



Rising Skills: Digital Upskilling for Advanced Manufacturing Workplaces

The manufacturing sector is becoming more technologically advanced. Tradespeople need 21st-century digital skills to adapt to these 21st-century workplaces. But the sector is struggling to attract young people and women into the trades.

We asked stakeholders across Canada about the emerging skills that manufacturing tradespeople need to adapt to the future of work.

For this research, we consulted welders, metal fabricators (fitters), machinists, industrial electricians, instrumentation and control technicians, and others—particularly in the Red Seal trades. Although not all apprentices, journeypersons, and trainers were Red Seal-certified, we primarily consulted trades that are common to most jurisdictions across Canada and approved for Red Seal status.

The [Red Seal Program](#) sets common standards to assess the skills of tradespeople across Canada.

Rising importance of 21st-century digital skills and social and emotional skills

Advanced manufacturing processes demand 21st-century digital skills. Technical skills include the ability to use computerized machinery, set up IP addresses for equipment, and safely install digital technology. Tradespeople also need to be able to communicate effectively, collaborate virtually, solve problems in digital environments, and use technology to manage trade-specific information.

Beyond digital literacy, tradespeople need understanding and empathy to work in increasingly diverse workplaces and to deal with difficult interactions. They will need to adapt to changing workplaces and “wear many hats”—for instance, welders are sometimes asked to do fabricators’ tasks.



Broadband vs. dial-up generations

Generational differences affect digital upskilling:

- Apprentices are typically digitally savvy. They prefer text and e-mail communication, whereas established journeypersons are less comfortable with basic digital tasks and prefer voice and face-to-face communication.
- Older tradespeople are often more proficient with traditional methods. Younger apprentices may only know how to use emerging technologies.
- The pace of digitization can be overwhelming for older journeypersons. They may offload digital tasks to younger staff while being reluctant to pass along traditional trade knowledge for fear of losing their jobs.

These generational differences can impede apprentices’ on-the-job learning, specifically of digital skills. Journeypersons may not be familiar enough with emerging technologies to mentor apprentices on technical skills. In addition, miscommunication can intensify differences in work style: Some apprentices can’t directly communicate their questions, and some journeypersons can’t adequately process online queries.



“The old one has dials ... and the new ones are digital.... Old guys don’t know how to set the new ones—they’re used to the old knobs. So, just technology, it’s everywhere. If you can’t keep up, you’re a dinosaur.”

Journey person, manufacturing sector

For knowledge to be transferred, both parties require core communication skills: active listening skills and the ability to convey information in a way that is attentive to generational preferences.

Rebranding manufacturing trades to align with future work trends

The trades have been stigmatized as manual, dirty, and old-fashioned. People we talked to observed that youth are more interested in technology jobs. Clearly, there is a need to rebrand these roles to align with the digital reality. Canada needs to tackle the urgent skill and labour shortages in the manufacturing sector—in part by opening opportunities to explore digitally advanced careers for marginalized groups, such as diverse youth and women.

Recommendations

The following suggestions could strengthen apprenticeship training and lifelong learning in the Canadian manufacturing sector:

- **Highlight emerging skills in recruitment efforts.** Marketing and promotional materials need to encourage young people and women to enter the trades. One way to encourage them would be to highlight the digital skills needed in advanced manufacturing environments.
- **Develop a knowledge transfer strategy to address emerging skills.** Employers should consider strategies that address the unique learning needs of tradespeople at different stages of their careers:
 - **Promote team mentoring on emerging skills.** Tradespeople and apprentices on a team would identify common learning goals related to emerging skills and technologies. Individuals would work with one or more mentors on the team to develop emerging skills.

- **Use reverse mentoring to help journeypersons upgrade their digital skills.** In this approach, a junior apprentice mentors a senior tradesperson on digital skills. The mentee becomes the mentor specifically on digital skills, thereby improving reciprocity in the relationship.

- **Integrate generational considerations into mentorship training.** Mentorship training should include cross-generational communication strategies, so older tradespeople are better able to communicate with younger generations.
- **Integrate social and emotional skills into inclusive workplace strategies.** Social and emotional skills training can increase respect, the ability to resolve conflicts, and emotional intelligence in the workplace. This training should be offered alongside broader inclusivity strategies to make manufacturing workplaces more inclusive for women.

Want to learn more?

On behalf of the Future Skills Centre, we spoke with Canadian apprenticeship stakeholders across a range of trades. To learn more about this research, see our impact paper, *Bridging Generational Divides: Advancing Digital Skills in Canada’s Apprenticeships and Skilled Trades Ecosystem.*



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