the data analysis process transparent and reliable (Finlay, 2002).

Member checking also contributes to the credibility of the research. All participants received by email the drafts of the paradigm cases as well as the interview transcripts. This provided an opportunity for participants to determine credibility and whether the findings were valid for them as individuals (Benner, 2008), as well as whether they felt the interpretations reliably reflect their experiences in a male-dominated apprenticeship classroom.

3.7 Conclusion

The methodology and methods outlined in this chapter provided the structure and insights required to do effective research, produce credible results, and protect participants. The research questions were presented and addressed using an interpretive phenomenology approach that also considered a theoretical perspective of post-structural feminism. Data collection and analysis methods were explained, and reflexivity, ethical concerns, and trustworthiness were addressed. Chapter four presents the research findings, including interpretations of the paradigm cases, themes, and exemplars.

Chapter 4 – Findings

As discussed in chapter three, the participant interviews were analysed using Benner's (1994) interpretive phenomenological method, and paradigm cases, themes, and exemplars were identified. According to Beck (2021), the presentation of paradigm cases permits readers to engage in and become familiar with the experience of each participant. As a goal of feminist research is to ensure that all voices are also present (Hesse-Biber, 2012), each participant is presented as a paradigm case. The section on paradigm cases begins with a summary of interpretations of the cases in light of each other that provides context to the experiences of participants, followed by the presentation of each individual case. Following the presentation of the paradigm cases, themes are identified that represent the experience and meaning that emerges across participants rather than being centred on the individual. Exemplars are represented by the quotes used to illuminate specific aspects of paradigm cases and themes, as explained by Beck (2021).

Because paradigm cases represent the individual experiences and themes represent more of the collective experience emerging for participants in different areas, they are read as two ways of looking at the same data, or two perspectives of the experience, both the individual viewpoint and the more collective one. For this reason, readers may notice some repetition when reading through the findings, as an experience relating to an individual presented in a paradigm case may also be used as an exemplar to highlight a theme as it describes an experience common to multiple participants.

4.1 Interpretations of Paradigm Cases

As each case was examined in light of the first and then the subsequent cases, various similarities and differences were recognized among the individual experiences of participants.

The background statements that were collected as well as the interview questions related to background showed that the participants engaged with male spaces and gendered embodiment when they were growing up. This was sometimes referred to as tomboydom, and all participants but one reported having experience using tools that assisted in building confidence. The participant who did not report this same experience using tools before her apprenticeship also reported more difficulty regarding fitting in when it came to the classroom.

Most participants described the industry as a more hostile environment then the classroom. Those who didn't report this had a more inclusive industry experience rather than experiencing the classroom as more hostile than the other participants. Although industry context was not requested and it was not the subject of a specific research question, past and current experiences in the workplace became a part of each of the interviews. This demonstrated the importance this context had for the participants, so it has been considered to be relevant and included in the presentation of paradigm cases. The participant who did not discuss industry experiences was making a conscious effort during the interview not to include them, as she understood that the interview was about classroom experiences. This implies that she had lots to say but deliberately filtered it out of her responses.

The background and industry experiences of the participants provide the fore-structure and the social context they have experienced which informs their experience in a male-dominated apprenticeship classroom. The major similarity among all the paradigm cases was the feeling that the experience in the apprenticeship classroom at the institution was a positive one overall. However, each participant was able to report an example of how they experienced a non-inclusive environment during their programme. In addition, one participant spoke about specifically modifying her behaviour to fit in. A common response to a non-inclusive experience

in the classroom was for a woman to go silent rather than advocate on her own behalf. Only a few participants experienced other female students being in their classroom, and this was described as ranging from a refreshing, supportive experience to one that was more competitive in the case of one participant.

Some participants were more forthcoming and articulate than others during the interviews, and these observations were also included as part of the reflexivity journal. Regardless, all are included here at the level at which they engaged, and the reader may notice the differences in the depth of presentation of the paradigm cases. Readers should also be cognizant of the ethical concern outlined in section 3.5.2 regarding confidentiality. Because many participants used their real names and this presentation of the findings includes a mixture of real names and pseudonyms, some of the experiences are described in minimal detail to protect the anonymity of the faculty.

4.1.1 Elysha

Background

Elysha shared how she had grown up around boys for the most part so felt very used to being around them. A level of competitiveness is also a motivator for her in terms of "showing up the boys". When she was younger, she spent a lot of time with Dad in the shop learning how to build things and use tools. After some time at university and then some time away from school altogether to teach snowboarding, she gained employment at a small company as an apprentice. The small size of the business allowed her to learn from the boss, which had a significant and positive impact on her learning.

Industry

Industry is experienced by Elysha as very inclusive, and she feels that companies want to have women on their teams. She describes how the presence of women seems to be associated

with a greater level of overall respect on a team. The difference in physical strength can sometimes pose a barrier in the workplace but is overcome by approaching the work in different ways, and this has been respected by male colleagues.

Classroom

Elysha describes her experience of the classroom community and collegiality as very positive overall: “most days were good days cause there [at the institution] it was just enjoyable, it’s fun, and lot of teamwork and socializing even”. She feels that the current generation of apprentices seem to be more supportive of females in apprenticeship. That being said, having other women in the class in second year “was refreshing” because there was someone to relate to when the “boys were talking their boy talk”. Elysha also explains that in the first year, when there were no girls in the class, it would “feel like you are alone, in a sense, sometimes”. For Elysha, working around a lot of “boys” includes ‘blocking’ things that you don’t necessarily want to listen to, and a level of understanding is required to navigate successfully. She states, “[I]t’s just a certain genre, you have to be okay with it.”

In Elysha’s first year, there was also the feeling that being a woman meant that you had to prove yourself. This was experienced to a lesser extent in the second year, when more common ground existed with most classmates; however, one male classmate in the second year seemed to have that expectation. She describes her best day in the classroom as the day that respect was gained from all of her classmates in this regard, stating, “I guess I proved myself, but I shouldn’t have to, either”. When her abilities were questioned by classmates, it had the effect of making her question her own abilities, and this affected her level of confidence while she was in the classroom.

She describes most of her relationships with faculty as positive. One instructor said at the beginning of the programme that he wanted to support females and that he could be approached

if there were any problems or any discomfort with the learning environment. Elysha describes this as like a weight coming off her shoulders, saying, “I didn’t feel as alone, you could say […] I felt safer I guess too.”

A negative experience with an instructor that changed the nature of the relationship for the remainder of her programme is also related by Elysha. When she suggested that there may be a simpler way to complete math problems that were frustrating students, she received a snide response (limited detail to protect instructor anonymity) that strained the relationship, and Elysha recalls that “[i]t did feel sexist when he said it”. While the examples described here include some challenges that Elysha had with specific individuals, she primarily describes the classroom as a very positive experience.

4.1.2 Katrina

Background

Katrina grew up around her dad, uncles, and grandfather, who were all into cars. All of them are avid Thunderbird fans, spent a lot of time at car shows and included Katrina in their ventures. In junior high school, she fell in love with a trade and decided to pursue an apprenticeship. While it didn’t pan out the way she expected at first, she ultimately found an employer and enrolled in an apprenticeship programme at the institution.

Industry

Although it wasn’t discussed at length during her interview, Katrina describes the workplace as very different than the classroom, a tough place that can be harsh. She describes how people expect to see a man in her position and how they also expect her to know more than is required by her apprenticeship. Her programme requires her to have certain knowledge, which she has; however, her background in the field is not as strong as that of her male counterparts. Katrina feels she is evaluated based on the tacit knowledge of the male apprentices instead of on what she is required to understand from her training.

Classroom

The classroom is described by Katrina as a positive experience. She explains that it was nice to see other girls there, and the guys in the class were also helpful as she felt they had more knowledge of the material. She felt more comfortable in the classroom towards the end of the year as people got to know each other better.

Katrina explains that she didn't have as much confidence as her classmates in the shop environment where hands-on tasks are completed. Again, she felt the guys had more background knowledge than she did. Some of the strategies employed included asking questions of the other girls and the instructor, as well as listening to the guys and watching them point and just figuring it out. She didn't seem to feel quite as comfortable with her male classmates in the shop environment.

The instructors are described by Katrina as very positive and supportive of learning in the programme. One of them would consistently check in with her and make sure the material was understood. She mentions that he seemed to understand that there was more nervousness on her part when working in the shop. Katrina describes the upbeat attitude of one of the instructors and his level of engagement as contributing positively to learning, and the way the instructors built an open environment fostered good conversations in the class and among her classmates.

4.1.3 Haley

Background

Growing up with her father exposed Haley to working on cars, as he spent a lot of time at the weekends working on classic cars. After leaving Canada for two years and then returning, both dad and daughter worked in the construction industry, which exposed Haley to many different trades as well as the opportunity to ask a lot of questions. Unfortunately, due to being sexually harassed by a person in authority and being given no support from the company, she abandoned the idea of a trade in construction. After some time in various jobs, an interest was

sparked in another trade (limited detail to protect instructor anonymity), and Haley sought an apprenticeship. After three years of struggling in various workplaces and being harassed and belittled by managers, Haley has finally found a workplace that is supportive.

Industry

While much of her industry experience is described as part of her background, thoughts and observations that came up about industry during the interview included some of the coping mechanisms that she had learned in the workplace that contributed to success in the classroom. Haley describes these as including “playing off the energy of others” or assessing the attitudes of someone else to best inform her how to engage with that person. In addition, the requirement to have a thick skin is described by Haley as a reality of being a female apprentice, as well as having to constantly prove yourself because, as she states, “unfortunately girls in the trades are immediately looked at as weaker”.

Classroom

The classroom is described by Haley as a mainly positive environment; however, some of the attitudes expressed by classmates were less than inclusive. When asked to choose their own groups for shop activities, for example, the girls were left out and would be stuck together along with anyone else who had not been chosen. This confirmed for Haley that she had to prove herself in the classroom just as she did in industry. When male students in the class formed social media groups that did not include the female students in the class, she considered it to be somewhat isolating, making her feel like an outsider. Haley also explains how male classmates would “click together” and take a while to “warm up” to the girls in the class. Haley’s response to all of this was to stay quieter, keep to herself, and try not to take too much personally.

Haley describes how many of her instructors were inclusive and would encourage the women in the class to speak up more. These instructors were also very transparent in relaying

that they were still growing accustomed to more women in the trades and were open to discussing anything they might say in the class that might be offensive or concerning.

The attitudes expressed by one instructor, though, as well as by some of her male classmates, made the classroom feel somewhat like the workplace for Haley. An instructor who taught temporarily as a substitute was disengaged from his teaching, which had a negative impact on learning. Haley describes this instructor's behaviour as including snide, sometimes sexist remarks to the class. He demonstrated attitudes from industry in the classroom, "where it made me think back to this is why the trades are thought of this way".

4.1.4 Jacqueline

Background

Jacqueline describes growing up as quite a tomboy, always helping her dad in the garage. Most of the neighbourhood kids were boys so a lot of time was also spent with them. She describes playing outside, riding bikes, and playing video games. Jacqueline liked to build things and to take things apart and put them back together. Her influencers included relatives who were tradespeople that supported her going into an apprenticeship. Specifically, there was a counsellor in high school who worked to get her enrolled in a high school apprenticeship programme. Jacqueline obtained journeyperson status in one trade and then during a downturn in the economy when there was no work in her trade, she began a new apprenticeship. She feels her strong hands-on background has made a significant contribution to her current success in her apprenticeship programme.

Industry

The workplace wasn't discussed at length during the interview with Jacqueline. While discussing how women may need to be more creative with physical tasks, she established that this is a more common occurrence in industry rather than at the institution. Due to her lifting

capabilities in relation to the requirements of her job, she has learned creative ways of working with pulleys and ropes.

Classroom

Jacqueline relays being in the current classroom at the institution as a positive experience, although she also suggests that the classroom experience during her first apprenticeship, also completed at the institution, was more uncomfortable. In relation to her current experience, she describes her best day in the classroom as one when she was confident with the material and her classmates were in a similar space where "everybody's light bulb starts going off" and they were functioning as a community, engaging in an open discussion "where everyone is actually heard". She describes her classmates as all wanting each other to succeed. Students would help each other in class, at lunch, and before and after school.

Instructors made it clear early on that inappropriate behaviours would not be tolerated in the classroom. Management of the learning environment was handled well, and decisions were made fairly. A contributor to Jacqueline's success was the positivity and engagement on the part of the instructors in terms of their trade as well as their teaching. For the most part, the instructors were able to be a part of the class community, as demonstrated by their ability to crack jokes (respectfully) with the students in addition to delivering the material.

Jacqueline engaged in learned behaviour and coping mechanisms in the classroom because she had an underlying concern about how women in the trades were perceived or stereotyped. It was important to her not to perpetuate negative stereotypes of women so that the apprenticeships could become a more welcoming environment for all women. Some of the behaviours she describes included silencing ("don't say that, that's not right"), or not speaking up and answering questions, dressing in a way that would not fit with stereotypes ("Like I don't dress a certain way because I don't want to have those, fulfil those stereotypes…"), and adapting

personality traits (I'm pretty flirty by nature too so I try to like, tone a lot of me down"). She describes her experience over time as building the ability to "carry myself a little better", suggesting she had learned behaviours which allowed her to be successful in her current trade.

4.1.5 Liz

Background

Liz started to develop her mechanical skills from grade nine (age 14) and throughout high school. She frequented welding and automotive shops while attending high school, and welding became a real passion for her. She describes this prior experience as helping to show "that I can hold my own with the guys". Liz was discouraged by influencers during this time, and she explains that this only served to increase her commitment to pursuing an apprenticeship. After some time pursuing employment as a welding apprentice without success, starting a different apprenticeship and being laid off, she found employment as an apprentice in the automotive field, an area she had not previously expected to work in.

Industry

Liz talks about the significant amount of time she spent attempting to secure a welding apprenticeship because of the passion she felt about welding and her desire to become a welder. She feels it is difficult for women to gain an apprenticeship due to various barriers and mental models held by others. Regarding her current apprenticeship, she explains that dealing with being treated differently is frustrating and tiring, and, along with having to continuously prove her knowledge and skills, adds to the level of energy it requires to manage her work.

Classroom

Liz experienced the classroom as a very positive and inclusive environment. She describes the instructors as setting ground rules at the beginning of the year that were explicit regarding how students need to work together, and that they were all equal. The instructors then made sure that no one was marginalized during the programme. Liz describes them as being

committed to the success of everyone in the class and that they were always willing to help. They had well-organized curricula and were skilled at adjusting to the various learning styles of students in the room.

Liz feels that the freedom to share ideas in a supportive learning environment allows a person to grow as an individual. The ability to be yourself and be in a safe space to learn empowers the ability to participate freely, and she states, “I don’t have to censor myself.” She also describes it as affording the capacity to consider what is being said and work out what it means to an individual as a person rather than providing responses that are more aligned with what others might want to hear. She talks about building the confidence to not worry about what other people think or “put up masks” to make other people happy.

When Liz was previously in a different programme at the institution, there was more physical work and as a result it was more challenging. She felt an underlying requirement to “try to relate to how a man thought instead of how I thought”. Some of the experiences she had in that programme that she thought occurred because she is a woman included male classmates offering their assistance, possibly assuming it was required due to her lack of physical strength when in fact Liz would not attempt a task unless she felt confident in her ability to complete it.

4.1.6 Courtney

Background

Courtney developed mechanical skills because of her father’s insistence that if someone wanted to own a car, they should have the knowledge and skills to maintain it. A long-time boyfriend also became a partner in learning about, as well as fixing cars, and Courtney’s interest in vehicles never went away. Various roles in industry continued to build her knowledge and steer her career towards an apprenticeship.

Industry

Courtney experienced more challenges relating to her being a female apprentice in her workplace than in the classroom. Challenges in the workplace included a supervisor who yells and micromanages as well as customers who refused to be served by a woman. While some customers are also described as very supportive, and it is easy to get along with most colleagues, the negative aspects that also exist made the workplace a less than desirable environment for Courtney.

Classroom

Courtney describes the classroom as a positive experience overall, especially in relation to the guys in the class. She states, "The guys I had class with were pretty great". There were also three other girls in the class and a conflict with one of them at the beginning of the year may have caused Courtney's estrangement from the other girls as well. She experienced exclusion when she was omitted from a Christmas gift exchange the group of girls organized. Courtney attributes not fitting in to having different background knowledge from her classmates, a different approach to how one presents oneself, and a manner of engaging with school that did not include much social interaction.

The programme was delivered by two instructors who had very different teaching styles. One instructor was very easy going and had a more welcoming tone, treating students with a level of respect that was instinctively returned. It was apparent to Courtney that he spent time preparing for classes and was thoughtful about what would support learning for the students. The other instructor's approach was more about having the command of the classroom and much of the learning was self-directed by students.

Neither instructor is described by Courtney as having the specific classroom management techniques needed to build a culture of community within the classroom. The values that one of

them discussed were personal religious and family values that may have revealed a values misalignment for Courtney. She explains that she felt that at some point there would be conflict between them based on those values. She states, “I’m sitting here, you’re not going to like me, we are not going to get along.”

4.1.7 Lisa

Background

For Lisa, working on a horse farm taught her about physical work and light handy duties. She found this gratifying, and the time she spent working on her dad’s semi, even when the work was as simple as tightening and loosening bolts, taught her that girls can manage tools and hands-on work. Running counter to this, she discussed how cultural influences may also have played a role in building a context where it isn’t usual or normal for girls to use tools. This enforced an underlying assumption that a female in an apprenticeship that mostly involves men may have to prove that she is capable in a hands-on environment.

Industry

Lisa feels that industry has been very supportive in her current apprenticeship. She explains that in her workplace she is not expected to perform duties that require her to go beyond her physical strength and occupational safety standards are taken seriously. Past workplaces were also supportive when an extra hand was required to complete more physically demanding work. There seem to be different attitudes from co-workers that Lisa feels may be age related, with people who have been in industry a long time requiring increased substantiation that females are able to do the work just as well as their younger male counterparts.

Classroom

The classroom at the institution is described by Lisa as very supportive and comfortable just about all the time. Her instructors would be explicit about positive feedback in a one-on-one setting, which Lisa experienced as empowering. It encouraged her desire to be a better student

and tradeswoman, and she worked harder to be successful. Although the instructors never openly stated that they thought her level of success had anything to do with gender, the tone of their conversations implied that they thought this might be the case, and that they were pleasantly surprised. She states, "I feel very lucky to have had only positive feedback and positive experiences."

One challenge Lisa experienced was when groups were chosen for projects early in the year by students and not the instructor. It could feel alienating when classmates did not seem to understand her skill levels and were hesitant to be inclusive when choosing partners or groups. Once Lisa had demonstrated her hands-on skills, however, this issue dissipated, so it was experienced only very early on in each year or period of study.

Lisa talks about how women can bring different perspectives "to the table" and have a different approach to offer for solving problems that can sometimes be more creative. Lisa demonstrated this creativity by taking a different approach to a classroom problem from her male classmates, diagramming concepts learned in the class to ease understanding.

4.1.8 Melony

Background

Every job Melony has ever had has been in a male-dominated workplace. She describes being raised by a "farm boy" who knew how to work hard, which built an expectation that Melony would employ a similar work ethic. Failure was never an option, and a certain stubbornness was also cultivated, which explains why sticking with her apprenticeship is so important. She talks about how her background enabled coping and survival skills so that the apprenticeship environment was more manageable.

Industry

In her apprenticeship, Melony learned early to "be one of them so that you are not harassed by them". She was bullied at various times in the workplace, and often there seemed to

be a need to 'play along' with harassment and jokes even though some experiences were quite bothersome. Melony has learned in recent years, however, that she can stick up for herself and she now maintains a boundary she doesn't allow people to cross without appropriately dealing with them. She confirms that a thick skin is necessary for survival in her apprenticeship from a workplace perspective.

Classroom

Although she was not sure what to expect when she first went to the institution, Melony considers her experience of the classroom as "extremely supportive". The environment felt very natural to her, and she feels that this resulted from her level of experience in spaces that were predominantly male. She also explains that from her perspective, the thick skin she feels is required in the workplace is not required to be successful in the classroom at the institution.

The faculty in the programme set very specific expectations about inappropriate behaviour and the fact that it wouldn't be tolerated in the programme. They were "very focused on making sure that everybody learns equally and that everybody has a chance at stuff and that everybody is safe". Students were encouraged to work together and teach each other if someone had more knowledge on a topic. Students became, in Melony's words, a "class family", working and studying together and cheering each other on in a supportive environment. For her, this made the difference between "continuing with the apprenticeship and just saying screw it". When instructors were very supportive and encouraging, she also didn't want to let them down and so she worked harder to build on her success.

4.2 Themes

While the paradigm cases are personal accounts about participants as individuals, the themes presented here are organized to represent common experiences of multiple participants in

some detail. As described in chapter three, meanings for participants were identified and named following Benner's (1994) approach. While engaging in this process in relation to all participants, it was recognised that some names used to describe experiences were similar. The names were then reduced to those in Figure 2. Tables were established for each of the names and the relevant experiences of participants that emerged were recorded as quotes in the table. The findings were then drafted from the trends recognized in the tables as well as an overall sense of each experience from reading and rereading the transcripts.

Figure 2: Names Utilized for Thematic Interpretation

During the writing-up of the findings, groupings and themes became more refined as additional similarities were also identified. Names were then grouped into the overarching themes of external influence, faculty, and community, as depicted in Figure 3, with sub-themes where appropriate.

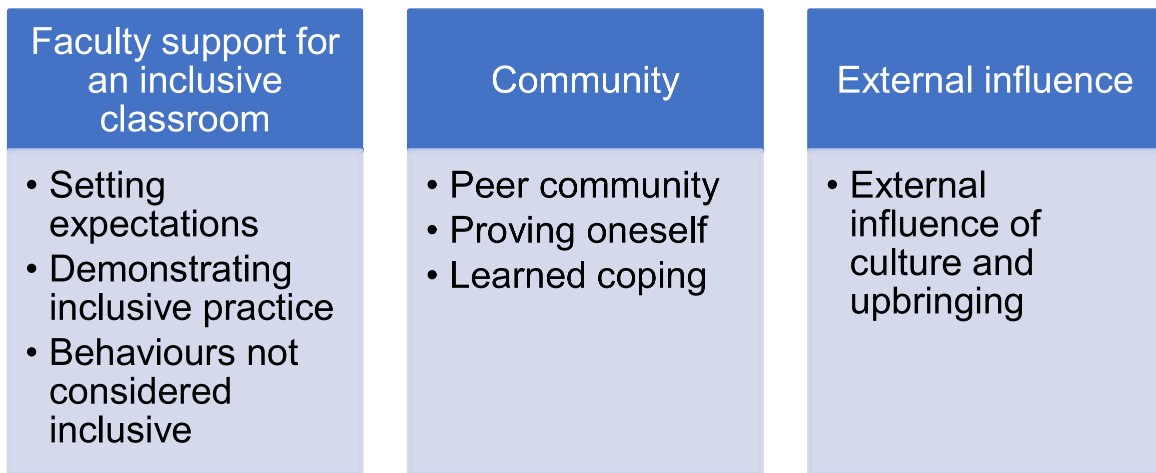

Figure 3: Themes

These overarching themes and sub-themes became the structure for the presentation of the following themes: faculty support for an inclusive classroom, community, and the external influence of culture and upbringing. These are presented here in the remaining sections of chapter four. In the presentation of these themes, the term ‘faculty’ is used to represent an overall entity or the whole of the instructional group and the term ‘instructor’ refers to an individual faculty member.

4.2.1 Faculty Support for an Inclusive Classroom

All participants report having a positive experience with faculty in the classroom overall, though some also report negative experiences in specific instances. This theme refers to the experiences of participants regarding the level of support provided by faculty to promote inclusivity in the classroom and its impact on learning. Positive dynamics in the classroom environment were established for participants when faculty took specific action to support inclusion in their programmes. They did this by setting expectations and demonstrating an inclusive practice in their day-to-day teaching, including having specific conversations with

female students to support them. These are discussed here along with instances of behaviours demonstrated by faculty that were not considered inclusive. Faculty played a significant role in creating a welcoming environment for the female students in their classes.

Setting Expectations

Setting expectations for the entire class was the most common intervention aimed at inclusion that was experienced by participants. Each programme has an orientation morning with all students and faculty of the programme present, and most participants experienced this as a time when expectations were set for behaviour, making it clear to students the classrooms would be inclusive spaces. Melony's description of the type of clarity that was provided by faculty in her programme on the first day is an exemplar demonstrating the experience of many of the participants.

> They made it very clear that uh, we're not, that they're not going to tolerate people, um mistreating someone else just because they disagreed with like, their gender, or uh, who they were attracted to, […] you know, class is for learning. (Melony)

Having this clarity up front before students even got to the classroom made participants feel welcome right away, and they also perceived in many cases that the person who was setting these expectations was someone they could approach for help.

Jacqueline's experience of the setting of these types of expectations occurred when faculty set them in the individual classrooms. She states, "Some of them made it pretty clear in the beginning that if you're going to be a distraction that you just would not be welcome in the classroom." Alternatively, expectations were also set at the beginning of an individual class by engaging students in an activity that set the

expectations for the entirety of the course. Students set ground rules for the class that outlined acceptable behaviour.

> We made ah, a list of class rules as a group. Um so we broke into a group of like 3 or 4, ah, classmates, and wrote a list of rules or guidelines that we felt would make a good learning experience, um and then we got together with everybody's lists and put them all up on the board. (Lisa)

Lisa goes on to say that this activity made her feel much more empowered and welcome in the class: "it made me feel more empowered of my learning, […] it just created a very, very welcoming environment". Expectations set by both faculty and student groups helped participants feel as if the classroom would be a safe environment as they began their programme.

Demonstrating Inclusive Practice

Faculty also demonstrated inclusive practices in their day-to-day teaching, including encouraging the women in the class and moderating student behaviour, in addition to providing specific support. Haley describes how her instructors encouraged the women in the class to speak out, saying, "My main teachers were […] very inclusive and definitely wanted to hear from us girls more […] they would encourage us to speak a little bit more." This comment from Haley demonstrates an awareness that women being silent in their classrooms had meaning and was something that should be addressed to provide an inclusive space. For other participants, ensuring appropriate behaviours in the classroom day to day also followed the expectations set at the beginning of the course.

> It's very inclusive, its captivating, um they are always making sure that everybody's on the same page […] and making sure that there's nothing kind of going on… I guess sexist wise is the best way to put it. (Liz)

Instructors would also provide specific support in the shop environment when necessary to ensure there was an understanding of how to perform tasks.

> He was always really concerned, he wanted to make sure I was getting it, […] and would just come up and check in, […] I feel like he could tell that I was a little nervous sometimes probably particularly in the labs. (Katrina)

When Katrina spoke about this support it did come across as genuine and not condescending or benevolent, an important balance for faculty to understand when working with female students. As indicated in these examples, some faculty were truly invested in the success of women in their classrooms daily.

Two participants confirm that their instructors had specific conversations with them in a one-to-one setting to encourage them on their journey and to let them know they were there to support them. One instructor approached the only female in the class at the beginning of her programme to relay his intentions to support her as a woman in the trades.

> One of the teachers came to me early on and asked me you know, if anyone makes you feel uncomfortable, like, I'm here to like, to support women in the trades and I want to be here to help, like, let me know if there's anything that makes you feel uncomfortable at any point or if any of the boys bother you. (Elysha)

Elysha goes on to describe her relief and how this instructor made her feel welcome by doing this.

> You know what, it almost took a big weight off my shoulders. I didn't feel as alone, you could say […] I felt safer I guess too […] and you know he didn't have to do that, but it did mean a lot to me, and it made me feel more welcome in the community. (Elysha)

It is interesting to note the significant impact that a conversation taking only a few minutes had for Elysha. Recognizing the difference between her social context and that of the instructor, validating for her that challenges exist, and offering support were all very valuable.

In Lisa's case, the messages in the one-to-one conversations were more about encouraging her progress in the programme and letting her know how well she was doing, "They were all very encouraging with every test, with every practical assignment that we had, or project, they were all wow, you did really well on this." These conversations encouraged her learning and progress in the course. She states, "It encouraged me to keep doing well or even better than I was. I, I found it motivating and empowering." These instructors were also careful not to make these comments publicly and attract attention in front of the class, which may have had a more detrimental effect. Again, these types of interventions took a negligible amount of time on the part of the instructors, but they made a big difference for both Elysha and Lisa in their apprenticeship journey.

Behaviours Not Considered Inclusive

Some of the participants reported behaviours by faculty that were not considered inclusive. On occasion, inappropriate and sexist comments were made in front of the class. These comments might not have been directed at any person in the room, but they still had a significant impact. The following comment by Haley provides an exemplar for how this is experienced by participants.

> I know it's not directed, commented at me precisely but, sometimes, you're… you know it's about you, in a way. And you take it a little bit personally even if it's

> not directed to you. Uh I've learned over the years to kinda just try to brush it off but it's always there you know. (Haley)

These behaviours by an instructor caused Haley to describe why apprenticeship might be considered an unwelcoming environment with her comment, "where it made me like think back to this is why the trades are thought of this way".

Both Haley and Lisa describe an experience involving the instructor using the pronoun 'guys' to represent the class or group. Lisa describes it as something that did not offend her or make her feel excluded; however, it was something she wanted to bring to the attention of the researcher because she felt that other women in the class might be offended by the use of a male pronoun to describe a group that included them. She states,

> The biggest thing I wanted to add was how the instructor addressed the class with the whole "guys" thing. That was honestly the biggest thing that was like, it throughout my whole experience as a student that was honestly the thing that stuck out to me the most, um like I said even though I'm neutral towards it, it, I could easily see how it is alienating. (Lisa)

Lisa continues to say how neutral she was toward this, but she also describes it as the 'biggest thing', and it was something very noticeable for her. This might indicate that it meant more to her then she lets on in the interview. Perhaps she doesn't feel she should be offended by it so has decided not to be but can also see it as alienating for others.

Haley brings it up as an example of how mindful her instructors were. They would use the term 'guys' and then correct themselves immediately. She states, "They'd be like 'okay guys'", and then he'd be like 'I'm sorry ladies, guys and girls' he's like 'I'm just so used to it, if it offends you." Faculty may or may not be aware that using a

male pronoun to describe the entire group could be offensive, and although female students may or may not feel alienated, it was brought up by more than one participant as something both faculty and female students could potentially see as inappropriate.

How each instructor approaches their classroom matters to the experience of female students studying in these classrooms and to their learning. Lack of support and lack of inclusive teaching practices were ways in which participants experienced the classroom as unwelcoming. Alternatively, setting expectations, encouragement, and moderation of behaviour in the classroom all had a very positive impact on participants in terms of feeling welcome in their classroom community. The following theme concerns this classroom community and the experience that participants reported having with their classmates.

4.2.2 Community

A sense of community in the classroom was an aspect participants identified as contributing to their success. This theme considers the experiences of participants regarding factors inherent in the classroom community. This includes the supportive attributes of the community and the need to prove oneself as a woman in apprenticeship, as well as any requirements to establish coping behaviours to succeed. Overall, the feeling of community was interpreted as positive by participants.

Peer Community

Many participants expressed the importance the sense of community had on their experience. A positive peer community was very relevant to participants regarding having a sense of belonging as a female in a male-dominated classroom. A positive community supported study sessions at breaks, assistance from classmates with the course material, and the practice of students encouraging each other along their respective journeys.

Melony articulates this, describing her classroom community as a “class family” that worked through the programme and supported each other, creating a positive learning environment. Her statement is an exemplar for how many of the participants experienced their classrooms.

> Like it became this little class family for the most part, it was really nice, cause like, you’d help each other with studying, you’d help each other with assignments in class, it’s like you’d check in on each other and I don’t think it was any particular moment, it was all of those moments that made it so great, cause you can cheer each other on. (Melony)

Melony went on to describe how some of her male classmates would stand up for her when anyone exhibited non-inclusive behaviours.

> If I didn’t have the chance to say it, then usually the guys would respond before I even could, and be like well she’ll kick your ass so like love to see you piss her off, which I like, found quite hilarious, […] you’re around each other so much that you become this little, close knit [community], and you look out for each other so it’s really nice that the boys would stand up for me. (Melony)

Melony wasn’t the only participant who reported male classmates standing up for her. While faculty could set expectations and follow through, peers also had a very meaningful influence on participants. Classmates were often described as people you could go to when you had concerns about the course material. Another participant talks about her male classmates going over material with her when she didn’t understand concepts, communicating a general sense of helpfulness from her classmates.

> The guys were really helpful with that, and they could help you go over what you weren't sure of if they knew it, […] so I think just have a willingness to share, so, and um just, yeah like everyone was pretty helpful to each other. (Katrina)

Another participant, Jacqueline, describes classmates relying on each other and helping each other during class times, lunch breaks, and before and after school, creating an atmosphere of positivity within the group.

> I've had good experiences with students helping students whether it'd be during class time, when we had the opportunity, or even on our lunch breaks, before and after school too […] we didn't really have anyone with a poor attitude that didn't want to be there. That wanted to bring the group down, no everybody was pretty positive and helpful. (Jacqueline)

While this type of community interaction described by Jacqueline is meaningful in any learning environment, the participants in this research experienced it as a form of acceptance, which was very important to them and was also reported by Liz.

Liz talks about her experience of a classroom as one in which students want to be there and everyone is working together and helping each other out. She states, "The majority of the people in my class are absolutely amazing. If you have a question, they will explain it to you. They won't put you down for it." Liz uses the word majority, articulating the experience that every participant communicated as similar regarding the classroom community – that the majority of their peers were supportive. In some instances, however, participants were excluded from the social aspects of the class group, and Haley provided an example of this.

Haley describes the male students in the class engaging in social media together, communicating by using their mobile phones in class.

> Halfway through the course they formed a like this group chat, and they would send memes to each other and like they'd always be like giggling and like, kinda like checking their phones and communicating with each other through them, through that, and like that was a little… ah like exclusive. (Haley)

When Haley was asked if she felt she would have been included if she was a guy, she replied, "Oh, a hundred per cent", further explaining how it made her feel excluded: "I guess I was just a little bit on the outside or like lonely. I tried not to take too much of it personally […] I stayed quieter; I was pretty quiet." This example demonstrates that the peer community was not as accepting of every participant. In addition to social exclusion, the requirement to prove oneself and the need to learn how to cope in a male-dominated environment were challenges that were also expressed by participants.

Proving Oneself

The feeling of having to prove oneself was a reality for five of the participants. Specific instances that individual participants experienced in this regard and that serve as exemplars for the experience of proving oneself are discussed here. These instances were in response either to the feelings and observations a participant had in the class or to a cultural discourse that caused the instance without any provocation from other students or faculty.

Elysha describes some boys in her class who made her feel as if she needed to prove herself, particularly in her second year. In that class there was a male student who "thought he knew everything", and although Elysha had been trained well in the workplace by her journeyperson mentor, this particular male student came across as

condescending. Elysha explains, "I felt like I was treated different, […] I felt like he was trying to, I don't want to say mentor me, but he was just trying to teach me as if I didn't know." She describes how she just focused on doing things perfectly and by the end of the course he was coming to her for advice.

> I guess I proved myself, but I shouldn't have to either […] should have just been like a common ground […] you know some stuff, I know some stuff, but instead it was like you're female you might not know anything so let me just show you. (Elysha)

It felt good to her to gain his respect, but she also felt conflicted because she shouldn't have had to prove herself to gain it: "At the same time it creates conflict in my mind because I shouldn't have had to gain respect, but it also felt good to actually gain it." Elysha also discusses the effect that all of this had on her confidence in the classroom, stating, "You know when someone's questioning my abilities like that, or just challenging me. Then it makes me question my abilities, and that you know messes with my confidence level." Elysha provides an example of how one person or one negative event can influence an overall confidence level, constituting a negative impact that goes beyond the event itself to her confidence as an apprentice and her ability to confidently complete her programme.

Lisa experienced the need to prove herself a couple of different ways, both as a feeling she received from her classmates and what she felt the expectations would be as a woman in apprenticeship. She felt she had a great experience with her classmates in the programme, describing herself as lucky: "I've been very lucky to have all of my

classmates very encouraging", but she also talked about the challenge of splitting off into groups, especially at the beginning of each year in her programme.

> In every period of study that I did, the most challenging parts would be, ah, as weird as it sounds, finding a partner for the project, if it wasn't assigned from the teacher. […] because I think even my classmates were maybe a little hesitant because I am a female, so maybe they were hesitant because they weren't sure how good my practical skills would be. (Lisa)

From her classmates Lisa would feel the need to prove herself at specific times, usually at the beginning of the course, and once her technical skills were proven, this feeling would go away. She discusses how it could be alienating until she showed her classmates that her technical skills were there. Lisa explains, "So class-wise, it, it was a little bit alienating […] then that alienation went away because, […] I sort of proved myself, so that I was slightly more accepted." Lisa's experience is a bit contradictory as she describes how she was alienated by classmates after saying how lucky she was to have all her classmates encouraging her. One might also question why luck should be required to be accepted into this community.

In a more general sense, Lisa also talks about the need to prove oneself as coming from assumptions that she made as a female going into the apprenticeship.

> I think that there is definitely a little bit more as a female in the male-dominated trade too, there is definitely a little bit of, of proving that, […] that we belong and I don't think anybody made me feel like I had to prove myself, I think I put that on myself just because there's not a lot of females in the trade, um so although I

> didn't feel that other people needed me to prove to them, I feel like I needed to prove to them, because I'm a girl. (Lisa)

Lisa felt that because she was a woman in a male-dominated apprenticeship, the requirement to prove herself was automatically implied rather than an explicit expectation of her classmates.

Haley also talks about group work and how the guys in her class would "immediately click together" leaving the girls to form their own group. She explains, "Me and the other girl were essentially almost forced together all the time too, just cause we are the girls and then whoever was left out was stuck with us." She reported that some of the guys in her class gave her the impression that she needed to prove herself. Haley felt as if she was judged on her ability because of her gender.

> Some of the guys in the classroom did have the attitude that you needed to be able to show that you could do it […] it's like judging a book by the cover right, you're, you are always the first impression you get from someone is what they look like right? Or… and unfortunately girls in the trade are immediately looked at as weaker. (Haley)

Feeling that she was automatically considered weaker because she was a girl, she had to prove she could do the work rather than it being assumed she could until discovered otherwise.

> Like as a girl you always have something to prove. You have to, you have to prove yourself as you can do this, like it's not just oh you can do it cause you can do it. It's like, well you're a girl I don't know if you can do it so let's see you do it. (Haley)

For the participants who had felt they needed to prove themselves, there was a sense that as a woman it would be assumed you could not do something until you proved otherwise. However, for a man in the same class it was assumed he was able to do the task until he proved he could not.

Learning to Cope

A few of the participants talked about the need to have coping mechanisms as a female in their programme. This area of findings is also presented as specific instances relating to individual participants which are exemplars for the experience of learned coping in this research.

When referring to how the male students in Haley's class acted in a way that excluded her, she describes feeling used to being an outsider, and she refers to needing to have a thick skin to be in a male-dominated field.

> You kind of realize going into a male-dominated field that you do have to have a tougher skin and you have to put up with a little bit more than you probably normally should have to as a female. (Haley)

Haley had an expectation that a thick skin would be required in the classroom because of her experience in industry, and her classmates proved her correct.

Elysha doesn't use the term thick skin, but she describes how she has to "block it out" when there is a conversation that she considers inappropriate. Because of the way she grew up, she considers this a normal thing to do if you are going to be working around men. She states, "In my head I don't care because I've heard this before and […] I just kind of block it out but at the same time I'm like can I just talk about some real, you know like, global warming." While Haley and Elysha describe these coping mechanisms as a response to specific behaviours in the class, a more in-depth conversation occurred

with Jacqueline as we delved into the meaning of coping mechanisms during her interview.

Jacqueline always talks about her programme as being very inclusive, but she also talks about ways in which she had adjusted her behaviour to better fit into a male-dominated environment. Though she never uses the term ‘thick skin’, Jacqueline makes some interesting comments pertaining to coping mechanisms in her apprenticeships, and she had completed two separate apprenticeship programmes.

Discussing her current programme, she describes how she has learned to manage herself in her programme, which she attributes to how comfortable she feels in the class.

> I definitely know how to handle myself around them better now than I would have prior. It’s the coping mechanisms and the boundaries, um and it is hard to be yourself because... like if you really unleash the woman inside, they don’t handle it very well. (Jacqueline)

Jacqueline also talks about modifying how much she speaks up in class to manage the impression that others have about women in trades. She does not want to leave a negative impression that would cause men to be unsupportive of other women doing apprenticeships in the future.

> Cause I also don’t want to be that girl in class who talks all the time or whatever cause there’s a bit of a stigma anyway so. […] I think they kind of come in with that thought already too, right? […] like they’re used to, like women being chatty or something and I didn’t want to be… that really outspoken one in class all the time, who doesn’t stop talking. (Jacqueline)

When asked about what she would have changed, she says that she would have spoken up more often and been herself rather than protect stereotypical perceptions of women in apprenticeship. She admits to modifying her behaviour to influence how her male classmates would think about all women apprentices. Jacqueline talks about other behaviours she employed to manage the perceptions men have of women in apprenticeship, describing how she modified how she dressed to look more like a guy so she would fit in.

> Like I don't dress a certain way because I don't want to have those, fulfil those stereotypes […] and you have to be careful what people are going to think about all women based on what you do, like that's a pretty a heavy burden. (Jacqueline)

Because she had completed two programmes, Jacqueline was the participant who had the most experience in male-dominated apprenticeship classrooms at the institution. She describes a very inclusive experience in her current programme as a fourth (and final) year, but throughout the conversation, it became clear that it seemed as if she has learned over the years how to cope well in the environment. She describes modifying her behaviours and the way she dressed to fit in, as well as managing how much she spoke up and what questions she would ask in class. So, while she describes her classroom as very inclusive, she also describes a lot of different ways she adjusted to feel included in that classroom.

4.2.3 External Influence of Culture and Upbringing

Participants were asked during the interview about their background statements in the context of their success in the male-dominated apprenticeship classroom. Of the eight participants included in this research, seven of them identified that their background experience made them feel more confident as an apprentice and one of them did not feel as confident in the apprenticeship environment.

Like many of the participants, Elysha had spent a lot of time around boys growing up, saying, “I’m just used to boy crap”, and she made an interesting comment about women in apprenticeship. She explains, “All the girls that I know that are in the trades are like more tomboyish and they’re adrenaline-seeking girls you could say. Like they’re there charging the boys. Every single girl that I know.” Many of the participants also identified as embodying a more male gender performance, alluding to their ability to cope in a male-dominated environment. Lisa articulates this sentiment too, saying, “I feel like I can cope well in a male-dominated trade, um at the end of the day I am a female but I’m not a girly girl, and I hate to use that term.” In addition, Haley is very open about her view that having a “tougher skin” and not taking things personally are what helped her to be successful. Participants who had hands-on experience as well as an understanding of how to manage themselves in a male-dominated environment as part of their upbringing describe these aspects as contributing to their success. This might allude to the environment not necessarily being inclusive for all women but only for those who understand the prevailing culture.

Jacqueline and Katrina talk about the difficulty of fitting in due to their own pre-conceptions about being a woman in a male-dominated apprenticeship classroom before even coming to the institution. Jacqueline describes the environment in her current programme as making her feel quite comfortable; however, when reflecting on her very first courses, she discusses how being one of the only females in the class made it more difficult to participate because of the judgements she expected to receive due to outside cultural influences.

> I definitely felt that way when I went through [the institution] the first time. Like when I went through my first courses. It, it just felt like answering a question

incorrectly as a female somehow hurt more? But, but that might not necessarily be true, that might just be how I felt about it. (Jacqueline)

Katrina didn't have the same level of confidence due to her background and said she felt that the male students had an easier time with the course material. She states, "I'm just not very good with like mechanics and stuff and most of the men are." Katrina relates that this made her feel more uncomfortable with her studies. The hands-on lab work also made her feel somewhat excluded because she is a woman, and she describes how she would stay quiet when she was with a group of guys and would attempt to work things out on her own. "Yeah, when you're just ah in a group of guys you have to just kinda have to listen and watch where they're pointing and then figure it out for yourself." Katrina did not have the same level of experience as the other participants during her upbringing and seemed to struggle with her confidence level as well as working around men more than any of the other participants. Again, this supports the idea that it is the women who understand how to cope in the environment who experience it as more inclusive.

4.3 Conclusion

The participant experiences highlight when there was an inclusive environment and provide examples of ways in which faculty and classmates positively impacted women in male-dominated apprenticeship classrooms. Faculty had a meaningful influence by taking time to make sure participants were supported as women in male-dominated apprenticeship classrooms and ensuring the classroom itself was inclusive. There were specific instances, however, when faculty did not make participants feel welcome. What may have seemed insignificant to an instructor, such as a comment in front of the class, had a significant effect on participants. Their engagement with and confidence regarding their studies could be considered at risk because of non-inclusive

behaviours. The same types of behaviours by those in the class community also occurred and there were also instances of exclusion. Being excluded from the group, feeling that one needs to prove oneself, or modifying one's behaviours to cope and to be successful were all experienced by some of the participants in some capacity. While these experiences were often about other students rather than faculty, there may be ways in which faculty can propel the entire class towards inclusivity by taking specific action in the classroom regarding inclusion.

All participants reported that the classroom was more inclusive than their workplace; however, all except one of them also reported a strong background in male-dominated spaces. The one participant who reported a weaker background in this area also experienced feeling on the outside in her class, particularly in the shop or in a hands-on environment.

While chapter four focused on the outcomes of the analysis of the interview data based on participants' experiences in the classroom, chapter five interprets and synthesizes those outcomes, considering the research questions as well as the post-structural feminist perspective. It will reveal the effect that faculty have had as well as how they can continue to improve their teaching methods to provide inclusive classrooms for women studying in male-dominated apprenticeship programmes.

Chapter 5 – Discussion

The purpose of this research study is to inform practice for faculty at a Canadian polytechnic institution that supports an inclusive teaching environment in male-dominated apprenticeship classrooms. This research utilized qualitative methods informed by interpretive phenomenology as well as a post-structural feminist theoretical perspective to address two research questions. These are repeated here.

1. What meaning can be attributed to the lived experiences of women as they study in male-dominated apprenticeship programmes in a Canadian polytechnic institute?
2. How can the accounts of women in male-dominated apprenticeship programmes inform inclusive practices of faculty teaching in these programmes?

The first section in this chapter explores the first question through a discussion and analysis of the participants' experiences and what they mean. Next, the second question is addressed through an introduction of a model adapted from post-structural feminist pedagogy that is designed to support an inclusive culture in male-dominated apprenticeship classrooms. The chapter is then summarized in the conclusion.

5.1 Participants' Experiences and What They Mean

This section explores the participants' experiences and what they mean for them and how this fits with the literature about inclusivity. Figure 4 summarizes the participants' experiences regarding inclusivity in the male-dominated apprenticeship classrooms included in this research and what they mean for the participants. Whether an experience is considered inclusive or non-inclusive has been determined by what the experience

meant to the participants; this meaning was identified in their response to probing interview questions such as "What did that mean to you?" or "How did that make you feel?" The inclusive aspects of the environment are discussed in sub-section 5.1.1, and those considered non-inclusive are discussed as microaggressions in 5.1.2. Sub-section 5.1.3 considers the backgrounds of the participants – their upbringing and culture – that add important context to their perceptions of inclusivity in their classrooms.

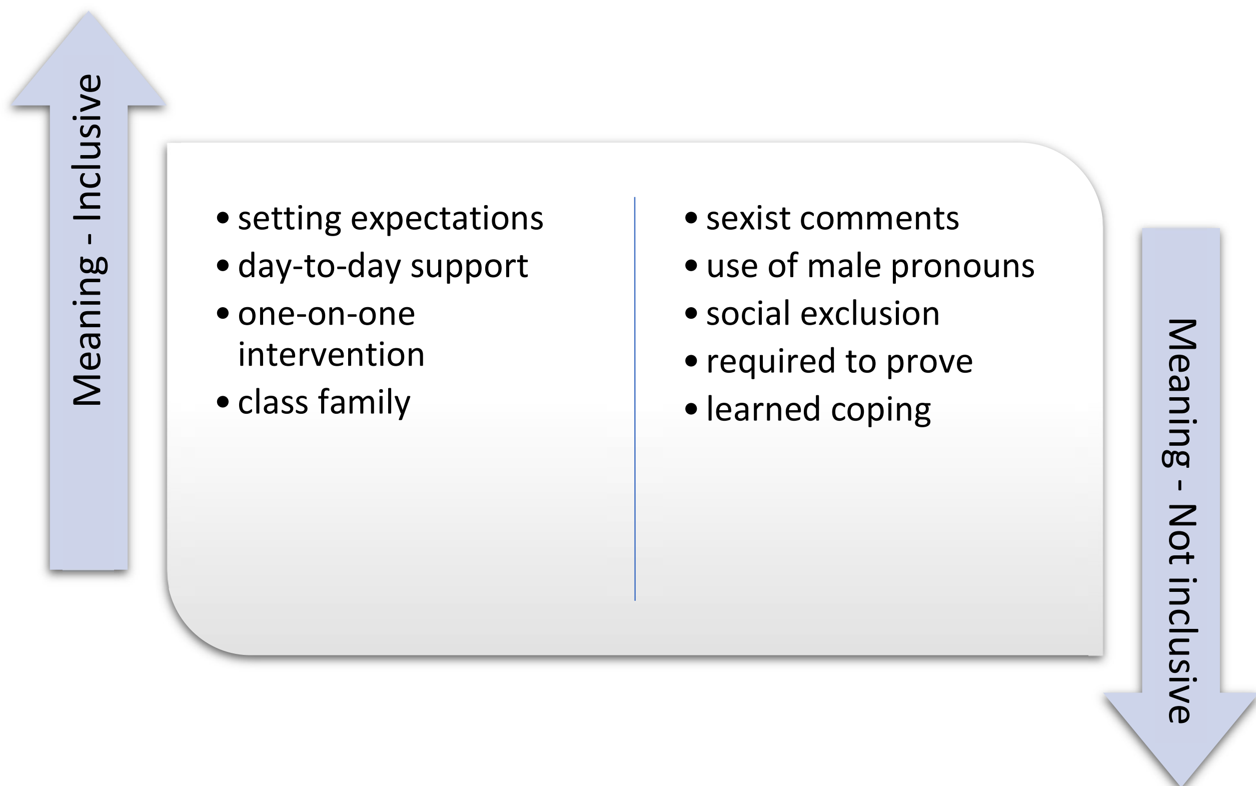

Figure 4: Participants' Experiences and Meaning Regarding Inclusivity in the Male-Dominated Apprenticeship Classrooms

Chapter two presented the essential components of post-structural feminism from Scott (1994). These are language, discourse, difference, and deconstruction. In this discussion of the findings, these concepts are incorporated as they relate to a tangible explanation of the subtleties

in language and discourse that cause difference – marginalizing women in male-dominated apprenticeship classrooms. The potential for the deconstruction of a normative order is also discussed as an avenue to transform this underlying culture or discourse, which would increase inclusivity in male-dominated apprenticeship classrooms.

5.1.1 Inclusivity

The participants experienced inclusivity when faculty set expectations, provided day-to-day support, and had a one-on-one intervention conversation with them. In addition, the term ‘class family’ is an exemplar used by one participant to describe an inclusive social environment in the classroom. These experiences that were understood by the participants as being inclusive are discussed here.

Setting Expectations

The participants consistently experienced the classroom as more welcoming and inclusive when clear expectations were set by faculty as to how people would be treated in their classrooms, followed by monitoring of these behaviours during the course. Faulkner et al. (2021) describe setting expectations as a way for faculty to create a foundation for an inclusive classroom, and the students in their study preferred it when faculty clearly communicated that discriminatory behaviours would not be tolerated. The female students felt more comfortable in the class and saw the instructor as an approachable person who cared about their concerns (Faulkner et al., 2021). In this study, Melony articulates this very clearly when she describes how the ‘thick skin’ she needs to cope in her workplace was not required during her programme at the institution. Her instructors set expectations concerning inclusivity at the beginning of the programme and took it seriously throughout the course, making her feel safe and welcome in the classroom environment. In their research on women in apprenticeship in Australia, Jones et al.

(2017) also highlight that the non-acceptance of behaviours which are disrespectful to women is an attribute which makes learning during an apprenticeship more inclusive.

Day-to-Day Support/Teaching Immediacy

Teaching immediacy demonstrated by faculty as day-to-day support also impacted the perception of inclusivity in the classroom. Christophel and Gorham (1995) define teacher immediacy as "nonverbal and verbal behaviours, which reduce psychological and/or physical distance between teachers and students" (p. 292). Building on the construct of immediacy introduced by Mehrabian (1966), Gorham (1988) established that perceptions of teacher immediacy were impacted by verbal behaviours. These include incorporating humour, engaging in informal conversations with students, and asking specific questions to solicit student responses, which all result in a positive contribution to student learning.

In this study, communication directed to specifically encourage the women in the class as a daily practice was experienced as welcoming. Examples included checking in when there was apparent nervousness with the hands-on work required in the shop, as in Katrina's case, as well as celebrating good work so female students were encouraged to continue, as experienced by Lisa. In Haley's example, the instructors specifically tried to encourage the female students to speak up in the class. Faulkner et al. (2021) suggest that positive relationships fostered with students through immediacy behaviours can "create stable and inclusive learning environments" (p. 94). Frymier and Houser (2000), in their work investigating students' perceptions of instructor–student relationships, discovered that female students considered instructors' immediacy behaviours as more important than their male classmates did. This was particularly relevant to making students feel good about themselves in the learning environment, thus demonstrating the value of this type of encouragement for women in male-dominated apprenticeship classrooms.

One-to-One Intervention

Although only one participant, Elysha, referred to a one-on-one conversation, it seemed to have significant impact. Elysha describes feeling a weight coming off her shoulders as well feeling safe and welcome. She recognized that the instructor wasn't required to have that conversation with her and the fact that he did was very meaningful. Elysha's instructor demonstrated his awareness of her social context and understood the possible influence of other social contexts on her experience of the classroom. Interpersonal validation of non-traditional students in the way Elysha's instructor approached her supports feelings of self-worth and the ability to be successful in the class (Rendon, 1994). In Dewsbury's (2020) deep teaching model, faculty are encouraged to build an awareness of the social context in relationships with students and develop empathy for their "social schema" (p.185). This requires faculty to make a commitment to a personal transformation that includes reflection and understanding how their own social context can influence the classroom in addition to understanding the social context of their students (Colley et al., 2003; Dewsbury, 2017).

As demonstrated in this research, deliberate interventions on the part of faculty, whether they are directed at the entire class or at female students specifically, can have a very positive effect on inclusivity in their classroom.

Class Family

Many participants in this research described their experience within the classroom community as a positive one, and the establishment of a "class family" (Melony) had a substantial influence on belonging and inclusivity. Both inside and outside the classroom, peers worked together to study, solve coursework problems, and, as Melony articulates it, "cheer each other on". Lave and Wenger (1991) use the term legitimate peripheral participation to describe learning as participation in a community. Wenger (1998) further describes learning as an

engagement that is embedded “in culture and history” (p.13), increasing our understanding of how social context can impact this learning. Colley et al. (2003) also consider teaching and learning to be “primarily social and cultural rather that individual or technical activities” (Colley et al, 2003, p. 472), with newcomers required to master knowledge through the social and cultural practices of the community to become full participants (Lave & Wenger, 1991). Because they represent a minority in the classroom, women in male-dominated apprenticeships can face challenges to social and cultural participation such as social exclusion, needing to prove themselves, and the requirement to learn coping mechanisms. These are discussed further in section 5.1.2. Lave and Wenger (1991) argue that social participation becomes fundamental for learning. This implies that women in male-dominated apprenticeship classrooms must overcome these challenges to gain social acceptance and learn appropriately with their peers.

Belonging and inclusion contribute to social participation in a community of practice and supports learning. Researchers report that students experience feelings of belonging and inclusion when they feel connected with other students (Faulkner et al., 2021; Freeman et al., 2007). Male-dominated classrooms where female students experience this connection are described as more engaging and more motivating (Walton et al., 2012; Wilson et al., 2015), thus contributing to academic achievement (Dewsbury & Brame, 2019). In a study by Wilson et al. (2015), a survey of over 1,500 students in multiple institutions divulged that having a greater sense of belonging positively influenced both their behavioural and their emotional engagement. The authors establish “that a sense of belonging cultivated in a class is strongly related to the way the students feel, how hard they try, and how willing they are to participate in a class” (p. 768). Good et al. (2012) link this specifically to women, reporting that women’s sense of belonging can be reduced over time because of negative experiences in a male-dominated

classroom, impacting their desire to pursue their studies. After finding that women's persistence is impacted by their perception that they do not belong in male-dominated STEM classrooms, Lewis et al. (2017) call on educators to foster a community of inclusivity. Acceptance by classmates is a key factor in belonging (Zumbrunn et al., 2014), and the descriptions by most participants in this research liken the class to an inclusive community of practice.

The findings of this research regarding inclusivity are relatively consistent with the findings in the literature regarding experiences of women in male-dominated classrooms. However, because the current literature does not focus on male-dominated classrooms specifically, only a call for support in general terms is articulated rather than providing specific ways to enact that support. The discussion here relating to teaching immediacy, practices such as setting expectations, and having supportive one-on-one conversations contributed to a welcoming atmosphere that the participants considered inclusive and advances the literature in this space by highlighting the ways in which faculty took control of the discourse in their classrooms in a positive way. A supportive peer community also promoted belonging and inclusivity for participants, encouraging engagement, participation, and persistence in their field (Walton et al, 2015; Lewis et al., 2017). These findings demonstrate that if faculty could play an even more active role in displaying and promoting positive behaviours and supporting the peer community by influencing the discourse in their classrooms, these classrooms could become more inclusive.

5.1.2 Microaggression

From a post-structural feminist perspective, the non-inclusive experiences that the participants relayed about their classrooms represent a discourse that was often enacted through language (Scott, 1994) and can be connected to microaggression (Sue & Spanierman, 2020). Described by Sue and Spanierman (2020) as "verbal and nonverbal interpersonal exchanges in

which the perpetrator causes harm to a target, whether intended or unintended" (p. 8), microaggressions are forms of discrimination that are commonly deep-seated in a person's social context and are often unconsciously delivered (Barthelemy et al., 2016; Sue & Spanierman, 2020). Microaggressions can be delivered verbally, non-verbally, or environmentally through systems and policy (Sue & Spanierman, 2020), and they have been categorized by Sue and Spanierman into three forms. These include microassaults, microinvalidations, and microinsults. Overt and deliberate forms of sexism towards women would be considered microassaults, while microinsults and microinvalidations are more unconscious ways of delivering slights (Sue & Spanierman, 2020).

Sue and Spanierman (2020) list seven themes or ways in which microaggression is enacted that have been identified by various researchers (see p. 93). These are as follows: an assumption of inferiority, a denial of sexism, acting as if women are invisible, imposing restrictive gender roles, engaging in sexual objectification, treating women as second-class citizens, and the use of sexist language. Listed in Figure 5, each of the non-inclusive experiences of participants in this research, as identified previously in Figure 4, can be connected to one of the seven themes of microaggression identified by Sue and Spanierman (2020).

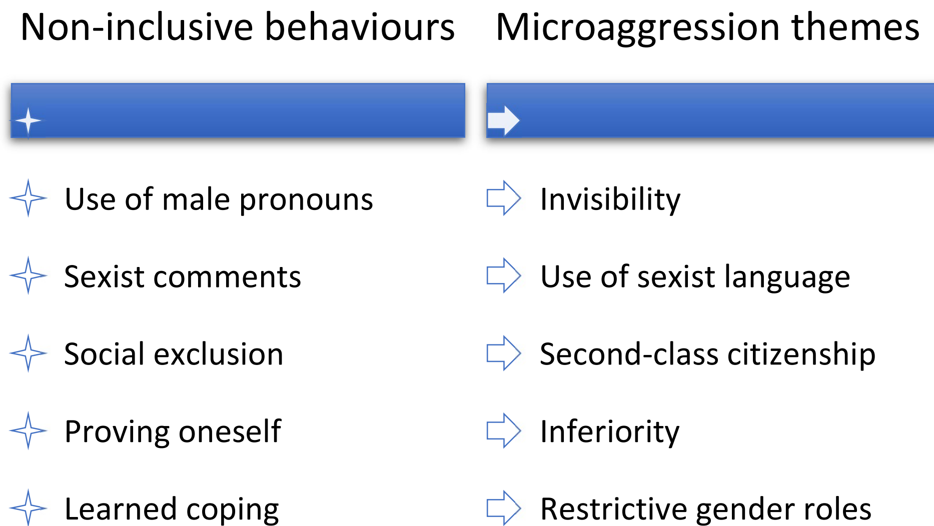

Figure 5: Connection of Participants' Non-Inclusive Experience with Microaggression Themes

While much of the literature does not make this same connection to microaggression, Barthelemy et al. (2016) specifically make a connection in their study exploring gendered experiences in STEM classrooms through a framework that includes both microaggression and hostile sexism. They demonstrated the negative experiences of their participants could be understood using these frameworks and made connections to all seven microaggression themes. While hostile sexism is easier to recognize, micro-aggressive behaviours are much more subtle and are considered harmless by many (Sue & Spanierman, 2020). Microaggressions "are pervasive, negatively impacting the mental health and everyday experiences of women" (Nadal et al., 2013, p. 217). O'Leary et al. (2020) refer to microaggression as "the manifestation of implicit bias" (p. 3).

This implicit gender bias articulated via microaggression (O'Leary et al., 2020) can be considered the language through which the current discourse is enacted. The remainder of this section discusses further how microaggression is connected to the non-inclusive experiences of

the participants, including sexist comments and the use of male pronouns by faculty, social exclusion, feeling the need to prove oneself in response to a stereotype threat, and learned coping.

Sexist Comments and the Use of Male Pronouns by Faculty

While many types of microaggression can seem relatively harmless to the perpetrator, such as a single comment made at the front of the class by an instructor, or addressing everyone in the class as 'guys', they can be related as forms of microaggression and over time they harm the recipients (Sue & Spanierman, 2020). Haley expresses this in her reaction to the sexist comment made by her instructor: "where it made me like think back to this is why the trades are thought of this way." This statement highlights that the comment is one of many that can create an unwelcome environment for women in apprenticeship over time. Some of the most exclusive behaviours that participants experienced in the class were comments made by instructors that both Haley and Elysha perceived as sexist and that connect to Sue and Spanierman's (2020) theme of the use of sexist language. The use of male pronouns to describe everyone in the room, whether male or female, is also considered a microaggression that Sue and Spanierman point out sends the following message: "Male experience is universal. Female experience is meaningless" (p. 46).

In their 2015 study about microaggressions in college classrooms, Suarez-Orozco et al. determined that microaggressions towards marginalized groups were pervasive, described as occurring in 30% of the classrooms they had studied. Further, they determined that the faculty were the most frequent perpetrators of microaggressions in their classrooms. Microaggressions are often unintentional and thought to be harmless or sometimes even positive by perpetrators who are unaware of the impact they are having, but this doesn't make them any less harmful to the recipients (Nadal et al., 2013). Again, Haley makes this clear when she describes how the

sexist comment made by her instructor made her feel, stating, "And you take it a little bit personally even if it's not directed to you. Uh I've learned over the years to kinda just try to brush it off but it's always there you know." For Haley, this single incident is added to many more that can happen daily to a woman in a male-dominated apprenticeship. According to Nadal et al. (2013), dominant groups, in this case men in male-dominated apprenticeship classrooms, can fail to acknowledge the number of microaggressions a female apprentice might experience on an everyday basis and thereby minimize the level of harm they are doing.

While the specific acts of microaggression reported in this research are not consistently reported in other studies regarding women in male-dominated apprenticeship classrooms, the experiences that other studies do report can be related back to microaggression themes. For example, Jones et al. (2017) report microaggressions by faculty as sexual objectification in the form of jokes made about females during teaching activities as well as the use of sexist language in the class. Bridges et al. (2022) describe complicit behaviour from faculty in their study where instructors failed to intervene when male students ostracised women in the class, thus normalising restrictive gender roles. Second-class citizenship is also relayed by faculty in the Makarova et al. (2016) study through comments about being happy that women are present (as if they don't naturally belong there). An underlying problem of gender bias in the classroom is that it is enacted through microaggressions by faculty in positions of power, often unconsciously and unintentionally. It can be difficult for women to understand and manage what is happening to them in the classroom under these circumstances (Sue & Spanierman, 2020).

Social Exclusion

Sue and Spanierman (2020) describe treating women as if they are second-class citizens as a microaggression that can cause "a sense of not belonging" (p. 103). A participant in this research describes how social exclusion by her peers caused her to "go quiet" (Haley), and she

confirms how in her case exclusion or a lack of belonging directly impacted her engagement in the class. Haley describes the male students excluding the female students from social media interactions, and when she was asked whether she would have been included if she was male, she responded, "Oh, a hundred percent." Haley felt that she was excluded specifically because she is female. Jones et al. (2017), in reference to the apprenticeship workplace, also report male-only interaction on social media making women apprentices feel excluded. A female participant in the Myers et al. (2019) research about male-dominated STEM classrooms reported that none of the men in her class would talk to her because she is female, and one of the male students interviewed in the same study suggested that women are unfairly involved or ignored and normalized the behaviour as fitting with a gender order.

In their research investigating the social exclusion of women in male-dominated STEM fields, Cyr et al. (2021) found that men with implicit stereotypes about women reported less socialization with female colleagues. The findings were consistent with their hypothesis that "women's exclusion from social networks arises from their devaluation in fields dominated by men" (p. 5). Further, women who did not have social ties with their male colleagues reported lower engagement, support, and self-efficacy and perceived higher levels threat to their identity. Cyr et al. (2021) also report that social inclusion was linked to women's outcomes more than to those of the men in their study. In research by Walton et al. (2012), the authors report that a lack of social connectedness or a feeling that one's group does not belong (in this case women) can also undermine motivation.

Proving Oneself in Response to a Stereotype Threat

As reported in chapter two, the literature contains many examples of women in male-dominated classrooms feeling the need to prove themselves in their programmes (Cech et al., 2011; MacIsaac & Domene, 2014; Makarova et al., 2016). This need to prove oneself is

described by O'Leary et al. (2020) as a response to a stereotype threat. Steele (1997) defines a stereotype threat as a situation in which a person feels threatened with being "negatively stereotyped, with being judged or treated stereotypically, or with the prospect of conforming to the stereotype" (p. 614). A stereotype threat is also related to feelings of belonging (Smith et al., 2012; Spencer et al., 2016), and subsequently impacts inclusivity in the classroom.

Experiencing either benevolent sexism or being excluded from group work by classmates meant that the participants could feel extra pressure to succeed and their level of self-confidence could be impacted (Spencer et al., 2016). Elysha points this out in her reference to her experience of benevolent sexism, saying, "It makes me question my abilities, and that, you know messes with my confidence level." For Haley and Lisa, exclusion from group work by classmates occurred at the beginning of a programme and was less frequent once the male students had ascertained that the female students were capable of doing the work. The fact that this exclusion happened less as the men got to know the women in the class better sent a clear message to both participants, as Lisa clarified: "then that alienation went away because, […] I sort of proved myself, so that I was slightly more accepted." The alienation Lisa describes negatively impacts social connections, increasing feelings that one does not belong (Spencer et al, 2016). Similar to Haley and Lisa's experience, two female participants in the Bridges et al. (2022) study were also excluded from group work by their male classmates and responded by keeping to themselves and the authors describe the use of stereotypes as a method to deter women.

In addition to the direct experience with her classmates described above, Lisa had also felt that the need to prove herself was automatically implied in relation to her as a woman in a male-dominated classroom. She states, "I didn't feel that other people needed me to prove to them, I feel like I needed to prove to them, because I'm a girl." In situations where women are a

minority in a group setting, they are more likely to feel that they will be stereotyped (Cohen & Swim, 1995), thus increasing their level of stereotype threat in that situation (Beasley & Fischer, 2012). This is an example of how women have an expectation that they are going to be required to exert more effort when they see that they are in a minority in a male-dominated group (Smith et al, 2012).

A predicament arises from women feeling stereotype threat as it can also cause underperformance in the classroom, especially with tasks that push the limits of ability (Spencer et al., 2016), and then this underperformance perpetuates the stereotype itself. While stereotype threats are often experienced by women when they respond to their classmates, faculty can play an active role in mitigating such threats. Smith et al. (2012) report that women who are explicitly told they can be successful by putting in the same effort as male students experienced higher levels of belonging and were more motivated to succeed. Other strategies include assigning challenging work to convey potential (Steele, 1997), optimism about women's abilities being expressed by faculty (Steele, 1997), and the creation of an identity-safe, or inclusive, environment (Spencer et al., 2016).

Authors further complicate the notion of stereotype threat by demonstrating that the need to prove oneself is often a response to microaggression and therefore potential evidence that a microaggression has occurred. Citing gender microaggression themes provided by Sue and Capodilupo (2012), Barthelemy et al. (2016) explain that having to prove one's worth in the field is a result of being assumed to be a second-class citizen or a lesser person in that field, and benevolent sexism is considered by Nadal et al. (2013) to be a microinsult, which implies that women are inferior and incapable. Sue and Spanierman (2020) also connect microaggressions

and stereotype threats by describing a stereotype threat as a psychological effect of microaggressive stressors that affects a person's cognitive ability to perform.

Learned Coping

In the context of this research, learned coping has been considered to involve adopting attributes and behaviours which help a participant navigate a male-dominated environment that may not always feel inclusive. The participants describe coping mechanisms they had developed to be successful in their male-dominated apprenticeships. Specifically, Haley refers to having a thick skin, Elysha discusses how she would block certain comments or conversations in her mind and Jacqueline openly discusses how she learned to manage herself and modify her behaviour to influence her classmates' perceptions of women in apprenticeship. These coping mechanisms are also demonstrated in the literature and explained in this thesis as a response to microaggression.

Jones et al. (2017) cite a comment by one participant as representing an overall sentiment in their research; the participant states, "I think if you don't have that thick skin it makes it a lot harder to cope" (p. 19). This is like a statement made by Haley, "You kind of realize going into a male-dominated field that you do have to have a tougher skin" and is similar to the responses of participants from multiple studies that include women in male-dominated classrooms (Bridges et al., 2022; MacIsaac & Domene, 2014; Makarova et al., 2016; Rhoton, 2011). Another example from the work of Makarova et al. (2016) highlights a participant shutting out or blocking her male classmates. Similar to Elysha in this study, the Makarova et al. participant says, "You simply sometimes close your ears and work by yourself; just because I am now in the workshop and the only one [woman] in the class, too" (p.13). Responding in such a way so as to protect oneself is apparent in this research as well as in other research involving women in male-dominated classrooms.

Gender-related microaggression from peers in a male-dominated apprenticeship classroom can be thought of as everyday sexism that takes a more subtle form as opposed to the types of overt sexism and discrimination which are no longer considered acceptable (Sue and Spanierman, 2020). Perpetrators may be well-meaning individuals with egalitarian beliefs who inadvertently degrade women via seemingly innocuous actions and comments (McTernan, 2018; Sue & Spanierman, 2020). However, Midgette and Mulvey (2021) report that participants in their study who engaged in gender-related microaggression also scored higher on a hostile sexism scale. Sue and Spanierman (2020) also note that it is often easier for targets of gender-related microaggression to deal with hostile overt sexism than the subtleties of microaggression, which can often require a check of one's sanity. Women can be the target of microaggressions their entire life, with heightened experience of this in male-dominated environments; they become exhausted by them over time and they are harmful unless they are mitigated in some way (Sue & Spanierman, 2020). The thick or tougher skin reported by participants in this research as well as in the literature is explained by Nadal et al. (2013) as a cognitive response of resilience to microaggressive behaviour. Further, the authors describe additional behavioural responses to microaggression as avoidance, avoiding conflict by "zoning out" and "walking away" (p. 209), which are similar to Elysha's response as well as that of the participant from the Makarova et al. (2016) study mentioned above.

The discussion with Jacqueline highlights how she learned to manage herself in a male-dominated classroom over time. She states, "I definitely know how to handle myself around them better now than I would have prior. It's the coping mechanisms and the boundaries, um and it is hard to be yourself." Like all the participants in this research, Jacqueline describes her experience as positive and inclusive; however, her statement implies that she has learned how to

handle herself to have that positive experience. Elysha also mentions the requirement to adapt oneself to the environment to be successful when she says, "It's a certain genre, you have to be ok with it". These statements are examples of how the language Jacqueline and Elysha use to describe what they consider a predominantly inclusive space actually portray a less than inclusive discourse.

In their work on microaggression, Capodilupo et al. (2010) discuss another emerging theme regarding gender-related microaggression that they call "leaving gender at the door" (p.205), which alludes to microaggressions that convey to women that they should keep their feminine selves out of the given context. Having more successful women in male-dominated environments cannot be achieved by women continuing to assimilate in the way Jacqueline and Elysha have, nor will this create a culture that is authentically inclusive (Smith et al., 2012). In the next section it is argued that the experiences participants had before becoming an apprenticeship student contributed to their ability to cope and be successful in a male-dominated classroom. This provides important context to the meaning participants attributed to their experiences in the classroom regarding inclusivity and is not discussed in the current literature regarding women in male-dominated apprenticeship classrooms.

5.1.3 Impact of Upbringing and Culture on the Experience of Inclusivity

Each of the participants interviewed in this research spoke of growing up in male-dominated spaces, most of them having a deep connection in that regard, reporting embodying a male gender performance which contributed to their confidence. One participant did not describe the same level of connection to male-dominated environments in the past and subsequently reported a lower level of confidence regarding working with her male classmates in the hands-on shop environment during her programme. According to Jones et al., (2017) "The characteristics of women who become […] tradeswomen include the survival skills often needed to navigate

unwelcoming workplace and [training] environments" (p. 15). Jones et al. also report that all their participants came from families with other family members who work in trades, which suggests that their participants understood how to fit in or manage in the male-dominated classroom. Other authors report similarly that women who are successful in male-dominated classrooms have backgrounds that have helped them to build the necessary confidence (MacIsaac & Domene, 2014). This raises the question of whether female participants who report experiences they have in their environment as inclusive attribute this meaning to them because they understand how to act in the environment. In other words, they are so accustomed to the discourse and the language used to enact that discourse that they feel comfortable inside it.

Craig and Lacroix (2011) explain tomboydom as allowing women to embrace masculinity and learn to balance gendered behaviour. They are often seen as 'one of the guys', and while this is considered a compliment in many cases, it also serves to perpetuate a patriarchal binary structure and the resulting gender norms (Craig & Lacroix, 2011). The participants' experiences with male-dominated environments and coping with microaggression throughout their lives has contributed to their level of confidence and belonging in an environment which has not always been demonstrated as inclusive. Exposure to a male-dominated environment or tomboydom and the feminine identity of participants have also been related to the ability to perceive microaggression by Capodilupo et al. (2010). Citing a model of feminist identity development created by Downing and Roush (1985) that explains development in stages ranging from passive acceptance to active commitment, Capodilupo et al. (2010) explain that participants with a greater feminist identity were more likely to recognize and understand the impact of microaggressions. This suggests that participants embodying male gender or 'fitting in' might be less likely to recognize the subtle sexism that is contributing to a

culture which would be experienced as less inclusive by someone who did not have a similar background.

An argument presented in chapter two, that the environment may not be inclusive but rather that women who are able to succeed are those who have learned to cope or thrive in a somewhat non-inclusive environment, seems to be demonstrated by this research. By learning to cope with microaggressive behaviours throughout their lives, the participants in this research may have entered a non-inclusive environment with an advantage that allows them to have a level of confidence that facilitates their success in that environment. In research by Nadal et al. (2013), overcoming microaggression was reported as an attribute facilitating stronger emotional resilience and the desire to work harder. Upbringing is one factor that plays a role in how women in male-dominated classrooms experience and understand microaggression or subtle sexism (Nadal et al., 2013) and thus how they experience inclusivity.

In summary, it must be considered, given the low numbers of women in these classrooms, that they are not as inclusive as they could be, and the importance of applying the learning from this and other research to inform inclusivity in these classrooms must be stressed. In addition, women in these environments who come from a background that includes male-dominated spaces and a similar discourse are less likely to be able to recognize microaggressions for what they are, rendering these women less able to understand what is happening to them (Capodilupo et al., 2010). Caroline Criado Perez (2019) discusses how women may not note the impact that language is having on them, "which goes to show that you don't have to realize you are being discriminated against to in fact be discriminated against" (p.111).

Researchers have expressed the need for a shift in the underlying culture, or a change in the discourse, to make meaningful change. As Smith (2013) suggests, "in order to trouble

gender, one needs to remove gender norms from their usual and proper place" (p.863). Feminist Nancy Fraser (1995) distinguishes between affirmative action and transformative action, describing affirmative actions as those which are aimed at correcting inequities without correcting the underlying social framework, and transformative actions as those which restructure the underlying culture. For women in male-dominated apprenticeships, affirmative action would be represented by recruitment efforts to get more women enrolled in these types of programmes, but until, as Fraser would put it, we transform the culture to support an inclusive community of practice where all can fully participate, we are not remedying the problem of subtle sexism and the difficulties in navigating a male-dominant culture. Further, transformational action "would change *everyone's* sense of belonging, affiliation, and self" (Fraser, 1995, p.83, emphasis original).

The tenets of post-structural feminism can provide the means for transformation because they question the fixed order. Seeing language in the form of microaggression as the lens that a discourse can be seen through means that change can be made through questioning or deconstructing troublesome normative behaviours. Deconstruction calls for criticism of the way things are and the disruption of the current discourse to redefine our worlds. In the next section, a model is presented which is adapted from a post-structural feminist pedagogy and is suited to the needs of male-dominated apprenticeship classrooms because it encourages the continuation of practices that support inclusivity as well as transform non-inclusive behaviours.

5.2 Informing Faculty – A Model for Inclusivity in Apprenticeship Classrooms

This section addresses the second research question: How can the accounts of women in male-dominated apprenticeship programmes inform inclusive practices of faculty teaching in these programmes? It discusses the transformation of the culture required to shift language and

behaviour and deconstruct the implicit bias that is enacted in the current discourse in male-dominated apprenticeship classrooms. Sue and Spanierman (2020) highlight that for the culture to shift, there needs to be a critical mass of 20-25% in the marginalized group to begin making a difference; however, this may be hard to achieve if the current culture in apprenticeship remains androcentric.

Educators have an opportunity to influence a discourse which is more welcoming and inclusive for all students by understanding how we can transform ourselves and our classrooms. To be leaders of change, faculty must be able to align their values to new beliefs and be able to make decisions with moral courage (Crawford, 2014). Many of the non-inclusive behaviours discussed in the literature as well as in this research can be attributed to pervasive microaggression in the community which is ingrained in the discourse and enacted through language and behaviours that exclude women. This section presents a framework for a post-structural feminist pedagogy which is then adapted for male-dominated apprenticeship classrooms to increase inclusivity in these spaces.

5.2.1 Post-Structural Feminist Pedagogy

The goals of feminist pedagogy are defined by Manicom (1992) as teaching that aims to make social change, that is, changing the world to transform oppressive gender relations as opposed to having "an aim to have (some) women 'make it' in the world of (some) men" (p. 366). If our goal as educators is to transform the current discourse in our classrooms to make them more inclusive spaces rather than having some women with the right background or social context and the right coping mechanisms 'make it', a feminist pedagogy can inform the steps to take in the classroom to enact that transformation (Shrewsbury, 1987).

When considering the suitability of feminist pedagogy for apprenticeship programmes, however, two distinct premises initially render it an unfit model for these types of classrooms.

First, feminist pedagogy has been characterized as a way of teaching that is used by feminist faculty members who have a specific agenda to utilize particular teaching practices to raise awareness of "patriarchal traditions and systemic discrimination that disadvantage women […] encouraging individuals to devise mechanisms for social change" (Crawford & Jackson-Best, 2017, p. 710). At the institution where this research was conducted, male-dominated apprenticeship classrooms are not typically taught by feminists but by mostly male faculty who worked in the trades occupations they now teach and may carry "stereotypical ideas […] of particular roles or groups" (Crawford, 2014, p.35). While many of them support more women going into these apprenticeship programmes, they may be less likely to consider themselves feminists or to see social justice as the underlying aim for the delivery of their courses. Second, a distinctive component of many feminist pedagogies is the engagement of students in a reciprocal relationship with instructors regarding the development of an appropriate curriculum for knowledge exchange (Crawford & Jackson-Best, 2017). However, apprenticeship programmes delivered by the institution have a prescribed technical curriculum that students are assessed on. This curriculum is developed under the advisement of industry partners who are specified in the apprenticeship system as stakeholders who inform education and certification standards, as well as a board of skilled trades who provides input on knowledge and competencies to be included in apprenticeship programmes. Current curriculum does not support any type of reciprocity but maintains a more traditional model where the instructor must drive a specific learning agenda to ensure required competencies are met.

In their book *Feminist Pedagogy in Higher Education: Critical Theory and Practice,* Nicholas et al. (2015) also confirm the absence of engagement with feminist pedagogy in the STEM (technical) fields. In considering the argument by Crawford and Jackson-Best (2017) that

"there is no singular feminist pedagogy as there is no singular feminist theory" (p. 711) there is an opportunity to build upon the essential tenets of a post-structural feminist pedagogy and apply them to inform inclusivity in male-dominated apprenticeship classrooms at the institution, thus addressing the gap in technical teaching spaces highlighted by Nicholas et al. (2015). The remainder of this section demonstrates how post-structural feminist pedagogy can be adapted to a model for inclusivity in apprenticeship classrooms that is suited to the perspectives of faculty (who are not feminist) and a prescribed curriculum (which cannot be adjusted to promote social justice) to support a transformation of the culture for an inclusive learning environment. This model is developed to bridge the gap between traditional post-structural feminist pedagogues and realities of technical training in apprenticeship programmes.

According to Tisdell (1998), there are many strands of feminist pedagogy which are informed by various theoretical underpinnings, and she argues that all of them build on four recurrent themes from the work of Maher and Tetreault (1994). Specifically, mastery, or how knowledge is constructed; voice, the ability of students to represent themselves; authority, concerning power relations in the classroom; and positionality, essentially referring to the social construct and recognition of difference (Maher & Tetreault, 1994; Pierce, 2011; Tisdell, 1998). Tisdell differentiates post-structural feminist pedagogy as one that focuses on the positionality of both the instructor and the students and how this positionality affects the remaining three themes: mastery, voice, and authority. These themes are depicted in Figure 6. Each of the themes are briefly described next before being adapted to the apprenticeship context in the following section, 5.2.2.

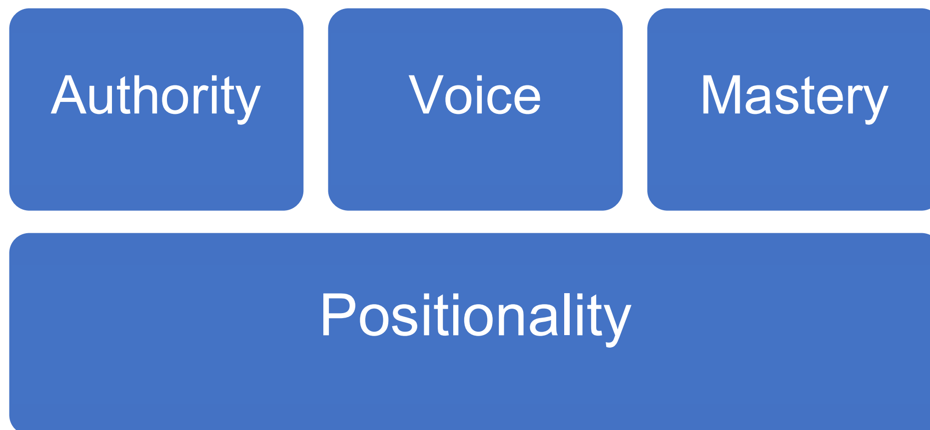

Figure 6: Themes Depicting Tisdell's (1998) Post-structural Feminist Pedagogy

Positionality

Positionality refers to the social context that influences teaching and learning in the classroom. Educators bring their worldviews into the classroom (Nicholas et al., 2015) and post-structural feminist pedagogies are concerned with developing appropriate sensitivities to the location of individuals within structured power relations (Pierce, 2011).

Authority

Authority is concerned with power relations in the classroom (Maher & Tetreault, 1994; Pierce, 2011; Tisdell, 1998). By understanding their own positionality, faculty can challenge issues concerning authority in the classroom (Tisdell, 1998) and employ teaching techniques to increase the power of all students as opposed to limiting the power of some individuals (Shrewsbury, 1987).

Voice

In post-structural feminist pedagogy, voice is concerned with agency and the ability of students to speak with their own voices (Pierce, 2011), which results from being empowered or shared authority in the classroom (Wang et al., 2011). When considering voice, attention must also be given to the meaning of silence (Tisdell, 1998) and not being heard (Manicom, 1992).

Mastery

The construction of knowledge – ways of knowing and acting in the world – in a post-structural feminist classroom validates women's experiences and ways of knowing (Manicom, 1992). This happens when positionality is considered, and authority is subsequently distributed, so that all students have a voice in knowledge construction (Shrewsbury, 1987).

The goal of any feminist pedagogy is to transform oppressive classrooms and associated power relationships as well as challenge current ways of knowing to increase social justice (Manicom, 1992). Post-structural theories are concerned with constantly shifting identities contributing to new truths and how these changes affect positionality (Tisdell, 1998). As social justice is increased, there can be a shift in the positionality of faculty and students, thereby influencing the themes of authority, voice, and mastery at a new level.

5.2.2 A Model for Inclusivity in Apprenticeship Classrooms

Figure 7 depicts a model for inclusivity in apprenticeship classrooms that is adapted from the post-structural feminist pedagogy model described above. The elements of equity mindset, teaching practices, student empowerment, and participation are discussed here as components of a pedagogy that aims for inclusivity and that is suited to apprenticeship programmes.

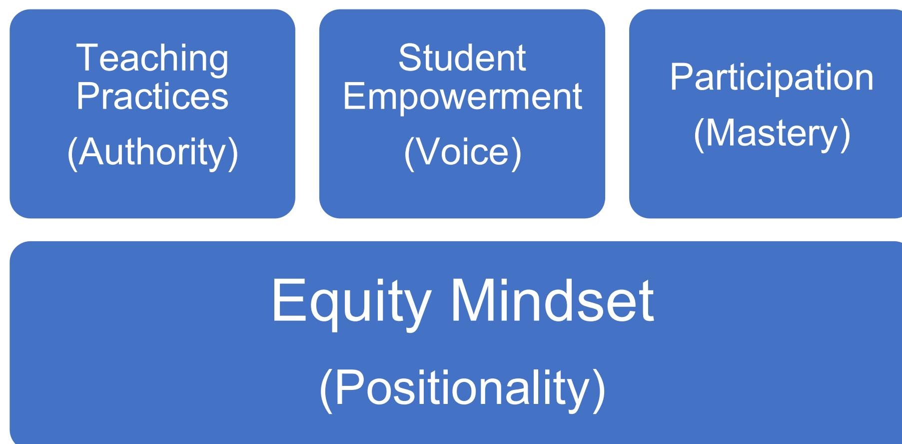

Figure 7: Adapted Model for Inclusive Apprenticeship Classrooms

Equity Mindset

"Instructors have significant power in college settings to reproduce or interrupt social bias" (Blair et al., 2017, p.32), and Tisdell (1998) highlights positionality in post-structural feminist pedagogy, especially that of faculty, as ultimately influencing the other themes. Equity mindset in this model parallels positionality in the post-structural feminist pedagogy model discussed in the previous section and represents a level of awareness of the faculty and students of equity. In this study, the equity mindset of the instructors in the male-dominated apprenticeship classroom played a key role in determining the level of inclusivity. For example, the recognition that Elysha's instructor had for her social context in comparison to his own and that of her classmates in their one-to-one conversation had a significant positive impact on Elysha. Many participants also highlighted the expectations that were set at the beginning of their programmes that specifically addressed equity in the classroom. On the other hand, faculty who enacted microaggressions themselves and did not choose to actively mitigate other microaggressions in the classroom contributed to participants' experience of a non-inclusive environment.

Barthelemy et al. (2016) call for faculty training to educate them about microaggression and raise their awareness of it and of how women are inadvertently treated in male-dominated classrooms. Implicit gender bias can be more directly challenged with open conversations among faculty about gender equity and its impact on women in the classroom (Lester et al., 2016), and diversity training improves implicit assumptions men make about women in STEM (Jackson et al., 2014). The social context of learners who may be marginalized in the classroom needs to be considered and faculty need to reflect on how their own social history might have an influence (Dewsbury, 2017). Dewsbury (2020) argues that self-awareness and how an instructor situates

themselves socially are the most important competencies if an inclusive classroom is to be achieved.

Teaching Practices

Teaching practices that address issues of power in the classroom need to be employed, which would fit with the theme of authority in the post-structural feminist model previously discussed. Faculty can leverage their authority or influence to positively impact inclusivity by interrupting traditional hierarchical or patriarchal (Wang et al., 2011) structures, focusing on empowerment and capacity building rather than domination (Shrewsbury, 1987). Acknowledging implicit gender bias in the classroom can diffuse tacit support of microaggression, and faculty can build an inclusive community where biases can be confronted in a safe environment (Mallinger et al., 2015).

In this research, an example of participants experiencing microaggression was when male students did not choose them to be part of their work groups, particularly at the beginning of a course before the women had a chance to prove their skills to the men. A straightforward solution to this issue could be to have instructors choose the groups at the beginning of the programme. However, this would not address the underlying culture nor provide an opportunity to transform it. Actively addressing this microaggression would entail having a conversation with the class about what the instructor is seeing, pointing out the potential harm of it, and shifting the perspective by engaging all students in a conversation about the skills and diversity that they each bring to the class. The non-inclusive experiences of the participants in this research and in other research can be minimized by addressing the microaggressive discourse, and women are "more satisfied with teachers who actively address, rather than ignore, micro aggressive acts in the classroom" (Lester et al., 2016, p. 69).

By actively addressing microaggression in the classroom as an element of their teaching practice, instructors become the allies of the female students in their classes (Brown & Ostrove, 2013). Brown and Ostrove describe an “ally” as “an individual [in the dominant group] not only committed to expressing as little prejudice as possible, but also invested in addressing social inequity” (p. 2211). Addressing microaggression can be accomplished by building a culture of respect and accountability, and Sue and Spanierman (2020) summarize models that address microaggression in the class as incorporating the following steps:

1. Asking questions
2. Paraphrasing to clarify the speakers’ intentions
3. Pointing out the potential harm
4. Attempting to broaden or shift perspectives (adapted from Sue and Spanierman, 2020, p.213)

Highlighting microaggression by addressing it in these ways creates awareness, which provides a way of preventing it from occurring and changes environments at the individual student level as well as at the classroom level (Nadal et al., 2013).

Student Empowerment

Student empowerment is directly related to voice which represents agency, as well as the ability to be heard and respected. When traditional authority and power structures in the classroom are altered, power is given to all students, resulting in empowerment of female students and their voices being heard (Wang et al., 2011). Voice in post-structural feminist pedagogy is also concerned with silences, which concerns both when female students do not feel safe enough to speak up and when what they do say is dismissed, thus privileging certain (male)

voices (Manicom, 1992). In this research, Jacqueline talks about her reluctance to raise her hand and speak because she was concerned that she would perpetuate negative stereotypes about women, but her silence went unnoticed. And Haley discussed how her instructors would actively engage the female students in the class, stating that "they never seem to talk down to us, especially us girls cause they would encourage us to speak a little bit more".

As discussed earlier in this chapter, practising teaching immediacy and building positive relationships in the class can create inclusive learning environments that encourage students' voices (Dewsbury 2020; Faulkner et al., 2021). Dewsbury (2020) suggests paying attention to the ways in which student identities are validated in the classroom, thus allowing students to "feel safe to be themselves, safe to express their opinions, and safe to learn" (Faulkner et al., 2021, p. 107). This can often be accomplished through dialogue which suggests that students are more central to the learning process and aims to understand individual experiences and backgrounds (Dewsbury & Brame, 2019; Faulkner et al., 2021).

In addition, faculty can empower their female students by taking action to mitigate stereotype threat in their classroom. Rattan et al. (2018) found that when students had the perception that their instructor believed they could succeed in the class, they were more likely to feel they belonged. An example of this is when Lisa's instructors continued to let her know how well she was doing throughout her programme. As also discussed earlier in this chapter, instructors can address stereotype threat by letting female students know they can be successful (Smith et al., 2012), assigning challenging work (Steele, 1997), expressing optimism (Steele, 1997), and creating an identity-safe, or inclusive, environment (Spencer et al., 2016).

Participation

Participation in this model means the full participation of all students and their full contribution to the classroom. Participation is aligned with the concept of mastery in the post-

structural feminist pedagogy model. When the instructor brings an equity mindset and actively becomes an ally to female students by addressing microaggression, as well as incorporates immediacy behaviours to encourage voice and empowerment, all students can participate in the learning. The participation of all students provides connections required to build community in the classroom (Faulkner et al, 2021). This community in a post-structural feminist classroom can be considered as enacted through "the autonomy and individuality of members who share a sense of relationship and connectedness with each other" (Shrewsbury, 1987, p. 171), where celebrating difference as alternative points of view is encouraged (Wang et al., 2011). All participants in this research stressed how important the sense of community they felt with their classmates was when it came to their experience of inclusivity in the classroom.

The elements of this inclusivity model discussed thus far, equity mindset, teaching practices, and student empowerment, contribute to overall participation and a sense of belonging for students in apprenticeship classrooms. Good et al. (2012) conceptualize belonging as involving "one's personal belief that one is an accepted member of an academic community whose presence and contributions are valued" (p. 701), and Wilson et al. (2015) describe it as a "malleable construct" (p. 768) that can be affected through engagement in the classroom. Thus, faculty have an opportunity to further influence belonging by fostering a sense of community.

Shrewsbury (1987) describes building a model in the classroom that encourages students to work together on shared goals as well as assist each other with individual goals. Crawford and Jackson-Best (2017) develop the concept by describing a participatory classroom as promoting individual student knowledge that contributes to learning through collective problem solving. In an apprenticeship classroom, teaching that includes the varied life experience of students and what they have learned by working in industry contributes to the construction of knowledge for

all students in the class (Wang et al., 2011). An inclusive classroom would also acknowledge and incorporate the knowledge and skills of the female students. Women may not always complete a task in the same way as men and often need to find creative ways of performing tasks or solving problems. Faculty can support the celebration of alternative points of view (Wang et al., 2011) by purposefully incorporating women's ways of knowing.

The goal of this adapted model is to achieve a more inclusive apprenticeship classroom. By enacting the elements of the model, equity mindset, teaching practices, empowerment, and student participation, faculty can achieve a more inclusive apprenticeship classroom. Zumbrumm et al. (2014) found that students reported a greater sense of belonging resulting from instructor support as well as positive interpersonal relationships with classmates, and Dewsbury and Brame (2019) proclaim that support in the classroom contributes to belonging, which then promotes academic achievement.

This model is correlated with the way post-structural theories are concerned with shifting identity to new truths (Tisdell, 1998), and it seeks to shift identities in a similar fashion to achieve inclusivity. The "acquisition of new information, engagement in meaning-making, and the growth of self-knowledge" (Broido, 2000, p. 13) contribute to college students becoming allies. As the elements of the model just mentioned are enacted in apprenticeship classrooms, the students' awareness of microaggression may influence their own equity mindset. Through faculty implementation of this model in the classroom, male students can also be encouraged to become women's allies in their classrooms, and this means that the elements of the model are enacted at a new level. Inclusivity would thus become more prevalent in our classrooms, to the benefit of all students and faculty.

5.3 Conclusion

While the participants in this research all report an inclusive classroom in their apprenticeship programmes overall, there were specific exclusionary behaviours that took place. Many participants spoke about their ability to manage their environment through coping mechanisms and proving themselves, thus building their confidence. These experiences as well as many reported in the literature can be related to a response to microaggression (Sue & Spanierman, 2020). The upbringing and cultural experiences and perspectives of participants in male-dominated environments also contribute to a certain feminist identity which means they may be less likely to understand microaggression or its effects on their success over time (Capodilupo et al., 2010). The current literature regarding women in male-dominated apprenticeships does not make connections to microaggression, nor how the backgrounds of participants contribute to their experience of microaggression.

To provide a more inclusive culture for women in male-dominated apprenticeship classrooms, it is necessary to take transformative action as opposed to affirmative action (Fraser, 1995; Smith, 2013). The underlying culture needs to be addressed to build lasting change rather than have only a small percentage of women able to 'make it' (Manicom, 1992) by having a thick skin and proving themselves repeatedly through their apprenticeship programme.

Feminist faculty concerned about social justice incorporate feminist pedagogies in their classrooms that specifically address social justice concerns in classroom discussions as well as in the curriculum (Crawford & Jackson-Best, 2017). While feminism and social justice may not be at the forefront of the minds of apprenticeship faculty, a post-structural feminist pedagogy approach (Maher & Tetreault, 1994; Tisdell, 1998) can be adapted so that it is more suited to encouraging inclusivity in male-dominated apprenticeship classrooms. By attending to their class

with an equity mindset, building inclusive behaviours and allyship into their teaching practices, and empowering their students, faculty can increase participation and build a more inclusive classroom. This classroom has the potential to build awareness for all participants, further influencing inclusivity at a new level. The greatest potential is for these students to go on to influence their workplaces through their own equity mindset and inclusive practices, making apprenticeship spaces more welcoming for all women and not just those who have developed a skill set to cope in a non-inclusive space.

Chapter 6 – Conclusions

The purpose of this research is to illuminate the experiences of women in male-dominated apprenticeship programs at the institution to inform practices for faculty that support inclusivity in these classrooms, and posed the following research questions:

1. What meaning can be attributed to the lived experiences of women as they study in male-dominated apprenticeship programmes in a Canadian polytechnic institute?
2. How can the accounts of women in male-dominated apprenticeship programmes inform inclusive practices of faculty teaching in these programmes?

This study addresses a gap in apprenticeship research in addition to making significant and original correlations. Although there is past research about women in male-dominated apprenticeships and some classroom experiences are shared in those studies, there was no existing research that concerned the classroom specifically. While the results of this study indicated that female participants considered the male-dominated apprenticeship classrooms they studied in as inclusive environments overall, non-inclusive experiences also occurred in specific instances. This thesis connects non-inclusive behaviours in this and other apprenticeship research to types of microaggression. It also demonstrates that women with a background in male-dominated environments may not have the same perception of microaggression and not recognize microaggressive behaviours in the same way as a woman with a different feminine identity (Capodilupo et al., 2010), thus affecting their own understanding of inclusivity. Making these correlations uncovers the problem of a non-inclusive culture in a way that allows concrete solutions to be developed.

Utilizing the theoretical perspective of post-structural feminism, a better understanding is established of the underlying discourse - hegemonic masculine behaviour demonstrated because of social and economic inequalities - and how it is enacted through microaggression. To address this discourse in an apprenticeship classroom setting, a pedagogical model is adapted from the post-structural feminist pedagogy explained by Tisdell (1998) for inclusivity in apprenticeship classrooms. The model represents a pedagogy that can address non-inclusive behaviours such as microaggression in the classroom as well as further support inclusive teaching practices, thereby increasing the level of belonging for both male and female students. Additionally, it provides a tangible and practical way to answer the call for transformation made by other researchers of women in apprenticeship.

The remainder of this chapter discusses research limitations, recommendations for future study, and implications for practice before providing a personal reflection and concluding remarks.

6.1 Research Limitations

A major limitation to the research was onset of the COVID-19 pandemic with significant impact to both data collection methods which were modified so the research could continue, and the population size, both discussed in chapter three. With the modified data collection methods, participants were interviewed about experiences in a program they had completed up to 10 months before the interview occurred and it was no longer possible to keep journals as their programs had already concluded. While sufficient data was collected to answer the research questions, from the perspective of feminist research praxis, a journal is an effective means to provide both voice to participants and the reduction of power imbalance between the participant

and the researcher (Meth, 2003) and so the change in data collection methods to exclude the journal due to the pandemic can be seen as a limitation.

The pandemic also decreased the population of possible participants for the research. The population size was adversely affected by program intakes that were cancelled in the spring of 2020. An additional limitation regarding population size also needs to be recognized. The male-dominated apprenticeship programmes within the professional influence of the researcher could not be included in the study due to ethical considerations. It is unknown whether an increase in population size and a subsequent increase in the number of participants would have resulted in the inclusion of female students who did not experience a male-dominated environment as part of their background and upbringing, thus providing an alternate perspective on the findings of this research.

The backgrounds of the participants and their level of experience with tomboydom and male-dominated environments before coming to their apprenticeship programs may also affect their ability to identify microaggression or other non-inclusive behaviours. Looking to the feminine identity scale from Downing and Roush (1985), which ranges feminine identity from passive acceptance to active commitment, an understanding of where participants see themselves on the scale may provide more insight as to what experiences are reported as non-inclusive, versus experiences being reported as inclusive because the environment is comfortable and normal for participants with a male-dominated background.

6.2 Recommendations for Future Study

Building from the limitations of this research, a future study might include doing the research while participants are actively enrolled in their programs and incorporate additional sources of data such as journals or observations. Kenten (2010) explains that journals can

provide data that is more difficult to access by interviewing alone, and journals afford the opportunity to discuss participant experiences in greater depth when followed up with an interview. According to Benner et al. (2009) observations provide context that includes “unstated realities of the […] setting” (p. 450) and allow the researcher to gain a fuller understanding of the experiences of participants. Either additional data from participants in the form of journals or additional context provided by observations (or both) would provide richer data and provide more insight into the lived experiences of the participants.

Further research could also investigate the lived experience of female students who have left their apprenticeship programs. As discussed in this thesis, women who are successful in these environments seem to be the women who can learn and apply specific skills to cope in the environment, and many of these same women may not be able recognize non-inclusive behaviours they are experiencing. More understanding could be gained about inclusivity in male-dominated apprenticeship classrooms from women who have chosen to leave.

Insights could also be gained from additional research about the background experiences, or the external influences and upbringing, of women in male-dominated apprenticeship classrooms. The social context that a woman brings into the classroom and her perceptions about expectations of her as a woman in apprenticeship is discussed in this research as also influencing perceptions of inclusivity in the classroom.

An action research project conducted during the implementation of the model introduced in chapter 5 would provide empirical knowledge about the incorporation of the model and implications of its use, thus informing modifications for improvement. According to Stringer (2014), action research can take a localized and pragmatic approach to a problem in practice and provides a means for investigation into a desired goal to evaluate effectiveness. Further to this,

an inquiry employing critical participatory action research would be committed to "social analysis, the self-reflective collective study of practice, and transformational action to improve things" (Kemmis et al., 2014, p. 12). Such a study could include both faculty and students working together to reflect on and evaluate the implementation of the model for inclusivity in apprenticeship classrooms, supporting inclusion through a pragmatic approach to transforming the culture in the classroom.

6.3 Implications for Practice

Discussed here are the development of sharing materials, publications, and conference presentations as well as a blog that can be incorporated to disseminate this research.

Sharing Materials

A set of sharing materials will be developed to share the insights and ideas generated through this research. A presentation will be developed that affords in person sharing opportunities to groups both inside and outside the organisation. Groups inside the organisation include but are not limited to the Women in Trades and Technology (WiTT) board, the management team for the apprenticeship programs who directly supervise faculty in these programs, the office of Equity, Diversity, and Inclusion (EDI), and any faculty groups who may be interested in the information. A report that summarizes the research will also be developed that allows the information to be shared without in-person presentation. This report will be shared with the Canadian Apprenticeship Forum working groups supporting the *National Strategy for Supporting Women in the Trades* (2020), specifically regarding the call for educators to create more inclusive classrooms. The report will also be shared with other educators in Canada working with trades on the National Council of Deans of Apprenticeship Trades and Technology.

Publications

An academic paper will be generated to disseminate this research in a more formal way. Studies concerning women in male-dominated apprenticeship classrooms specifically could not be found and there is an opportunity to fill a current gap in the literature. Wellington et al. (2005) describe journal publications as writing for peers and this research can contribute to the current discourse about women in apprenticeship. Publications considered for submission will be the *Journal of Vocational Education & Training*, the *International Journal for Research in Vocational Education and Training*, *Education + Training*, and the *International Journal of Training Research.*

Conferences

Presentations at conferences can assist in disseminating the findings of this research. In Canada, both the *Canadian Apprenticeship Forum* (CAF) and the *Supporting Women in Trades* (SWiT) conferences provide an opportunity to share with audiences who are involved in apprenticeship in Canada and are in positions to assist in influencing change, whether as a tradesperson, employer, or educator. Higher education organisations in Canada, such as *Polytechnics Canada* and *Colleges and Institutes Canada* (CICan) also hold annual conferences that include presentations in support of teaching and learning. In the UK, the *British Educational Leadership, Management and Administration Society* (BELMAS) holds an annual conference and invites presentations that deal with educational leadership concerns. More specifically, this work could be shared with the Gender and Leadership Research Interest Group at BELMAS.

Blog

In addition to informing faculty and other institutional stakeholders, there is an opportunity to also inform women in trades about the insights generated by this research. A blog focusing on challenges women in trades face and their impacts on women's lives will be

developed that provides accessible information about topics such as stereotype threat, microaggression and gendered embodiment. This blog will assist women in understanding the challenges they face in these environments as well as how they can support themselves and each other.

6.4 Personal Reflection on Conducting Feminist Research

Whenever the word "feminism" was spoken I would push against it, assuring those around me that I was not one of those people. That the guys I worked with did not have to worry about me. That I was not a troublemaker. I had grown up the in 1980s, influenced by the after-effects of radical feminism and to identify as a feminist at that time had a lot of negative connotations. Of course, I had a very limited understanding of what feminism was, or the role that it played in my life whether or not I embraced it. In fact, I embodied what Judith Blackwell (1998) had described as an "intellectual crossdresser." Growing up with two older brothers I remember a day when our mother had forced them to take me with them to the swimming pool, and my oldest brother saying to me on the street, "You can come with us, but you'd better learn to act like a boy." I learned from a very young age how to act to be included and I continued this through my upbringing and my career.

When my daughter was pursuing her undergrad, she started the conversation with me about what feminism really was and I began to realize there was a lot I hadn't understood. Around the same time, a female colleague encouraged me to read Sheryl Sandberg's (2013) *Lean In*, not because this colleague was a feminist so much as she felt it would help me to understand how to be successful in my own career, how to take a seat at the table. Overall, I felt it was a lot about surviving a culture, but there was one statement from Sandberg that was very impactful for me. It reads,

> "Horrible, I know - the sad irony of rejecting feminism to get male attention and approval. In our defence, my friends and I truly, if naively, believed that the world did not need feminists anymore. We mistakenly thought there was nothing left to fight for" (p. 142).

I saw myself in those words and I cried a little when I read them.

I was understanding what had happened to me, and I knew many women in male-dominated fields were doing the same thing. Compromising our identities so that we would be accepted. This generated a big question about inclusion. Was the world becoming more inclusive for women, or were women adapting and compromising to be accepted? Getting along so they could get ahead while not causing any trouble or disrupting the norm. When it comes to male-dominated trades there is much in the way of recruitment efforts, so many messages telling women that they can do it. But the numbers are not changing. In 25 years, it seems the needle hasn't moved, and many women who do get into the trades are not being retained. Are these environments inclusive? Or is it that the 6% of women in male-dominated trades represent the ones who learned early how to "act like a boy" and not cause any trouble?

This research provided an opportunity to investigate these questions within my practice. To determine if the classrooms were inclusive, and if not, find ways to truly influence the culture for inclusivity, eliminating any requirement for female students to adjust to the male-dominant culture to be successful. The result has been this thesis, along with significant personal transformation. My home office now has a bookcase dedicated to feminism and I share my thoughts and experiences with other women whenever opportunity for the conversation permits. I am finding out by sharing these ideas that many women have had similar experiences and have difficulty articulating what is happening to them inside the normative discourse that oppresses

them. A month after sharing this research at a national apprenticeship conference I had opportunity to meet with a female carpenter who had attended my presentation. She shared that I had opened her eyes and she now thought more about her actions and motivations at work, reminding herself to be true to her own identity and not compromising it to be accepted by others. It really is a learned behaviour that many of us don't realize we embody. It's time to find ourselves, and to work towards changing cultures and not marginalizing people. It's time for all women to feel welcome in the trades and not just the ones who understand how to survive in a male-dominated environment. It's time for everyone to question what's "normal" and instead make decisions about the society we want to create.

6.5 Concluding Remarks

Educators in a system of apprenticeship that includes both the workplace and the classroom have significant opportunity to influence the male-dominated culture in apprenticeship. According to Megan Crawford (2014), educational leadership includes influencing others towards a new and evolving collective identity while also perpetuating successful past identities in the organisation. Staff development is considered as "going hand in hand" (p. 142) with students' development and is required to shift as well as build positive cultures.

The question introduced in chapter one from the Canadian Research Council reads: "What new ways of learning, particularly in higher education, will Canadians need to thrive in an evolving society and labour market?" (Government of Canada, 2017, n.p). In an evolving labour market that requires more women to participate, new learning in higher education needs to include understanding of the social contexts of others and celebrate the knowledge and perspective that every person brings to the classroom. Every apprentice comes through a

classroom in a learning institution before certification and rather than have a workplace culture make its way to the classroom, there is opportunity for inclusive practices in the classroom to permeate the workplace. Throughout the literature for women in male-dominated environments there is an incessant call for transformation of a culture that is unwelcoming to women, and for educators involved in apprenticeship this needs to be a primary goal. Conducting this research was a sincere attempt to respond to this call for transformation and make an original contribution to our understanding of inclusivity in male-dominated environments.

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Appendix A – Interview Guide

Setting the stage for the interview

Briefing;

1. My background
2. Review the reason for the interview
3. review informed consent and ability to remove oneself from the study,
4. pseudonyms
5. explain that the interview is being recorded

Any questions from the participant?

Start Questions

Just to review your situation,

- What trade are you in?
- Did you complete a period of training at [the institution] in the last 10 months?
- What period did you complete?
- And just to confirm, would you describe your experience in this training as being a female in a male dominated apprenticeship classroom?

Transition

For the next part of the interview, we will be discussing your experiences in the classroom.

Research question 1.

What meaning can be attributed to the lived experiences of women as they study in male-dominated apprenticeship programmes in a Canadian polytechnic institute?

Interview questions

1. How would you describe the overall experience of being a female student in a male dominated apprenticeship classroom at the institution?
2. What did your best day in the classroom look like?
3. Can you also think of times that were challenging?
4. How would you describe how tasks were completed, say in the labs?
5. Did you ever find yourself doing this a bit differently then you your classmates?
6. Did you experience any differences in the way that you completed lab task? Did you ever need to get create because you did not have the same physical strength as some of your classmates?
7. What was your comfort level participating in the class? (did this change over time? How?) (this could be a question about confidence and whether background led to that confidence level)
8. Did you have any experiences in the classroom that made you think that you were having the experience because you were female?
9. Did you feel free to share your ideas?

***Probing questions should speak to meaning. I.e their reactions to their experience or the impact it had. Would speak to what that experience meant to them. It is important to probe during the interview to ascertain the meaning that participants attribute to their experience.

- How did it feel?
- What does it mean to you when x happens?
- What decisions did you make as result of this?
- How did this determine your actions (or behaviour) going forward?
- How did you react?
- Why?

Research Question 2

How can the accounts of women in male-dominated apprenticeship programmes inform inclusive practices of faculty teaching in these programmes?

Interview questions

1. How would you describe your relationship with your instructors? (without or courses, any one stands out who was positive or negative? How?)
2. What types of attitudes expressed by the instructors do you think would have helped you succeed?
3. What types of attitudes expressed by fellow classmates do you think would have helped you succeed?
4. Was there any aspect of your training that you wished you could have done differently, or would have worked better for you?
5. What types of classroom management choices, or strategies employed by the instructors would you say worked well for you?
6. Is there anything you would have done differently in regard to (give possible example from previous questions) if you were the instructor ?
7. How do you think your past experience (refer to specifics from background statement) contributed to your success (or failure) in this program?

***Probing questions should speak to meaning. I.e their reactions to their experience or the impact it had would speak to what that experience meant to them. It is important to probe during the interview to ascertain the meaning that participants attribute to their experience.

- How did it feel?
- What does it mean to you when x happens?
- What decisions did you make as result of this?
- How did this determine your actions (or behaviour) going forward?
- How did you react?
- Why?

Transition to debrief

Those are all the questions that I have for you.
Is there anything at all that you would like to add?

Some of the themes that I noticed coming from our conversation were ____; what are your thoughts on this?
This is how I will be using your interview; the purpose of my research is …. And the questions I am answering here are …

Thank you very much for your time. Please let me know if there is anything you think of later that you would like to add. As per your consent, you are free to withdraw from this study until six months after this interview. After six months the data will be aggregated (combined with other interviews) so it will not be able to be removed from the final thesis. A reminder that your interviews are anonymous and nothing about the interview will be attributed to you nor your name used in any way in or outside of the thesis.

End of interview

Post-Interview

Take notes in regard to impressions, body language themes and items to remember

when analysing the data (only if they agree to be video recorded)

Appendix B – Ethics Documents

- Participant consent form
- Participant information sheet
- Certificate of completion - Tri-Council policy statement: Ethical conduct for research involving humans course on research ethics.
- Ethics approval

Participant consent form

Version number & date: Version 2, June 14th, 2020
Title of the research project: Informing pedagogical practices with regard to women learning in male dominated apprenticeship programs in a Canadian polytechnic institute
Name of researcher(s): Lisa Soderquist Weatherby

Please initial box

Statement	Initials
1. I confirm that I have read and have understood the information sheet dated June 14th, 2020 for the above study, or it has been read to me. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
2. I understand that taking part in the study involves submitting a background statement (audio or written) and taking part in a 60-90 minute semi structured interview which will be audio/video recorded.	
3. I understand and agree that my interview will be audio/video recorded and I am aware of and consent to your use of these recordings for accurate data transcription.	
4. I understand that my anonymised background statement and transcript of my interview will be retained for up to 10 years to be used in the doctoral dissertation and future research.	
5. I understand that taking part in the study has emotional distress as a result of discussing sensitive topics or social or economic disadvantages as a result of exposure as potential risks.	

6. I understand that my participation is voluntary and that I am free to stop taking part and can withdraw from the study at any time up to the point of anonymisation (six months after the end of the study) without giving any reason and without my rights being affected. In addition, I understand that I am free to decline to answer any particular question or questions.	
7. I understand that my responses will be kept strictly confidential. I give permission for members of the research team to have access to my fully anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the report or reports that result from the research.	
8. I understand that confidentiality and anonymity will be maintained and it will not be possible to identify me in any publications, unless I choose to use my real name in the research. I understand that I may choose to use my real name or a pseudonym.	
9. I would like my real name used and I understand and agree that what I have said or written as part of this study will be used in reports, publications and other research outputs so that anything I have contributed to this project can be recognised.	Initial either 9 or 10
10. I do not want my real name used and I agree to use this pseudonym in the research: ______________________________ (write chosen pseudonym here).	Initial either 9 or 10
11. I agree that my information can be quoted using my real name or pseudonym in research outputs such as the doctoral dissertation, research articles, or conferences.	

12. I agree that my real name or pseudonym can be used for quotes.	
13. I understand that I can ask for access to the information I provide and I can request the destruction of that information if I wish at any time prior to anonymisation (6 months after the study). I understand that following this six-month point, I will no longer be able to request access to or withdrawal of the information I provide.	
14. I understand that the information I provide will be held securely and in line with data protection requirements at the University of Liverpool until it is fully anonymised.	
15. I understand that signed consent forms, background statements, and interview audio/video recordings will be retained digitally (on a hard disk) on a password protected computer in the Principal Investigator's office until data is transcribed and anonymised fully, at a date six months after the end of data collection, at which point the personal data will be destroyed.	
16. I understand that personal information collected about me that can identify me, such as my name (unless I choose to use my real name) or where I live, will not be shared beyond the study team.	
17. The information you have submitted will be published as a dissertation; please indicate whether you would like to receive a copy.	
18. I agree to take part in the above study.	

____________________ __________ ____________________

Participant Signature, Date

Person taking consent Signature, Date

Principal Investigator

Lisa Soderquist Weatherby

lisa.soderquistweatherby@online.liverpool.ac.uk

Participant Information Sheet

1. **Title of Study**

Informing pedagogical practices with regard to women learning in male dominated apprenticeship programs in a Canadian polytechnic institute

2. **Version Number and Date**

This Version 2 of the Participation Information Sheet was prepared on June 14th, 2020.

3. **Invitation Paragraph**

You are being invited to participate in a research study. Before you decide whether to participate, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and feel free to ask us if you would like more information or if there is anything that you do not understand.

Please also feel free to discuss this with your friends and relatives if you wish, but please do not discuss your recruitment with your course instructors, as this is a confidential study. We would like to stress that you do not have to accept this invitation and should only agree to take part if you want to. You will not incur any disadvantages should you decide not to participate.

Thank you for reading this.

4. **What is the purpose of the study?**

The purpose of the research is to inform pedagogy (teaching and learning approaches) in male dominated apprenticeship programs for a more inclusive culture. Sharing your stories will help to determine what experiences are specific to women in these programs and inform future institutional policy and pedagogy. The purpose of this study is also to contribute to national and international knowledge concerning gender in male dominated apprenticeship programs, as this is a low-researched area.

5. **Why have I been chosen to take part?**

You are being invited because you are a female student in a male-dominated apprenticeship program at your institution. Less than 5% of the student body are female, making your gender, views, and experiences underrepresented in this area.

6. **Do I have to take part?**

Participation is voluntary. If you decide not to participate, you will not incur any disadvantages. If you decide to participate, you are free to withdraw from the study at any time up to the point of data anonymisation (six months after data collection has ended), without explanation, and without incurring a disadvantage.

7. What will happen if I take part?

This project is guided by the research question: *How does the experience of female students in male dominated apprenticeship programs, at a Canadian polytechnic institute, inform pedagogical practices to promote inclusivity?* To answer this question, the Principal Investigator and sole researcher, Lisa Soderquist Weatherby, is interested in your experience of your apprenticeship program. To find out your experiences, this study has two parts: a background statement and an interview.

Part 1: Background Statement

At the beginning of the study, you will be asked to provide a short statement on your background. This statement will provide some basic biographical information that will help your researcher interpret your experiences. In addition to your general background, you will be asked to answer the question: “How did you come to be participating in this apprenticeship program?” You may submit a typed statement/a paper written statement, or an audio-recorded statement. This statement may be as long or a short as you wish.

Part 2: Interview

Following the final submission of your journal, you will be asked to take part in an interview. The interview will follow a semi structured format and will last 60-90 minutes. The researcher will prepare questions based on the goals of the research, as well as your background data. The purpose of the interview is to speak to your general experience of the apprenticeship program, as well as to clarify data presented in your background statement. You may also decide not to answer any questions that you are not comfortable answering. The interview will take place in a secure online platform called ‘Zoom’ to ensure your privacy. All interviews will be audio and video recorded through the Zoom platform. If you would prefer audio recording only, then video recording will not take place. Should you not have access to this online technology, then a telephone interview may be arranged.

8. How will my data be used?

The University processes personal data as part of its research and teaching activities in accordance with the lawful basis of ‘public task’, and in accordance with the University’s purpose of “advancing education, learning and research for the public benefit”.

Under UK data protection legislation, the University acts as the Data Controller for personal data collected as part of the University’s research. The Principle Investigator acts as the Data Processor for this study, and any queries relating to the handling of your personal data can be sent to the principle investigator or their supervisor.

Further information on how your data will be used can be found in the table below.

How will my data be collected?	Your data will be collected confidentially, depending on the method of study. Background statements will be collected by e-mail. Interview data will be audio/video (or simply audio recorded if that is preferred) recorded on the researcher's computer and digitally transcribed.
How will my data be stored?	Data will be stored on a password protected computer in the researcher's home office. Digital background statements (typed or audio recorded), and interview recordings will be kept on a secure hard disk which is password protected on the researcher's computer.
How long will my data be stored for?	Personal data will be stored for up to one year after collection. Anonymized data will be stored for up to 10 years, to support the research dissertation and dissemination.
What measures are in place to protect the security and confidentiality of my data?	The researcher has completed ethics training (TCPS-2: CORE) to conduct this study. Your data will be kept to TCPS-2: CORE standards and will always be stored in a safe, secure location (physically or digitally) only accessible by you and/or the researcher.
Will my data be anonymized?	Your data will be confidential, meaning it will be anonymous to the public, but not to the researcher or her supervisors.

How will my data be used?	Your data will be used in the researcher's doctoral dissertation as well as potentially in following research articles and presentations. Your data may also be used to inform and support policymaking or teaching practices at your institution. At this point your data will be anonymized.
Who will have access to my data?	Only you, the researcher, and her supervisors will have access to your data.
Will my personal data be archived for use in other research projects in the future?	No
How will my data be destroyed?	Any digital data will be permanently deleted. Physical data will be shredded.

9. Expenses and / or payments

There are no expenses, payments, or reimbursements involved in this study.

10. Are there any risks in taking part?

There are some perceived risks and disadvantages involved in this study, outlined below. Should you experience any discomfort or disadvantage as part of the research, please notify the researcher, Lisa Soderquist Weatherby, immediately.

Emotional Risks

Due to the personal nature of the methods for this study (background statement and interview), topics may arise which address sensitivities of participants and could be upsetting in nature.

Social and Economic Risks

This study is strictly confidential, however there may be some risk to the participant being exposed or exposing themselves to their fellow classmates or their faculty, either during the process of data generation, or when the research is published. This may present a social and/or economic risk of being treated differently by classmates or faculty in class or in the professional field for which they are training.

11. Are there any benefits in taking part?

There are several personal, institutional, and cultural benefits to taking part in this study.

On a personal level, Participants have the opportunity to gain more awareness of themselves and their environment by being involved in this research.

On both institutional and cultural levels, your data will provide valuable information as to whether a male dominated culture and/or gender bias exist within apprenticeship programs at the institution and in what ways. Research findings for this project will inform pedagogical approaches to the apprenticeship programs at the institution.

This research will also inform the Canadian Research Council, who pose the question: “What new ways of learning, particularly in higher education, will Canadians need to thrive in an evolving society and labour market?” Findings will also be disseminated to the post-secondary community through possible conference presentations and journal publications and may impact change beyond your institution.

12. What will happen to the results of the study?

The results from this study will be shared in multiple ways. Participants will not be identifiable from the results unless they have consented to being so.

The results of this study will be published in Lisa Soderquist Weatherby’s doctoral dissertation submitted in partial fulfilment of her Educational Doctorate in Higher Education at the University of Liverpool. Results may also be published in future research articles or shared at academic or professional conferences, or to administrators and policymakers at your institution.

Lisa Soderquist Weatherby’s doctoral dissertation will be accessible at the University of Liverpool’s online thesis repository. If further published, research articles will be available in academic journals or in conference proceedings. If used to inform administration or policy, the results will be available in the institution’s public policy and proceedings documents.

13. What will happen if I want to stop taking part?

If you decide to participate, you can withdraw your participation in the study at any time up to the point of data anonymisation (six months after data collection has ended), without explanation.

If you withdraw, results up to the period of withdrawal may be used with your consent. Otherwise you may request that the results are destroyed, at which point all data collected will be appropriately deleted from all electronic devices (e.g. digital background statements, interview audio/video recordings), or destroyed if hard copy (e.g. researcher notes).

To withdraw from the study, please contact the principal investigator, Lisa Soderquist Weatherby, by e-mail (lisa.soderquistweatherby@online.liverpool.ac.uk) or personal phone (**403-512-0102**).

14. What if I am unhappy or if there is a problem?

If you are unhappy, or if there is a problem, please feel free to let us know by contacting principal investigator Lisa Soderquist Weatherby, or her supervisors Ruolan Wang or Julie-Anne Regan and we will try to help. If you remain unhappy or have a complaint which you feel you cannot come to us with then you should contact the University’s Research Ethics and Integrity Office at ethics@liv.ac.uk. When contacting

the Research Ethics and Integrity Office, please provide details of the name or description of the study (so that it can be identified), the researcher(s) involved, and the details of the complaint you wish to make. The University strives to maintain the highest standards of rigour in the processing of your data. However, if you have any concerns about the way in which the University processes your personal data, it is important that you are aware of your right to lodge a complaint with the Information Commissioner's Office by calling (+44) 0303 123 1113.

15. Who can I contact if I have further questions?

Please ask Lisa Soderquist Weatherby any questions during recruitment or data collection. You can also contact her or one of her supervisors by e-mail using the following information.

Lisa Soderquist Weatherby
Principal Investigator/Sole Researcher
lisa.soderquistweatherby@online.liverpool.ac.uk
403-512-0102

Ruolan Wang
Supervisor
ruolan.wang@online.liverpool.ac.uk

Julie-Anne Regan
Second Supervisor
j.regan@liverpool.ac.uk

PANEL ON RESEARCH ETHICS
Navigating the ethics of human research

TCPS 2: CORE

Certificate of Completion

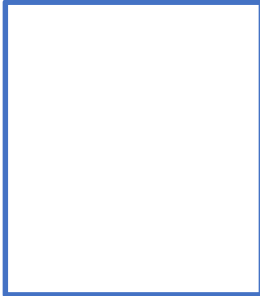
This document certifies that

Lisa Soderquist Weatherby

has completed the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans Course on Research Ethics (TCPS 2: CORE)

Date of Issue: **5 January, 2019**

From: research.ethics.board
Sent: April 25, 2019 4:10 PM
To: Lisa Weatherby
Cc:
Subject: REB Certificate of Approval



April 25, 2019

PI: Mrs. Lisa Weatherby

Department:

Co-Investigators: Mrs. Lisa Weatherby (Principal Investigator)
Dr. Ruolan Wang (Supervisor)

Sponsoring Agencies: [[AllSponsorAgencyNames]]

Project Title: Informing pedagogical practices with regard to women learning in male dominated apprenticeship programs in a Canadian polytechnic institute

Approval Date: April 15, 2019

End Date: August 31, 2020

The protocol and consent form for the above-named project have been reviewed by the Research Ethics Board (REB) and were found to be acceptable on ethical grounds for research involving human subjects. Any modifications to the protocol or consent form which are not approved by the REB will render this Certificate of Approval null and void.

Approval of the Research Ethics Board:

REB Chair