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ACCESSIBLE SKILLED TRADES:
INCLUSIVE AND ACCESSIBLE SKILLED TRADES EMPLOYMENT FOR PEOPLE WITH DISABILITIES

Research Report | 2026

Please direct questions and reprint requests to:
Canadian Institute for Safety, Wellness, and Performance
25 Reuter Drive
Cambridge, Ontario N3E 1A9
INFO@CISWP.ca
WWW.CISWP.ca

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Corresponding Author:
For inquiries about this report, please contact CISWP at INFO@CISWP.ca

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This report was written by Drs. Katherine Bishop-Williams, Marcus Yung, and Amin Yazdani, and Nicki Islic. Individual chapter authorship is listed on the title page of each report section.

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Disability and Inclusion in the Skilled Trades: A Phenomenological Study of Employment Barriers and Supports

Authors: Katherine Bishop-Williams, Lia Tennant, Marcus Yung, Amin Yazdani

ABSTRACT

Persons with disabilities remain underrepresented in skilled trades across Canada despite ongoing labour shortages. Little is known about their experiences navigating trade entry, workplace culture, personal protective equipment (PPE), accommodation processes, and disability disclosure. This study examined how disability interacts with employment structures, environments, and expectations across trades.

Using an exploratory phenomenological approach, semi structured interviews were conducted with 31 skilled trades workers, students, and apprentices who self identified as having one or more disabilities. Reflexive thematic analysis was supported by co interpretation with advisory and lived experience groups. The Functional–Expressive–Aesthetic (FEA) framework guided analysis of PPE related findings.

Participants demonstrated adaptability and persistence but faced multilayered barriers across the employment trajectory. Structural obstacles, including administrative complexity, inconsistent accommodation processes, and certification challenges, restricted access and progression. Cultural norms, including stigma, "old boys club" dynamics, and misconceptions surrounding visible and invisible disabilities, further limited equitable participation. Disability related strengths (e.g., hyperfocus, problem solving) were acknowledged but often overshadowed by deficit based assumptions.

PPE experiences centred on fit, function, comfort, and sensory load, with disability specific needs intensifying consequences of poor design. Participants described compatibility challenges with assistive devices and identified simple, scalable improvements to enhance usability and safety. Learning preferences reflected the importance of hands on instruction, clear steps, repetition, aids, and mentorship. Accommodation access was uneven, and disclosure decisions were shaped by safety considerations, trust, and anticipated stigma.

Strengthening equity in skilled trades requires streamlined administrative processes, inclusive PPE design and procurement, disability confident supervision and mentorship, and transparent, trust based accommodation and disclosure pathways. Sector specific implementation of existing national disability frameworks is essential to advancing safe, inclusive, and sustainable skilled trades careers.

KEYWORDS

Workplace accommodation, barriers to employment, employment resources, disability disclosure

INTRODUCTION

Disability and Skilled Trades Employment

Physical, cognitive, mental, and other impairments shape the employment cycle for persons with disabilities, from application and hiring to retention and advancement (Bonaccio et al., 2019). Despite growing disability and employment research, the experiences of persons with disabilities seeking employment in skilled trades are less understood. Data demonstrates, persons with disabilities remain underrepresented in skilled trades (Canadian Apprenticeship Forum (CAF), 2023). Understanding how disability intersects with skilled trades employment is an equity and economic imperative.

Disability is increasingly defined through a biopsychosocial lens (CSA Z1011, 2024; Fontana et al., 2025). Lederer et al. (2014) identified numerous definitions of work disability, though most emphasized relationships between health conditions and environmental demands shaping functional limitations. Functional limitation is therefore dynamic; it changes with job demands, accommodation practices, and structural conditions. In skilled trades, these dynamics may have heightened impacts due to physical and productivity expectations.

Canada has established multiple legislative and strategic frameworks to reduce employment barriers, including the Accessible Canada Act (2019). Provincial approaches continue to vary (Kovacs Burns and Gordon, 2009). The Canadian Human Rights Act prohibits employment discrimination (Legislative Branch, 2024) The Employment Strategy for Canadians with Disabilities outlines a national goal of closing the employment gap by 2040 (ESDC, 2024). Research evaluating anti-discriminatory legislation suggests that such policies reduce stigma (Nittrouer et al., 2024), but workplace practice gaps persist.

Data from the 2022 Canadian Survey on Disability show that 24.1% of working-age adults identify as persons with disabilities (CSD, 2023). Prevalence was higher among women and gender-diverse individuals and increased significantly since 2017. Unemployment among persons with disabilities arose from 5.4% to 7.8%. In 2024, employment among adults without disabilities was 66.2%, compared to 46.4% for persons with disabilities (Hardy and Vergara, 2025). Youth experienced the sharpest declines. Wage gaps widened from $1.91 to $2.22 per hour. Many persons not in the labour force reported wanting to work, indicating structural, not motivational, barriers (Hardy & Vergara, 2025). Individuals with less severe disabilities were more than twice as likely to be employed as those with very severe disabilities (Hebert et al.,

2024). Persons with disabilities were more likely to work part-time (Hebert et al., 2025), though part time work is uncommon in trades.

Employment Barriers for Persons with Disabilities

Globally, persons with disabilities commonly identify disability as their primary employment barrier (Yeager et al., 2006). In Canada, employer discrimination and labeling remain major obstacles (Shier et al., 2007). South African studies report training ceilings limiting advancement (Soeker et al., 2018). A scoping review found most interventions targeted pre employment rather than workplace advancement barriers (Jetha et al., 2019). Persons with disabilities remain concentrated in entry level roles (Kaye, 2009) and frequently experience underemployment (Shahidi et al., 2023). Disability specific factors, such as severity and age at onset, also shape employment (Gupta et al., 2021).

Employer perceptions significantly influence hiring. Concerns about accommodation costs and doubts about qualifications influence hiring decisions (Baker et al., 2018). Despite diversity, equity, and inclusion initiatives, persons with disabilities continue to experience fewer opportunities and reduced career growth (Bonaccio et al., 2019). Discrimination is a persistent theme in disability and work research (Vornholt et al., 2017). Bias persists despite lacking empirical basis (Lengnick-Hall et al., 2008) and training-based bias reduction shows limited long-term effectiveness (Calluso and Devetag, 2024). Canadian studies highlight employer education, individualized systems, and accessible supports as key enablers (Christianson-Barker et al., 2025).

Between 2016 and 2021, trades employment declined by 97,940 workers, with youth facing the largest reduction (Su et al., 2024). Ontario employers report stigma, mental health concerns, and recruitment challenges (Howe et al., 2023). Red Seal data show only 13.5% of trades workers identify as persons with disabilities, far below workforce proportions (CAF, 2023). Red Seal data show only 13.5% of trades workers identify as persons with disabilities, far below workforce proportions (CAF, 2023). Meanwhile, over 222,000 journeypersons are needed between 2024–2028 (ESDC, 2025). This gap highlights an opportunity for inclusive recruitment.

Across industries, employers are rarely proactive in recruiting persons with disabilities (Lengnick-Hall et al., 2008). Barriers begin during apprenticeship entry (Mitchell et al., 2023). Red Seal data show only 13.5% of trades workers identify as person with disabilities, far below

workforce proportions (CAF, 2023). Meanwhile, over 222,000 journeypersons are needed between 2024–2028 (ESDC, 2025). This gap highlights an opportunity for inclusive recruitment.

Despite barriers, trades may offer equitable earnings. A study of 100,000 Toronto secondary students found certified trades workers had the highest earnings (Brown et al., 2024), and students with disabilities entered trades more often than other pathways. Wage disparities were larger outside trades. Students with disabilities may also be encouraged towards trades (Parekh, 2013). Yet trades occupations themselves face social devaluation, creating dual stigma (Pizzara Milian et al., 2025). Still, trades apprentices in Australia reported strong employment and improved quality of life (Cocks et al., 2015). Research on lived experience in trades remains limited (Bailey et al., 2022). Gaps include hiring, discrimination, and policy-practice disconnects. Phenomenological approaches are needed to better capture these experiences (Bailey et al., 2022). Calls for equity in construction date back decades (Dainty and Baglihole, 2005; Powell and Sang, 2013).

Personal Protective Equipment (PPE) Barriers for Persons with Disabilities

Experiences in trades are also shaped by PPE access and usability. Federal legislation requires protective PPE but does not mandate appropriate fit (Legislative Services Branch, 2026). Some provinces, such as Ontario and BC, now require PPE to fit a diverse range of workers (Ontario, 2024; WorkSafe BC, 2022). Poor fit and discomfort are top reasons for non-use (Sehsah et al., 2020; McPherson, 2008). Limited research assesses PPE fit for diverse trades workers (Tennant et al., forthcoming), and none address disability-specific fit issues. Pandemic-era literature focused on disability–caregiver PPE interactions, not workers' own PPE experiences, leaving a gap.

Accommodation and Disclosure of Disability at Work

Advancing employment equity requires addressing environmental barriers contributing to work disability (Fontana et al., 2025). Assistive technologies and accommodations support productivity across disability types (Morash-Macneil et al., 2018; Mitchell et al., 2025). Yet implementation is inconsistent; workers report stigma and inadequate training (Ripat & Woodgate, 2017). Many accommodation requests are denied (Gupta et al., 2021), and dissatisfaction is common (McDonnall et al., 2023). Disparities align with social determinants such as race and education (Kaye et al., 2010). Organizational cultures may view accommodations as unfair advantages (Lovett, 2021), while employers cite cost concerns and

lack of awareness (Sepulveda, 2021; Steel, 2019). Evidence supports integrated, individualized disability management systems (Tompa et al., 2015; Wahidin et al., 2018).

Disclosure decisions involve self perception, workplace culture, timing, and privacy (Tomas et al., 2022). Workers balance professionalism, authenticity, and advocacy (Kulkarni, 2022) Disclosure can help contextualize accommodation needs (Patton, 2022). In trades, disabilities often remain undisclosed (Raykov & Taylor, 2013). Bias-reduction tools can reduce stigma but effects fade over time (Ruggs & McGonagle, 2023).

Study Objectives

This study aimed to characterize the experiences of persons with disabilities in skilled trades. Given the breadth and depth of perspectives shared by participants, the results and discussion are organized into three thematic sections. Accordingly, the study pursued three overarching objectives:

Objective 1: To examine the employment experiences of persons with disabilities in skilled trades, including barriers and facilitators encountered across the employment trajectory, from career entry, application and hiring, to workplace culture, retention, and advancement.

Objective 2: To investigate how disability interacts with workplace environments and equipment in skilled trades, with particular attention to PPE fit, function, sensory and cognitive impacts, and workers' recommendations for improving PPE accessibility through the lens of the Functional Expressive Aesthetic (FEA) model.

Objective 3: To analyze accommodation and disclosure processes among skilled trades workers with disabilities, including learning preferences, accommodation strategies, organizational supports and barriers, and the factors influencing decisions to disclose disability and the implications of disclosure for accessing workplace accommodations.

METHODS

Study Design and Approach

This study employed an exploratory qualitative design using a phenomenological approach (Bevan, 2014), supported by thematic analysis. A phenomenological lens was selected to deeply examine the lived experiences of persons with disabilities in skilled trades, emphasizing contextual factors, subjective meaning-making, and structural conditions shaping those experiences. Thematic analysis supplemented this approach due to the relative internal homogeneity observed across participant narratives (Ahmed et al., 2025).

The project was collaboratively designed, and data interpretation occurred with two groups. A project advisory committee of six institutional and agency representatives—each engaged professionally in skilled trades or disability services—provided methodological and contextual guidance. A lived experience advisory group of six individuals meeting study eligibility criteria contributed to data interpretation and ensured experiential validity. Both groups met online throughout the project. Members of the lived experience group received compensation equivalent to interview participants ($75 per session), while advisory committee members participated as part of their professional roles. The study received ethics approval from the Conestoga College Research Ethics Board (REB #603).

Participant Recruitment and Engagement

Participants were eligible if they self identified as living with one or more disabilities and were working in, or pursuing, a skilled trade in Canada. Disability was defined for participants as "a difficulty in functioning (e.g., physical, mental, etc.) that may affect day to day life," and self report was accepted without requiring diagnostic documentation. Skilled trades were defined using Skilled Trades Ontario (STO) classifications across construction, motive power, industrial, and service sectors (STO, 2023).

Participants were recruited via institutional partnerships, poster campaigns, a skilled trades college, trades employers across Canada, and disability services agencies. Recruitment used purposive and snowball sampling. Participants completed a one hour interview and were compensated with a $75 gift card. Interviews were conducted in person, by phone, or via video conference based on participant preference and location.

Participants received an information letter and consent form and were provided interview questions in advance to facilitate preparation, accessibility, and meaningful engagement (Haukas & Tishakov, 2024).

Participant Interviews

A semi structured interview guide with open ended questions was developed a priori and reviewed with advisory groups before data collection. The guide included five primary questions and associated probes. Interviews began by inviting participants to describe their trade, role, and experience, followed by an exploration of disability experiences and their relevance to work.

Subsequent questions addressed employment experiences such as applying for positions, navigating workplace culture, career advancement, disclosure decisions, and recommendations to improve trades accessibility. Consistent with phenomenological interviewing, questions included descriptive and structural components and incorporated imaginative variation to explore potential scenarios (Bevan, 2014). For instance, participants were asked how differences in inclusive hiring practices or pay would influence their choice between two employers.

Data Validation and Processing

All interviews were audio recorded and transcribed verbatim using advanced speech recognition software (MAXQDA, VERBI Software; Berlin, Germany). Audio recordings were reviewed to verify transcription accuracy and deepen researcher familiarity with participant narratives.

Transcripts were labeled with participant demographics, including age group (<30, 30–45, >45), gender identity, skilled trade, province or territory, and identified disabilities.

Synthesis, Thematic Analyses, and Validation

Participant characteristics were summarized using descriptive statistics to contextualize interview data.

Qualitative data were analyzed using the thematic analysis framework by Braun and Clarke (2006), aligned with constructivist epistemology. Thematic analysis supplemented phenomenological inquiry due to strong patterns of internal coherence within participant accounts (Ahmed et al., 2025). Following thorough data familiarization, initial codes were generated inductively through open, line by line coding. A comprehensive codebook reflecting participant language and emergent ideas was developed and applied across all transcripts.

Preliminary themes were drafted, reviewed, and refined through iterative cycles. First, the research team examined thematic coherence. Next, both advisory groups participated in co interpretation sessions, providing experiential and contextual validation. Final themes were named and illustrated using direct quotations. Fillers and repeated words were removed from quotes to promote clarity and uphold dignity in representation (Rockmann & Vough, 2023).

Credibility and trustworthiness were enhanced through triangulation with literature and advisory group insights, member checking, maintenance of an audit trail, researcher reflexivity, and peer debriefing, consistent with postpositivist and critical qualitative research paradigms (Creswell & Miller, 2000). Validation checks strengthened the reflexive thematic analysis process (Ahmed et al., 2025).

FEA Framework Analyses of PPE

Comments related to PPE were examined using both inductive codes and the FEA Framework (Lamb & Kallal, 1992). The FEA model has been applied in garment design, PPE development (Wagner et al., 2013; Oo & Lim, 2023), and analyses of PPE accessibility for underrepresented populations (Tennant et al., forthcoming).
Inductive codes for PPE experience included distraction and stimulation, forgetting to wear PPE, comfort and fit, functionality, and "no issues." These were then reviewed using FEA aligned deductive codes:

- **Functional:** fit, mobility, comfort, protection, donning/doffing
- **Expressive:** values, roles, status, self esteem
- **Aesthetic:** design principles, art elements, body garment relationship

Accommodation Analysis

As with PPE, accommodation data were initially coded inductively. Following open coding, additional deductive codes were applied to assess alignment with themes identified by Bishop Williams et al. (under review), including learning preferences, available resources, and physical settings. These themes, developed from survey data from 298 apprentices with disabilities, provided an analytic structure for evaluating accommodation experiences across classroom and workplace settings.

RESULTS

Participant Demographics

Thirty-one in-depth interviews were conducted; participant characteristics are described in Table 1. Most participants were male (58.1%, n=18), less than 30 years old (51.6%, n=16), from Ontario (n=23, 74.2%), and came from either electrical (33.3%, n=11) or mechanic and millwright trades (24.2%, n=8). Participants represented a range of training and career levels: high school vocational students (n=4, 12.9%), pre-apprenticeship (n=7, 22.6%), apprenticeship (n=5, 16.1%), completed apprenticeship but not certified (n=10, 32.3%), and journeypersons (n=4, 12.9%). Participants described experiencing varied impairments that impacted their day-to-day life as a disability, ranging from common diagnoses such as attention deficit hyperactivity disorder (ADHD, n=18, 58.1%) and anxiety (n=10, 32.3%) to vision, mental health, processing, and speech impairments. Summaries of impairment categories represented among the participant population are reported in Table 2.

Table 1. Demographics of interview participants about lived experiences as persons with disabilities in skilled trades.

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Male	18	58.1
	Female	11	35.5
	Non-binary or Transgender	2	6.5
	Missing	0	0
Age Group	Under 30 years	16	51.6
	30-45 years	6	19.4
	Over 45 years	3	9.7
	Missing	6	19.4

Characteristic	Category	Frequency (n)	Percentage (%)
Province (not mutually exclusive)	British Colombia	3	9.7
	Alberta	2	6.5
	Saskatchewan	0	0
	Manitoba	1	3.2
	Ontario	23	74.2
	Quebec	1	3.2
	New Brunswick	0	0
	Nova Scotia	0	0
	Prince Edward Island	0	0
	Newfoundland and Labrador	0	0
	Territories	1	3.2
	Missing	3	9.7
Trade (not mutually exclusive)	Electrical	11	33.3
	Mechanic and Millwright	8	24.2
	Carpenter	2	6.5
	Culinary and Pastry	2	6.5
	Plumbing	2	6.5
	Tool and Die	2	6.5
	Renovations	1	3.2
	Greenhouse Technician	1	3.2
	Hairstyling	1	3.2
	“Mixed” Construction	1	3.2
	Roofer	1	3.2
	To be determined	1	3.2
	Missing	0	0
Career Level	High School	4	12.9
	Pre-Apprenticeship	7	22.6
	Apprenticeship	5	16.1
	Completed Apprenticeship, Not Certified	10	32.3
	Journeyperson	4	12.9
	Missing	1	3.2

Table 2. Diagnostic categories of interview participants represented.

Diagnostic Category+	Frequency (n=31)*	Percentage (%)
Pain-related, flexibility, mobility, dexterity	15	48.4
Mental health-related	11	35.5
Seeing	4	12.9
Learning	23	74.2
Hearing	3	9.7
Memory	1	3.2
Developmental^	1	3.2
Unknown	N/A	N/A

+According to Statistics Canada Categories (2023)

*Categories are not mutually exclusive

^Includes communication impairments (e.g., stuttering) if not learning-related impairments

Objective 1: To examine the employment experiences of persons with disabilities in skilled trades.

Lived Experiences in Skilled Trades: Adaptability and Perseverance

Participants consistently described perseverance and adaptability as foundational to navigating both disability and skilled trades work. These qualities were described not merely as coping mechanisms, but as long standing life skills shaped through lived experience. One participant stated, "I get to experience it. It's my ability... I don't view them as disabilities. [...] I am able to persevere and push through and I do" (Participant 23).

Adaptability was similarly characterized as an ingrained life skill that supported participants across diverse situations. For instance, one participant explained, "I adapt really quickly to new environments" (Participant 24). Others emphasized that disability-related experiences shaped their work ethic, empathy, and collaboration efforts, thereby strengthening resilience in the trades: "[My disabilities] basically have shaped my work ethic, my empathy, and my adaptability... it made me more resilient in the face of pressure" (Participant 8).

Several participants described needing to work "even better" or "more diligently" than others to counter assumptions about reduced capability: "Things take longer for me… I'm more diligent about my work, I've been told" (Participant 28). These reflections illustrate how perseverance and adaptability function both as personal strengths and as responses to cultural expectations within trades workplaces.

Barriers Faced by Persons with Disabilities in Trades Culture

1. Paperwork and logistical barriers across the career trajectory

Participants described recurring bureaucratic and logistical challenges beginning at apprenticeship entry. These included misfiled apprenticeship documents, unclear registration processes, and contradictory guidance from institutions or unions. As one participant shared, "I didn't get into school until 2020 because my apprenticeship wasn't set up correctly and I had no idea" (Participant 3). Another noted, "[Company] said, 'apply to the union,' and the union said, 'talk to the company'" (Participant 17).

During training, logistical barriers often emerged around accessing accommodations. For example, one participant described misalignment between test scheduling and accommodation deadlines: "They require a week notice… I only get like a week notice at best" (Participant 16).

Participants who trained during COVID 19 disruptions or the labour strike at their training provider organization reported inconsistent supports: "There were some supports for some parts… there was next to nothing for shop work" (Participant 1), and "My email never got responded to… I've been going about it without accommodation" (Participant 18).

Post training, certification processes introduced additional obstacles. Several participants noted confusing or changing procedures for booking exams and requesting accommodations: "They've made it way more difficult… I booked my exam not knowing I had to ask for accommodations first" (Participant 11).

2. Physical demands and job fit

Some barriers stemmed from physical demands of specific trades or tasks. One participant described withdrawing from ironwork, "I applied to the ironworkers and that was a lot heavier, lifting rebar and taxing on the body, and I didn't even get to finish the job orientation because it was just it was too taxing on my body. I wasn't physically able to handle

it," (Participant 27). Others described shifting trades to find roles compatible with chronic pain or functional limitations, such as moving from carpentry to plumbing. One explained,

> "I did start in carpentry at first and the main thing is, I want to do [Renovation]. But I couldn't really do renos because of my back. So, that's when I went into plumbing. I thought plumbing would be a lot easier until I realized it wasn't. I was only plumbing for like two months until I realized."
>
> (Participant 29)

3. Transportation barriers

Reliance on driving was a common challenge. One participant shared, "It's been hard because right now I can't drive" (Participant 31). In many trades, lack of a driver's license reduced employability, mobility, or ability to accept job placements.

Impacts of Disabilities on Skilled Trades Worker

Participants described disability impacts that aligned closely with characteristics of their impairments, such as communication differences among participants with autism spectrum disorder or attention related challenges among those with attention deficit hyperactivity disorder (ADHD). For example, a participant noted, "It definitely affects my ability to socialize... people think I'm weird" (Participant 21), while another stated, "My cat walks by and I'm distracted... my brain is telling me I can't do it" (Participant 26). Some participants also highlighted the advantages of neurodivergent traits, such as periods of hyperfocus.
Across disability types, participants described impacts on work speed and processing time. One participant noted, "I'm not afforded the tools or the time in a test setting" (Participant 26). Others framed slower pace as consistent with accuracy and reduced waste:

> "It was more of: "If the spindle is not running, I'm not making money.
> Why aren't you running this through?" The place I worked at before my current job, I took my time and my boss kind of knew what was going on
> at this point. He didn't care because I wasn't scrapping anything."
>
> (Participant 3)

Meanwhile, others explained how their ADHD made them want to work faster: "I like to get things done quick and go, go, go and just get the job-at-hand done," (Participant 32). A participant outlined how the delay in initiating tasks coupled with their ability to work faster

likely made them work at a typical speed anyway: "I feel like I'm pretty middle of the road since it takes me a longer time to start new tasks. But once I've started them, I'm really fast," (Participant 2).

Confidence and clarity of instruction also emerged as relevant. Some participants described misalignment between their learning needs and supervisory communication: "Unless the people I'm working with understand how I learn, they don't necessarily get it" (Participant 3). Another shared how initial training undermined confidence when instructions were unclear:

> "The one job I started, I was comfortable in the interview and everything. And then when I went to the floor and they were explaining things that were new to me, my anxiety hit a high. [...] You want to produce a good job; you want to keep that employment is your main concern. They look at it as a lack of confidence."
>
> (Participant 10)

Misconceptions and Stereotypes in Trades Culture

Participants commonly reported facing misconceptions related to laziness, incompetence, or lack of commitment. One participant explained, "I try to stay ahead so I don't need accommodations... people think I can't do the job" (Participant 31). Another noted, "People assume ADHD is lazy or irresponsible... it's actually a difference in how I focus" (Participant 8).

Some felt their inconsistent performance due to disability was judged more harshly than consistent slow performance by nondisabled peers, "It's more of a shame thing if you can't keep up with what you're regularly doing. If you can't be consistent. If you're consistently slow, everyone's okay with you coming to work and being slow. They'll think poorly of you, but they'll never expect anything more," (Participant 17). Others described being demeaned when seeking clarification, "I would ask an employer or a foreman to re-explain something, and I would get yelled at because I was an idiot, essentially. That isn't the case at all," (Participant 11). Further, a participant shared how demoralizing these misconceptions can be: "I think employers would just say, 'hey, they have this disability, great, there's a weak link in the chain.' They don't see it as we're still hard-working people. We'll still get the job done. Hell, we'll get it done better than some of the other guys," (Participant 5).

Many associated these misconceptions with "old boys club" culture: "Anybody that wasn't part of the 'good old boys'... was pushed out" (Participant 26). Others described this culture as rooted in generational replication of harsh training norms. The culture sometimes led participants to question their future in the trade: "There were a lot of days where I'm like, should I even keep doing this?" (Participant 6).

Interestingly, some participants believed that neurodiversity was widespread among trades workers—often undiagnosed. Several estimated that a majority of their colleagues likely had ADHD or learning disabilities, though impairment severity varied (Participant 18).

> "Most of us that work in trades are disabled. I will tell you that out of everybody on my floor right now, I'd say 70% of us have ADHD, some type of spectrum."
>
> (Participant 32)

> "I feel like ADHD is actually extremely common. I don't know, for every trade, but especially for electrical."
>
> (Participant 16)

> "Most people that go into trades probably have learning disabilities or ADD or ADHD, or there's something going on."
>
> (Participant 3)

> "I found that a lot of people in the trades are in the trades because they are hands-on learners and they have some sort of learning disability."
>
> (Participant 11)

> "Well, [I think] we all have a bit of ADHD, which, yes, but we don't all have a lot of ADHD. And when you do have a lot... [trailed off]"
>
> (Participant 18).

Applying, hiring, retention, and promotion

Participants described substantial variation in experiences across the employment trajectory, influenced by trade type, employer practices, and their disability-related needs. Some had relatively smooth pathways; others described repeated barriers, inequitable treatment, or challenges navigating hiring systems.

Table 3. Participant experiences throughout the stages of employment, disaggregated by positive and neutral or negative experiences.

Employment Stage	Positive or Neutral Experiences		Negative Experiences	
	Participant ID, Disability Categories*	Quotation	Participant ID, Disability Categories*	Quotation
Seeking employment and applying	Participant 19 Mental health-related, dexterity	"It's finding out that there's a good work-place that socially I can be accepted in my ability to apply to [College] because I just before I saw that, I thought it was hopeless."	Participant 29 Pain-related	"If you tell an employer before they give you a job, they could limit you [...] or they might not give you the job."
	Participant 24 Seeing, mental health-related	"If they want to hire me, that's great, but if not, [...] I get all my applications out there to see which place will actually hire me."	Participant 31 Memory, Pain-related	"I guess so. I'm not really sure because I, you know, I haven't been hired, but I guess they look for someone who can drive."
	Participant 16 Learning	"It took a lot of talking to people through [Organization], other resources to get my resume to where hiring managers would like to see for apprentices, but once I did that, it was still challenging finding a workplace. Once I got that, one specific resume, places just hired me. I got two interviews in the same week."	Participant 20 Mental health, learning, dex-terity	"Sometimes when it's the weight limits where you carry 50 to 70 pounds: I'm like, 'okay, I can do maybe 50 to 60, but then once it gets to like 70,' I'm limiting myself. They have that there for a reason, so I shouldn't apply to that."

Employment Stage	Positive or Neutral Experiences		Negative Experiences	
	Participant ID, Disability Categories*	Quotation	Participant ID, Disability Categories*	Quotation
Interviewing and Hiring	Participant 21 Learning	"I think that [my disability will] be helpful because [it] makes me more personable. I know that that's a big thing in getting jobs and getting careers and getting recommendations."	Participant 31 Memory, Pain-related	"I am very honest [and] upfront with companies, and I do see that they appreciate it. But the issue is you never know if they say no because you have all these problems or if they're like, no, because we just don't want to work with you. [...] I've been advised not to speak of it until in-person with them, because you don't want to scare them away."
Retention, Accomod-ation, and Ongoing Support	Participant 23 Seeing, Mental health-related	"I advocated for my needs and I told them, 'hey, this is what I need you to do. And if you are unable to do it, I'm either going to have to look somewhere else for my job, or you're going to have to become more accessible towards me.' They were so willing to be accessible because I do a lot there and I provide a lot."	Participant 5 Learning, pain-related, dexterity	"Some of my jobs were with drunk employers, where if I gave them the wrong tool, they would throw a hammer at me. Or if I was two minutes late, they would make me walk to the job site. There were employers that were saying, 'Oh, your kids must be so embarrassed to have you as a dad. You're pathetic.'"

Employment Stage	Positive or Neutral Experiences		Negative Experiences	
	Participant ID, Disability Categories*	Quotation	Participant ID, Disability Categories*	Quotation
Retention, Accomod-ation, and Ongoing Support	Participant 17 Pain-related, mental health-related	"You have to be the best person on site if you have a disability."	Participant 5 Learning, pain-related, dexterity	"They wanted me to go back to full work. They wanted me to lie to [Insurance]. They were saying I'm too expensive and I'm not worth it. But I kept fighting it."
	Participant 21 Learning	"I think the most helpful thing for any-body to learn about a disability is to ask the person, who actually has the disabil-ity. Because the thing I hate the most is when there are these organizations and stuff to advocate. But if they don't have anybody who's on their team who actual-ly has that disability, how do you actually know what it's like?"	Participant 31 Memory, pain-related	"If they can't hire me because it is a safety thing, indicating that's why they're not hiring you. I know technically that would be con-sidered discrimination, but if it's for safety reasons, I feel like that person should know, especially because maybe they can set up a plan."
			Participant 23 Seeing, learn-ing, mental health-related	"Because why should I tell you what I need when you're my employer. You should ask what I need. [...] That's the part that annoys me the most, is they think that when you have a visual impairment, you can't do the jobs. But they don't bother asking me that."

Employment Stage	Positive or Neutral Experiences		Negative Experiences	
	Participant ID, Disability Categories*	Quotation	Participant ID, Disability Categories*	Quotation
Advancement	Participant 5 Learning, pain-related, dexterity	"I want to see it more like Europe, where they work for five hours, six hours a day. They go home to their families. They go home to their friends and they enjoy life. Here you make the big boss money or else you're not working. That's why I want to start up my own business. [...] I'm going to treat them like they're family."	Participant 7 Learning, mental health-related, developmental	"Sometimes you don't have many options, right? I guess, depending on the person and stuff. And in my case, I was pretty determined to find something to do."

* According to Statistics Canada Disability Types (2023); Categories listed in order listed by the participant

Differential treatment of visible and invisible, mental and physical disabilities

Several participants perceived that disability visibility shaped how colleagues and employers responded to them. Invisible disabilities were often minimized, questioned, or pathologized. As one participant explained, "I feel like since my disability isn't super visible, people are just like, 'oh, that's weird.' There must be something wrong with her," (Participant 31). Another observed that invisibility could mute the perceived salience of disability during hiring: "I don't really think that my disability is one enough to really [impact] the hiring process, because it's not one you can tell when you look at me," (Participant 32).

Participants also contrasted social responses to mental versus physical disabilities, noting greater stigma and moral judgment attached to mental health conditions relative to physical impairments. One participant articulated this comparison vividly:

> "I wish bipolar was treated like diabetes. Nobody's scared of people with diabetes, and nobody thinks poorly of them. [...] They're like, 'Oh, they can't help it. Their bodies just don't produce insulin properly.' I want bipolar to be treated like that too. My mind doesn't distribute the chemical properly."
>
> (Participant 19)

Together, these accounts suggest that (a) visibility functions as a gatekeeper to empathy, legitimacy, and accommodation, and (b) diagnostic category (i.e., mental vs. physical) shapes perceived credibility and risk in the workplace. These dynamics help explain participants' reported tendencies to "over perform," delay or forgo accommodations, or selectively disclose in contexts perceived as safer.

Objective 2: To investigate how disability interacts with workplace environments and equipment in skilled trades.

Experiences of Persons with Disabilities with PPE in Skilled Trades

Participants described a continuum of experiences with PPE, from no apparent issues to significant disability related challenges. About half initially reported no PPE issues; however, several of these participants subsequently provided examples of discomfort or usability problems, suggesting that PPE related discomfort may be normalized in trades contexts. As one participant put it: "[PPE] wasn't necessarily an issue. I mean, the masks suck, but everybody... kind of agreed with that, right?" (Participant 1).

Forgetfulness, Routine, and Social Safeguards

Participants frequently described forgetting to don, doff, or keep track of PPE, particularly when attention and memory demands were high on busy worksites. "I knew that I had my glasses somewhere, but I forgot it" (Participant 20); "With ADHD it's very easy to lose tools and forget things at job sites" (Participant 16). Forgetfulness also applied to removal: "I'll be wearing my earplugs in the break room, shouting to have a conversation, and that's until somebody points out, I'm like, 'oh [explicit] yeah, that makes sense now,'" (Participant 6).

Participants also identified self led strategies (e.g., keeping gear in one place; wearing steel toe boots routinely) and peer prompts as effective compensatory supports: "As long as I keep it all in one place, I'll remember it for the most part. [...] I basically wear steel-toed boots everywhere I go. But, in terms of the harnesses and stuff like that, I try to keep them all in one place," (Participant 2). These accounts highlight workgroup norms as informal safety nets for executive function challenges.

This subtheme surfaces lived cognitive experience (i.e., attention, memory) and situational scaffolds (i.e., routines, peers), consistent with a phenomenological focus on meaning-making within real work contexts.

Sensory Load, Distraction, and Overstimulation

Participants reported sensory sensitivity and constant awareness of PPE, especially ear protection, safety glasses, gloves, and fabrics. "I have issues trying to forget that I'm wearing it... I very rarely forget that I have it" (Participant 6). Others described overstimulation: "Ear protection... can get overstimulated... I can get overheated really quickly... breathable fabrics, that's all" (Participant 8). The same participant emphasized materials and textures: "Sometimes I get sensory sensitivity either from materials or textures in the gloves... The right fit, the right fabric, goes a long way" (Participant 8).

Importantly, sensory distraction sometimes resulted from PPE–assistive technology interactions: "When I'm wearing my hat, my glasses get pushed down. Then I constantly have to keep pushing my glasses up. And it's quite irritating because then every time I touch my glasses, I have to go wash my hands. [...] But I need my glasses to see," (Participant 23). These experiences reflect compound design constraints that standard PPE rarely anticipates and clarify how neurodivergent and sensory needs transform otherwise routine PPE into a persistent cognitive load, affecting attention, comfort, and workflow.

Comfort, Fit, and Thermoregulation

Participants linked comfort and fit to sustained wearability and safety and general discomfort: "The type of helmet that [arborists] have clips under the chin. Ours is the tightening on the back. I do find after like a long day of wearing it, it can get kind of painful or whatever on the head," (Participant 2). Another participant said: "If clothes don't fit me right and they just aren't made of good fabrics and materials, it's extremely difficult to do anything," (Participant 18). Another note that relates to disability-specific needs was raised by another participant: "Welding helmets are inflammation to your neck like crazy," (Participant 17). Other participants claimed that their disability impacted their thermoregulation, outlining, "If it's too warm, I find that my hands overheat a lot, so it has to be breathable gloves as well," (Participant 18). Discomfort amplified distraction and time costs: "The longer you wear [PPE] while you're sweating... it moves around... You're doing five seconds of work, then five minutes of wiping everything down... It's really challenging" (Participant 27). Choice and adjustability emerged as cross cutting facilitators: "Sometimes having earplugs... is very discomforting... Just having options would be nice" (Participant 18). Participants explained comfort/fit here is not a mere preference; it is functional and safety critical for sustained performance and hazard mitigation.

Functional Protection Gaps and Safety

Fewer participants reported overt functional inadequacies, but these were consequential when present, especially for sensory impairments. For example, a participant with low vision emphasized needing enhanced protection to compensate for depth perception risks: "I also have a hard time with finding proper shoes... I prefer steel toed... I can easily drop a knife and it will take a toe and I won't notice" (Participant 23). The same participant described inclusive protection through task specific PPE adjuncts: "When I'm using the mandolin, I have a cut proof glove... and a finger guard... you can hear it if it gets too close" (Participant 23). These accounts underscore that equitable protection may require augmented or specialized PPE, not simply standard-issue, so that safety equivalence is achieved.

Mapping Findings to the FEA Framework

Using the Functional–Expressive–Aesthetic (FEA) model, participants' accounts of PPE needs mapped most strongly to functional requirements, with selective insights into expressive and aesthetic considerations.

Functional: fit, mobility, comfort, protection, donning/doffing

Most reported challenges were functional. Participants emphasized comfort and fit as prerequisites for sustained wear, safety, and task focus. Sensory load (e.g., itchiness, heat, pressure, glare) operated as a comfort/usability problem that created distraction or overstimulation—particularly salient for neurodivergent workers and for those using assistive devices alongside PPE. Protection needs were sometimes augmented due to disability related risk profiles. As one participant with low vision explained: "So now when I'm using the mandolin, I have a cut proof glove to use. And I also have a finger guard. [...] When I have the finger guard, you can hear it if it gets too close," (Participant 23). This same participant also needed foot protection that combined non slip soles with steel toes to compensate for depth perception challenges, illustrating how equitable safety may require additional or specialized protective features.

In this dataset, functional shortcomings were the primary barriers to PPE adoption and safe, continuous use: fit/comfort (including sensory tolerance), thermoregulation, protection sufficient for disability specific hazards, and practical donning/doffing and gear management.

Expressive: values, roles, status, self esteem

Expressive themes were less frequent but meaningful where present. Some participants articulated safety values shaped by experience (e.g., hearing conservation) and perceived organizational commitment (or lack thereof) via cost and access to appropriate PPE:

> "All I can say: start earlier. I mean, when I was younger, I probably never wore hearing protection when I probably should have. [...] The rules have all changed over the years, gotten better. I suspect that the hearing loss issue, as time goes on, will become less."
>
> (Participant 30)

> "That also could be on a financial level because I generally look for thrift store finds... That's hard to find well fitted clothes when you need them immediately."
>
> (Participant 18)

> "It's a little harder to get some of the safety equipment through some employers because, 'oh, it costs too much money'... or, 'we can get it for you,' but they don't get it for you."
>
> (Participant 5)

> "If I wasn't in the union, I would not be able to afford my prescription safety glasses."
>
> (Participant 17)

Expressive dimensions appeared primarily through safety identity, norm shifts, and signals of inclusion/exclusion conveyed by whether employers fund and facilitate access to appropriate, including specialized, PPE.

Aesthetic: design, body–garment relationship, identity expression

Disability specific aesthetic considerations were rare, but two salient threads emerged:

1. Quality and appearance in everyday wear (e.g., durability, materials that maintain color/finish under heat and friction):

   "Everything has to be higher quality… thermal active… If you have cute stuff and it gets all messed up… it's good to have higher quality stuff… heat, friction… wiped the [colour] off."

   (Participant 27)

2. Identity and religious expression intersecting with protective design (e.g., facial hair and respiratory protection):

   "Because I have a beard, it doesn't create a full seal… maybe… improve PPE that could go over your head because sometimes due to religion, some people can't shave their beard whatsoever."

   (Participant 29)

Aesthetic concerns intersected with function where body–garment relationships (e.g., facial hair) directly affect seal integrity and thus protection. In these cases, "aesthetic" design choices enable both identity expression and adequate protection.

Suggestions to Improve PPE for Persons with Disabilities

Participants proposed targeted, practical improvements, predominantly enhancing functional performance while carrying expressive (inclusion, access) and occasional aesthetic (i.e., materials/finishes, identity compatible) implications.

- **Mitigate vibration and joint load (Functional):** "All those vibrations go up to your body… your hand… knee joint problems. Maybe… better foam pads or knee pads." (Participant 29).
- **Reduce sensory irritation via glove construction (Functional/Aesthetic):** "If gloves were made more inside out style so that the seams were on the outside… Or if the seams were flat… that was really nice." (Participant 18).

- **Improve eyewear adjustability and retention (Functional):** "Maybe a silicone padding... along the ear bits... designs that have an adjustable ratio to where it lands on your nose versus ear... Some way to keep it from falling off my face would be nice." (Participant 18).
- **Support thermoregulation (Functional):** broader access to breathable fabrics for garments and gloves (Participants 8, 18).
- **Ensure compatibility with assistive devices (Functional):** headwear/eyewear that co exists with prescription or specialized lenses without slippage (Participant 23).
- **Respect religious expression while preserving protection (Functional/Aesthetic):** beard compatible respiratory solutions to maintain seal while honoring religious practice (Participant 29).
- **Address cost and access (Expressive/Functional):** employer or union provision of specialized/prescription PPE to eliminate financial barriers and signal organizational commitment (Participants 5, 17, 18).
- **Many of these suggestions are low complexity changes (e.g., padding, adjustability)** with high impact on comfort, sensory load, and sustained use. Others (e.g., beard compatible respiratory protection, vibration mitigation) may require procurement policies and alternative device options to ensure equivalent protection.

Objective 3: To analyze accommodation and disclosure processes among skilled trades workers with disabilities.

Learning preferences among persons with disabilities in skilled trades

Participants described diverse learning preferences that mapped closely to patterns identified in prior work (Bishop Williams et al., under review). Five recurrent preferences emerged across impairment types: practical (hands on) instruction, clear and concrete instruction, repetition, aids and information, and supported learning through mentors/teams. In addition, physical learning conditions clustered into visual, auditory, and movement accommodations, with participants emphasizing individualized adjustments (e.g., brighter vs. dimmer lighting; quiet spaces vs. white noise) rather than a single "best" setting.

Practical (hands on) instruction: Many participants identified hands on learning as both a preferred mode and a primary reason for choosing the trades: "I found that a lot of people in the trades are in the trades because they are hands-on learners and they do have some sort of learning disability" (Participant 11). Participants wanted demonstrations, opportunities

to handle materials, and immediate application: "Once I've done it once, it's firmly in my brain. For me I'm very hands-on and need to have it in front of me doing it as I'm being told" (Participant 32).

Clear, concrete instruction: Participants stressed the need for stepwise, explicit directions without metaphors or abstract shorthand. One participant described difficulty with "follow the power" as an instruction for electrical flow: "I understand following the power, but I need... the full circuit... where does the rest of it go? That's where I get lost" (Participant 20).

Repetition: Repeated practice-built confidence, accuracy, and speed: "Doing things over and over again, like repetition... when you're going from suite to suite to suite" (Participant 7). Participants linked repetition directly to independence on core tasks.
Aids and information. Written instructions, checklists, calendars, and plans supported memory, reduced cognitive load, and enabled self checking: "Written instructions are always very helpful... This will get burned into my mind... those first couple times, it's very helpful to have things on paper" (Participant 21). Participants valued workplaces that normalized making such resources available: "I'm able to print off whatever I'm doing... a step by step" (Participant 10).

Supported learning (mentors/teams): Participants frequently referenced the importance of supportive coworkers and mentors, both in formal instruction and on the job: "A lot of coworkers will help me with reading and the big terminologies" (Participant 4); "There's a lot of guys [who] help each other out quite a bit" (Participant 7). For some, mentorship transformed psychological safety and participation: "He'd be like, 'I see where you're coming from... here's where you tweak your thinking'... It made me feel comfortable about speaking" (Participant 5).

Accommodation in Skilled Trades

Consistent with prior survey findings (Bishop Williams et al., under review), accommodations described by participants fell into two broad categories: (1) resource related accommodations based on learning preference, and (2) physical accommodations.

1. Resource-related accommodations:

Flexibility in tasks and timing: Participants emphasized value in flexibility, both in how tasks are completed and in pacing (i.e., extra time, breaks, splitting tasks, occasional absences). Flexibility reduced anxiety and improved quality: "It just allows your brain not to worry

about time... I've never ended up using the full period" (Participant 15). Some noted limits to available flexibility (e.g., minimum durations for test accommodations): "I can't use the accommodation for anything less than an hour... My quizzes might only be 20 minutes" (Participant 21). Participants also highlighted a desire for part time options and non punitive absences for disability related needs, contrasting this with strict "show up and work" expectations: "If you are unwell and the expectation is you show up every day or the government can remove you from your apprenticeship or the school can remove you; that's a big punishment. [...] The option should not be you either show up every day, or you drop out," (Participant 17).

Access to resources: Participants described four commonly needed resources:

1. **Aids and information:** lack of aids was experienced as systematically undermining success: "They stripped me of the memory aid. And when I wrote my first test, I actually failed," (Participant 3) and, "Why don't we just help people get the license? Put out information to study so people can pass, so the industry doesn't just go belly up," (Participant 15).
2. **Tutors: particularly important for certification exams:** "[Agency] gave me a tutor. I'm ecstatic. I've waited two years for a tutor, so I've had some tutoring, and that's been great," (Participant 10); "I did 60 hours of tutoring with an amazing tutor," (Participant 26).
3. **Learning strategists:** to help coordinate accommodations, health and safety, navigate apprenticeship systems, and identify learning needs; many wished they had access earlier.
4. **Technology:** for lifting or manual material handlings and for reading/vision support (examples detailed in Table 3).

Table 3. Participant quotations about the technology accommodations they used in skilled trades by impairment type.

Impaiment/ Disability Type	Participant ID	Quotation
Learning	P28	"I don't know what the program is, but just on an Apple phone, I can take a picture of text and it will scan it and then I can listen to it. That's what I usually do if it's stuff like that, or I can if it's usually numbers and stuff."
Physical	P17	"In terms of if you physically can't be here because of a medical illness, you should be able to come in online. I think through COVID we've learned the ability to do that."
	P29	"The main part I could say is accommodation that could have helped is like, I'm sure it's expensive, but in the long term, it feels like an investment. It always helps. We could install more pulley systems or hoists that instead of us human beings lifting heavy material, constantly moving and hurting ourselves."
Mental Health	P8	"The structured routines really help, staying on top of how I organize checklists, how I organize the tools, virtual reminders, sticky notes or alarms."
Seeing	P25	"So, I'll just use my phone because it's quicker. I can just speak it in right away. Okay, this is the item the person's looking for. Press on it, open it, find the product number, put it into my scanner right away, zoom in, find where it's located and go ahead and grab it for the customer instead of me."
Hearing	P30	"From [insurance] to get hearing aids. I got the letter this week or last week, and then I'll have to go to a hearing aid place and get them made up."
Memory	P31	"If my teacher's doing a PowerPoint, they can share it with me. Stuff like that. Just because I might not remember it. I make my own notes, but they might not be the greatest."
Developmental	N/A	No example provided.

Some participants reported not knowing what accommodations would be useful, believing none existed for certain impairments, or not needing accommodations once schooling or certification were completed. Others adopted self strategies (e.g., listening to music for focus) as alternatives to formal accommodations.

2. Physical accommodations:

In line with earlier categorization, participants discussed visual (lighting), auditory (noise level/white noise), and movement (opportunities to stand, stretch, or change position) supports. Importantly, participants emphasized directional adjustments, for example, either brighter or dimmer light depending on individual needs, underscoring the importance of individualization rather than one size fits all settings. (See Table 4 for quotations.)

Table 4. Example quotations that demonstrate the variability of preferences and participant needs related to each of the categories of physical accommodations and the diagnostic categories or impairments they face.

Physical Accommodation Type	Participant ID and Diagnostic Category(ies)*	Quotation seeking more physical input	Participant ID and Diagnostic Categry(ies)*	Quotation Quotation seeking less physical input
Visual	P23 Vision, mental health-related, learning	"Or if it is paper, I will ask them to give me black paper with white writing. So, the color contrast. I much prefer. It's so much easier when I'm in a darker setting versus a lighter setting because I am sun blind."	P8 Learning, mental health-related	"Sometimes I get sensory sensitivity [...] The lighting, sometimes the lighting affects me, too."
Auditory	P32 Learning	"It might even be nice for headphones in class. Not even with music, but just white noise. Because anything distracts me extremely easy in the class. I always try and sit in the very front row. So, there's no one in front of me that can distract me."	P18 Learning	"I just get extremely distracted in all manners of things, especially with the noise, it has been so loud and there's so many different noises going on, it's pretty overwhelming. I have to constantly have earplugs in, and even then, it's still a bit much and takes away from my focus."
Movement	P29 Pain-related	"I mean, the more difficult parts are either sitting or kneeling down. But in terms for me to get rid of the pain, the main part I do is just stand up and walk around."	P22 Vision	"So, when those tables are kind of your station, you get an engine, you take it apart, you put parts on those tables or under the table, and that's usually where you work. But for safety, they won't just let a blind person just walk in there. They'll guide them to their location where they need to be."

* According to Statistics Canada Disability Types (2023); Categories listed in order listed by the participant.

Successes and Challenges in Accommodation

The most prominent facilitator for successful accommodation was related to supported learning, including individualized planning and mentors or instructors who cared for the worker's circumstances, and programs or institutions that provided funding and resources: "Studying and the group... having those people there (Participant 14). "The programs... the institutions... helped a lot. Having the funding to give those resources to the people in the programs, that actually helped me out so much that it actually made me able to live better," (Participant 27).

Participants identified four major barrier types:

1. **Misconceptions and stereotypes.** Assumptions that needs were exaggerated or "common and manageable" without support; preference for sink or swim instruction: "Old school journeyman... 'I'm telling you what to do. You get it? We move on, we learn something else" (Participant 27).
2. **Insufficient preparation among instructors/employers.** Low patience for questions, limited awareness of learning differences in the trades: "Little to no patience for questions" (Participant 1); "A lot of carpenters and like carpenter businesses don't acknowledge that that is, actually, a pretty high part of the trade, that there are actually quite a few of us who struggle" (Participant 11).
3. **Macro-level disruptions.** COVID 19 restrictions and the Ontario college support staff strike impeded access to spaces and staffing, respectively: "Extra people... to assist you weren't actually allowed to be there" (Participant 1).
4. **Outright denial of accommodations.** Participants reported denials in workplaces, especially small employers, and in certification/testing centers, sometimes due to changing processes or paperwork hurdles: "If you ask for an accommodation... you kind of get laughed at" (Participant 6); "I'm a picker. I work in perishable and freezer, and grocery gets really hot in the summer. That's part of the reason why I fainted, actually, because I didn't use my accommodation because the boss at the time that was there didn't let me. And I was like, 'Okay, well, I'm not doing so hot." (Participant 31).

Disclosure of Functional Limitations and Disabilities in Skilled Trades

Participants often carried mixed perspectives about whether, where, and to whom they would disclose. Participants described reluctance due to stigma, fear of judgment, or prior negative experiences:

> "I'm still learning how to navigate. I'm still trying to learn how to communicate. For me personally, I have a really hard time in general asking for help. And then I also have a really hard time disclosing information about myself that might be kind of embarrassing and also could give a judgment about a person."
>
> (Participant 11)

Another participant explained their rationale as: "It's the stigma. I'd be way more likely to disclose to a boss about anxiety than I would be about bipolar. Bipolar and borderline. There is such heavy stigma with both of those," (Participant 19). Some participants noted that visually impaired workers feared systematic denial: "We live in fear... We're just going to get denied" (Participant 23).

Two core rationales shaped disclosure decisions:

- **Safety.** Disclosing to protect oneself and others on site: "Safety related. Just, I'm with the people every day" (Participant 28).
- **Transparency.** A perceived responsibility to inform, despite risk: "It is the right thing to do to disclose... but that typically leads to a loss of jobs" (Participant 23).

Where to disclose varied. many would disclose in school but not work, citing greater perceived protection and understanding in educational settings: "Going into a job, I would never ask for an accommodation. Going to a school, I would... They're more understanding" (Participant 10); "For school, I'm paying to be here... With workplaces... They'll find another reason [to fire you]... In the end, it's because of that [disability]" (Participant 21).

Who to disclose to hinged on trust, mutual respect, and familiarity: "Depends on the employer" (Participant 7); "Some people... you just feel more comfortable [with]" (Participant 20); "Trust in leadership... whether my employer would do something helpful rather than just follow paperwork" (Participant 8). Negative past experiences often reduced willingness to disclose in the future.

Resources for Employers to Accommodate Skilled Trades Workers with Disabilities

Participants recommended actions across employers, government, colleges or secondary schools, and training centres, while also noting limited awareness of existing resources.

For employers, Suggestions included: (a) transparent job postings that identify core

tasks and examples of possible accommodations (some cautioned this can feel performative if not genuine); (b) culture building for inclusion; (c) positioning trades as a strong fit for many persons with disabilities (e.g., hands on learning). Many participants believed employers should lead with inclusive employment but were uncertain about specific implementation steps.

For the government, proposed roles included grants and funding for both employees and employers, incentives for journeyperson mentorship, employment support centres, and restoring/expanding funding at key milestones (e.g., completion of training levels and certification exams). Participants referenced programs they had seen discontinued.

For colleges and secondary schools, participants urged earlier, non judgmental promotion of trades careers and visible examples of successful workers with disabilities to support self efficacy: "That would probably be high school... they already do target people... with ADHD" (Participant 2). Some felt secondary schools were underperforming in this area.

For training centres (i.e., union and non profit), suggested roles included connecting candidates to employers, sponsorship throughout apprenticeship, funding distribution, certification support, and helping individuals visualize full career pathways in the trades.

Across interviews, participants emphasized that learning preferences and accommodations are highly individualized, yet common patterns, hands on instruction, clarity, repetition, aids, and supportive mentorship, can be systematically supported. Successful accommodation was most likely where flexibility, resources, and supportive relationships converged, while misconceptions, insufficient preparation, system level disruptions, and denials constrained equity. Disclosure remained a risk reward calculus shaped by stigma, trust, and context, with participants more willing to disclose in educational than employment settings.

DISCUSSION

Overview

Across three objectives, this study shows that persons with disabilities in the skilled trades navigate a landscape marked by structural hurdles, cultural barriers, and uneven access to accommodations and inclusive equipment, alongside considerable resilience and strengths that support success. The findings reinforce evidence of persistent inequality in employment opportunities (e.g., wage and unemployment gaps (Hardy & Vergara, 2025)) and identify sector specific levers, particularly within apprenticeships, certification processes, workplace culture, and PPE design and procurement, that can close those gaps.

Objective 1: To examine the employment experiences of persons with disabilities in skilled trades

Structural and Cultural Barriers

Participants described administrative friction, paperwork errors, unclear processes, and complex rules that constrained entry, training progression, and certification. These barriers were often most acute at apprenticeship onset and during certification (e.g., Red Seal exam accommodations) and were amplified by system disruptions such as COVID 19 and the labour strike at training providers, which interrupted access to space, staffing, and communication supports. These experiences mirror evidence that inclusive apprenticeship pathways remain underdeveloped (De Raaf et al., 2024) and align with broader data showing widening disability related gaps in employment and wages (Hardy & Vergara, 2025).

Culturally, participants encountered stereotyping, gatekeeping, and "old boys club" norms, consistent with research documenting marginalization and hiring discrimination based on social status characteristics (Vornholt et al., 2017; Calluso & Devetag, 2024; Bailey et al., 2022). These norms often translated into pressure to "over perform" to achieve comparable recognition and advancement, an experience that contributes to cumulative fatigue and attrition. Participants also noted differential responses to visible versus invisible disabilities; invisible conditions were sometimes minimized or misunderstood, while visible disabilities could prompt unwanted scrutiny or judgment.

Functional Impacts and Strengths

Workers reported impacts related to attention, timing, communication, and social interaction, frequently intensified by employer misunderstandings rather than intrinsic limitations

(Stokar & Orwat, 2018; Groschl, 2007). At the same time, participants articulated strengths (e.g., hyperfocus, adaptability, persistence) that align with strengths based frameworks and challenge deficit oriented narratives (Wehmeyer & Shrogen, 2016; Ormerod & Newton, 2013). Physical demands were not universally prohibitive, but pain, mobility, dexterity, and flexibility constraints mattered for some; transportation limitations also constrained job access and mobility for certain workers, and assistive technologies may mitigate certain tasks (Du et al., under review; forthcoming), whereas sensory, cognitive, vision, and hearing needs often require systemic, not only individual, solutions.

Entry, Retention, and Advancement

Hiring experiences ranged from supportive to exclusionary. Participants perceived limited proactive recruitment of disabled workers (Lengnick Hall et al., 2008) and described dual stigma: disability plus the social devaluation of trades relative to other sectors (Pizzara Milian et al., 2025). Retention and promotion were discussed less frequently but, when raised, often required sustained extra effort to achieve parity, potentially contributing to "training ceilings" (Soeker et al., 2018) and motivating entrepreneurship as a route to model inclusive practice.

Objective 2: To investigate how disability interacts with workplace environments and equipment in skilled trades

PPE as a Safety and Equity Lever

Although PPE sits at the base of the Hierarchy of Controls (Morris & Cannady, 2019), it remains indispensable, and only effective when fitted properly, used consistently, and used as intended (Onyebeke et al., 2016; Brisbane et al., 2022). High injury rates in trades elevate the risks when PPE does not accommodate disability related anthropometric and functional differences. Poor fit and the performance penalties it creates, such as slower reaction times, reduced mobility, altered muscle activity, have been widely documented (Ammad et al., 2020; Bartkowiak et al., 2021; Brisbane et al., 2022). As seen with women in construction who lack access to appropriate sizes (Onyebeke et al., 2016), underrepresented groups face layered PPE inequities. Notably, PPE satisfaction correlates with job satisfaction (Wagner et al., 2013), underscoring potential links to retention. Participants also described conflicts between PPE and assistive devices (e.g., prescription/specialized lenses or hearing technology) that increased discomfort and reduced usability, highlighting an additional pathway to inequitable exposure.

Central Experience: Fit, Function, and Comfort (Including Sensory Load)

Participants' experiences cohered around fit, function, and comfort, with sensory load (i.e., seams, breathability, device weight/pressure, glare) producing distraction, fatigue, and symptom exacerbation, beyond generic comfort concerns (McPherson, 2008; Sehsah et al., 2020; Brisbane et al., 2022). They also noted executive function challenges (e.g., attention and memory demands) and routine executive function challenges (such as forgetting to don or doff equipment), for which workers proposed low cost, high yield strategies including spare kits, designated storage routines, continuous wear for certain items, and peer prompts. These data point to organizational and manufacturer levers that can yield swift improvements.

Persistent Knowledge and Policy Gaps

Despite growing interest in universal design (Bharath & Zakariya, 2021), disability specific PPE research in trades remains sparse; recent reviews identified no studies focused on improving fit/comfort for workers with disabilities (Tennant et al., forthcoming; Du et al., under review). An environmental scan catalogued PPE-adjacent adaptation (e.g., colour filter glasses, clear masks, hearing aid compatible hearing protectors, enhanced grip gloves, custom footwear) (Du et al., forthcoming), but these primarily modify tools or tasks rather than PPE fit or comfort itself. Provincial requirements for appropriately fitting PPE are inconsistent (Ontario, 2024; 2026; WorkSafe BC, 2022), and national guidance only briefly addresses disability within body type and gender considerations (CCOHS, 2025). The result is heavy reliance on individual workarounds and variable employer practices. Together, these gaps underscore the need for inclusive PPE design, procurement policies that stock multiple models/sizes (including beard compatible RPE), and routine fit/comfort trials to ensure sustained, safe use.

Objective 3: To analyze accommodation and disclosure processes among skilled trades workers with disabilities.

Learning Preferences and Effective Supports

Participants consistently identified practical (hands on) instruction, stepwise clarity, repetition, aids (e.g., checklists, written instructions), and mentorship as foundational supports, aligning with prior survey findings among Ontario apprentices and vocational learning literature (Bishop Williams et al., under review; Mackiwicz, 2025; Lei & Panicker, 2025). They also emphasized individualized physical and sensory conditions (lighting, noise/white noise, opportunities to move/stretch), suggesting the need to operationalize universal design and structured instruc-

tional practices in shop and site settings. These supports mirror the results themes of clarity, repetition, aids, and mentor supported learning across classroom, shop, and workplace contexts.

Accommodation: What Helps and Where it Breaks

Desired accommodations centered on flexibility in timing and pacing (extended time, pacing, non punitive absences), information supports, tutors/learning strategists, and task/assistive technologies. Evidence supports time extensions for some learners (Wei & Zhang, 2024), though debates about "over accommodation" persist in higher education (Harrison & Armstrong, 2022). In the trades, flexibility is site-based (e.g., schedules, sequencing), not telework; it remains critical to safety, learning, and retention. Access was uneven across context: unmet needs for communication/technical aids (Gupta et al., 2021; 2023), mixed associations between flexibility and lost time (Jessiman Perrault et al., 2025), and lower employment probability when needs go unmet, especially for early and late career workers (Schimmele et al., 2024). Employers reported low readiness and uncertainty about accommodation feasibility (Bishop Williams et al., forthcoming HR), while misconceptions, policy limits, and cost concerns persisted (Groschl, 2007; Sepulveda, 2021; Nittrouer et al., 2024; De Raaf et al., 2024). Consistent with these results, participants often lacked clear pathways to request accommodations and experienced variability between school and work settings.

Disclosure: Risk, Trust, and Context

Disclosure decisions reflected a risk–benefit calculus organized around worksite safety (protecting self and others) and transparency (perceived duty to inform), filtered through stigma, trust, and context (Tomas et al., 2022; Kulkarni, 2021). Participants were typically more willing to disclose in school than at work, citing perceived protection and responsiveness. Experiences diverged: some saw benefits (i.e., providing a rationale for accommodations; Patton, 2022), others reported penalties (i.e., stigma, job loss; Bam, 2025; Pantaleon et al., 2023; Gignac et al., 2025). Participants also noted that visible and invisible disabilities carried different social consequences, complicating decisions to disclose and the timing of that disclosure. Trust in supervisors and institutional culture were recurrent determinants, echoing the Results.

Resource Awareness and Diffusion

Participants were largely unaware of employer oriented resources and national frameworks (DWC, 2019; CSA Z1011, 2024; ESDC, 2024; Canadian Centre for Diversity and Inclusion, 2023; Canadian Human Rights Commission, 2026). This diffusion gap suggests that existing guidance is not reaching trades employers or frontline workers effectively, leaving individuals

to self advocate in the absence of supportive organizational systems (Christianson Barker et al., 2025; Tompa et al., 2022). Findings underscore the need to translate national guidance into trade specific toolkits, simple workflows for accommodation requests, and supervisor training.

Cross-Objective Synthesis

Legislative and strategic frameworks exist, but implementation lags within trades ecosystems, especially at apprenticeship entry, testing/certification, and site level practices (e.g., scheduling flexibility, PPE procurement and fit testing, accommodation workflows). Standardized, transparent processes and timelines are pivotal to reduce administrative friction.

Small, manufacturer level PPE changes (e.g., breathable fabrics, flat/external seams, adjustable eyewear, beard compatible respirators, wider size/shape ranges) and procurement policies (e.g., offering multiple models/sizes, on site fit/comfort trials) can produce outsized gains in safety, use, and retention for workers with disabilities. Inclusive PPE is part of reasonable accommodation and safety equivalence.

Addressing "old boys club" norms and knowledge gaps through supervisor/mentor training, disability confident HR, and structured mentorship can reduce stigma, enhance learning, and normalize accommodations. Embedding mentor roles and checklists/aids into routine practice operationalizes this shift. Confidential, predictable, and trust based disclosure and accommodation processes, anchored to safety rationales and job relevant needs, can lower stigma costs and improve uptake. Clear points of contact, documented responses, and non retaliation assurances are essential.

LIMITATIONS

This qualitative study used a broad, self determined definition of disability, consistent with contemporary conceptualizations, rather than an explicit "work disability" definition. While aligned with strengths based and self determination frameworks, self identification may bias participation toward individuals with milder or undiagnosed conditions and limits comparability across the diverse work disability definitions in the literature.

Although participants reflected varied demographics, disability types, and trades, the sample does not capture the full range of skilled trades or impairment severities. With over 50 Red Seal trades nationally, trade specific cultures and job demands may produce unobserved barriers. Individuals with more severe disabilities appeared underrepresented, potentially

mirroring broader employment exclusion. The study also lacked sufficient power to analyze differences by trade, impairment type, or disability severity (visible vs. invisible), constraining subgroup inference.

Researcher positionality and co interpretation with advisory groups strengthen interpretive validity but may also shape emphasis and meaning. As with all qualitative research, transferability depends on context; findings reflect shared themes rather than universal experiences.in addition, older workers were underrepresented (~10%), potentially attenuating reports of PPE fit/comfort challenges that increase with age; disability severity was not formally assessed, and anthropometric variation (e.g., hand morphology with arthritis) was not measured, limiting design relevant precision. The interview guide emphasized function; expressive/aesthetic PPE dimensions (FEA) may be underarticulated relative to functional concerns. Moreover, heterogeneity across institutions and employers limited our ability to disentangle system vs. site level barriers to accommodation and disclosure. Finally, the study took place amidst recent system disruptions (e.g., pandemic; college support staff strike), which may have amplified administrative and access barriers beyond typical conditions.

FUTURE DIRECTIONS

Future work should adopt trade stratified sampling and severity indexed measures (including visible/invisible and episodic conditions) to enable subgroup analyses by trade, impairment type, and disability severity across the employment trajectory. For PPE, studies should collect disability specific anthropometric data (e.g., hand morphology in arthritis; facial hair and seal variables; head/face dimensions for eyewear/respirators), conduct fit and comfort trials in real job tasks, and explicitly probe the expressive and aesthetic dimensions of FEA alongside function. In apprenticeships and certification, implementation research should test simplified accommodation workflows (e.g., standardized forms, timelines, and points of contact), evaluate procurement standards (e.g., multiple models/sizes, beard compatible RPE, assistive tech compatibility), and assess impacts on safety, learning, retention, and advancement using mixed methods. Multi site studies that follow workers longitudinally, including periods of flare up and relative stability, will clarify how severity and trade specific demands interact over time and which co designed solutions (i.e., with workers, unions, and employers) scale effectively in the skilled trades.

CONCLUSIONS

This study demonstrates how structural processes, workplace culture, and equipment design and procurement jointly shape the employment experiences of persons with disabilities in the skilled trades. Participants consistently exhibited adaptability and perseverance, yet faced administrative obstacles (e.g., apprenticeship entry, accommodation workflows, certification logistics, transportation), stigmatized norms (e.g., "old boys club," differential treatment of visible vs. invisible disabilities), and uneven access to supports (e.g., instructional clarity, mentorship, flexibility, and resources). These dynamics required many to "over perform" to achieve comparable recognition and advancement, reinforcing inequities despite clear disability related strengths (e.g., practical problem solving, hyperfocus, collaborative awareness).

Within the work environment, PPE fit, function, and comfort, including sensory load and compatibility with assistive devices, emerged as pivotal to safe participation, performance, and retention. Applying the FEA framework underscored that functional, expressive, and aesthetic elements are interdependent: small design choices (e.g., seam orientation, breathability, geometry/adjustability, beard compatible respirators) can have disproportionate safety and inclusion impacts. Participants offered pragmatic, design oriented recommendations that align with disability informed co design and point to actionable levers for manufacturers and employers.

Effective participation was facilitated by hands on instruction, clarity, repetition, aids, and mentorship, alongside site based flexibility (time, pacing, non punitive absences). Yet the diffusion of existing policies and frameworks into trades practice remains limited, leaving workers to self advocate and organizations to improvise. Advancing equity will require operationalizing what is already known: streamlined accommodation processes in apprenticeships and certification; procurement standards that ensure inclusive PPE options and fit/comfort trials; disability confident supervisor and mentor training; and trust based, predictable disclosure pathways tied to safety and job relevant needs. These steps are essential to translate national visions of inclusive work into day to day practice across the skilled trades.

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