Learning | Whitepaper

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Labour and skills shortage in Canada

Immersive technology promises faster, cheaper and safer skills development to address gaps in the workforce.

Summary

There is currently a labour shortage in Canada. The shortage is being driven by two trends: too few training and apprenticeship opportunities for people entering the workforce, and too many skilled people leaving the workforce. Training capacity for in-demand jobs is not keeping pace with the needs of Canada's workforce. This is impacting many sectors of the Canadian economy—most notably the construction industry—contributing to the existing housing shortage in Canada.

The labour challenge will have different impacts across sectors. There will be reduced demand for some jobs in natural resources sectors, while demand increases for green sector jobs. Additionally, people already in some skilled trades are forecasted to need upskilling in the next decade to expand their capabilities to keep pace with market trends. There is no simple answer or simple solution to addressing these complex problems.

To address the issue of training new workers, immersive solutions provide an attractive alternative to existing training and skills development approaches. Using virtual reality (VR), augmented reality (AR) and mixed reality (MR) technologies for training, trainees across a wide range of job roles can be trained faster, cheaper and more effectively than relying on live training programs alone. Immersive training also means delivering training in a low-risk environment where trainees can make mistakes, learn from them and improve knowledge retention.

Immersive training technologies have applications in many sectors, such as skilled trades, healthcare, technical occupations and even military training. The versatility of immersive training technologies means that virtually any sector with labour shortages could benefit from integrating these technologies into their training and skills development plans.

The current labour market

The labour market for people with skilled trades in Canada is in crisis. There are not enough people in the skilled trades to meet demand across a range of specialties, including construction, mechanics and repair technicians, and precision trades like welding.

There is also a shortage of apprenticeship spaces for training new people in skilled trades, making the labour shortage more complex to address.

The labour market shortage for skilled trades today presents significant challenges across multiple sectors of the Canadian economy. As of early 2022, there were more than 80,000 unfilled skilled trades jobs, up approximately seven per cent from the same period in 2021. These shortages were spread across a wide range of trades, including construction, auto mechanics and repair technicians, and more broadly applicable trades like welders.[1] The shortage means longer wait times for delivery, higher costs for delivery and generally less efficiency in the affected sectors.

The construction workforce has been hardest hit by the shortages of skilled workers compared to other sectors.[2] The construction workforce saw a decrease in skilled tradespeople of about four per cent in 2022, while managerial roles grew over the same period. This creates pressure on the existing pool of skilled tradespeople, with more work expected from fewer workers.

A shortage of construction workers creates systems-level challenges for building new buildings for all purposes. Housing in Canada has been hit particularly hard by labour shortages, with ripple effects projected well into the future. Canada is estimated to need approximately 3.5 million additional housing units on top of what is already required to sustain affordability for Canadians through to 2030.[3] Skilled tradespeople are vital to realizing this target. The skilled labour shortage for construction trades is directly linked to the housing shortage that Canada is experiencing today and linked to forecasted shortfalls.[4]

There is also a shortage of apprenticeship spaces to train new skilled tradespeople. Between 2016 and 2021 there was a decrease of 10 per cent of the total available spaces for apprenticeships, reducing the annual rate of new, qualified tradespeople ready to work year over year. Between 2019 and 2021 the demand for skilled tradespeople nearly doubled, making the impacts of the existing worker shortage and the reduced intake of new apprentices even more significant.[5]

The current labour market is experiencing not only shortages of qualified people, but shortages on the pathway to training new tradespeople.

Labour market trends

The labour market is changing, and change will accelerate as the adoption of automation and artificial intelligence accelerates. This will cause uneven demand across the labour market. New jobs and skilled trades will emerge—especially in green technologies—while other industries will require fewer workers.

The future labour market will require more skilled tradespeople overall, and this means a mix of training new workers and upskilling or retraining existing workers for new roles. Training requirements will continue to grow as the total demand for skilled tradespeople grows.

The future labour market for skilled trades is expected to be a mix of existing roles, and new skilled trades that did not previously exist. While the commercial and industrial use of automation and artificial intelligence (AI) are expected to accelerate and change the demand for labour across multiple sectors, the increased demand for human interaction and problem-solving is expected to increase the demand for "soft skills" and interpersonal roles.

The oil and gas (O&G) sector is expected to see changes from automation. O&G in Canada is expected to grow by approximately nine per cent over the next two years (2024–2026), with growing production targeted at export

markets.[6] Expansion of technology for oil and gas extraction is expected to reduce the overall number of jobs required in that sector even as output increases, with declines in aggregate oil and gas sector jobs as some roles become automated.[7] While there is still opportunity for employment in this sector going forward, automation will replace some roles and reduce aggregate demand for those roles.

Countries around the world are seeking to reduce emissions and increase the use of green and electric technologies.[8] This is expected to have major impacts on the future labour market, including for skilled trades. Roughly 13 per cent of new jobs in Canada by 2030 are expected to be in the green sector, with the potential for that figure to be as high as 20 per cent—400,000 jobs—if there is high growth in clean transportation and industrial technologies. Some longer-term estimates predict as many as 2.2 million people employed in clean energy by 2050.[9] Growth of green jobs is expected to be approximately five times higher than industry-wide projections for jobs in manufacturing and utilities, trades, transport and equipment, natural resources and agriculture sectors.[10] This is a major area of potential growth.

The transition to zero-emissions vehicles is expected to be a significant driver for jobs creation across the ecosystem that sustains zero-emissions vehicles, including infrastructure and manufacturing. The growth of renewable energy sources like wind and solar will require skilled tradespeople for manufacturing, repair and maintenance of clean energy infrastructure to ensure power is reliably generated and connected to hydro grids. Manufacturing jobs are also expected to surge for green energy, from solar and wind manufacturing to generate power to battery and charging station infrastructure to keep zero-emissions vehicles running.[11] The growth for demand for green sector jobs is expected to be significant.

High growth is also expected in roles that require a variety of daily activities and interpersonal skills.[12] This means training people for non-routine skills that are related to problem-solving and outcomes—focusing more on the result than on the specific process to get there. This requires training for "soft skills" in addition to the technical components of work.

In terms of the educational preparation that is expected for tomorrow's workforce, current projections show the single biggest category of jobs growth is for roles that require college education or apprenticeships—including skilled trades. The college education and apprenticeships category is forecast to comprise approximately 36 per cent of the jobs on the 2022–31 timeframe. The highest-growth jobs in the college and apprenticeships categories include:[13]

- Health services and associated roles
- Professional occupations in nursing
- Harvesting, landscaping and natural resources
- Technical occupations in health, arts, culture, recreation and sport
- Paraprofessionals including legal, social, community and educational services

The areas that will see the biggest decreases are industrial labour, bricklaying, assembly of some manufactured goods, and some outdoor professions in fishing, hunting and trapping.[14]

The challenge

Meeting the needs of the labour market for today and tomorrow will require training more people, faster, for the jobs in demand.

This will require both an expansion of the labour force for skilled trades that already exist and development of a workforce for new skilled trades—specifically for those new skilled trades required to support new sectors and technologies.

There are two primary challenges: training new workers to meet demand and upskilling existing workers.

Training new workers is essential to grow the workforce and to replace retiring workers. By 2028, an estimated 700,000 workers in Canada are expected to retire from all trades.[15] Many of these workers have significant experience and cannot be quickly replaced.

Upskilling existing workers is another major challenge. As of 2021, up to one million people working in the trades in Canada were expected to need upskilling at some point in their career to keep pace with changes in the labour market and the demand for new skills.[16] This includes upskilling older workers. In 2021, roughly one in three people entering apprenticeship programs for mechanical and automotive repair and precision production were 55 years or older.[17]

Upskilling will be required across many sectors. As many as 46 per cent of the current skilled trades jobs in natural resources and agriculture, and up to 40 per cent of skilled trades jobs in transport and heavy equipment will require upskilling to keep pace with the evolving demands in those trades.[18]

The barriers

The barriers to meeting the challenges are mostly related to capacity. A shortage of instructors and training opportunities is preventing entry to many people who want to learn skilled trades.

The shortage of instructors and training opportunities means there are more people willing to take on jobs in the skilled trades than there are people to teach and prepare them. It takes a long time to train instructors with the right experience and knowledge to train others. There is also a shortage of spaces available for training new people, and the spaces that are available are generally underfunded.[19]

Securing an apprenticeship is becoming increasingly difficult for new workers and for workers seeking to upskill. There is simply not enough capacity using current methods and approaches to train for skilled trades. The Canadian Apprenticeship Forum estimates that there is will be shortage of 60,000 apprenticeships by 2025, which translates into a shortage of 10,000 skilled tradespeople across 56 Red Seal trades, and up to 100,000 skilled trades if we include the 250 provincially regulated trades.[20]

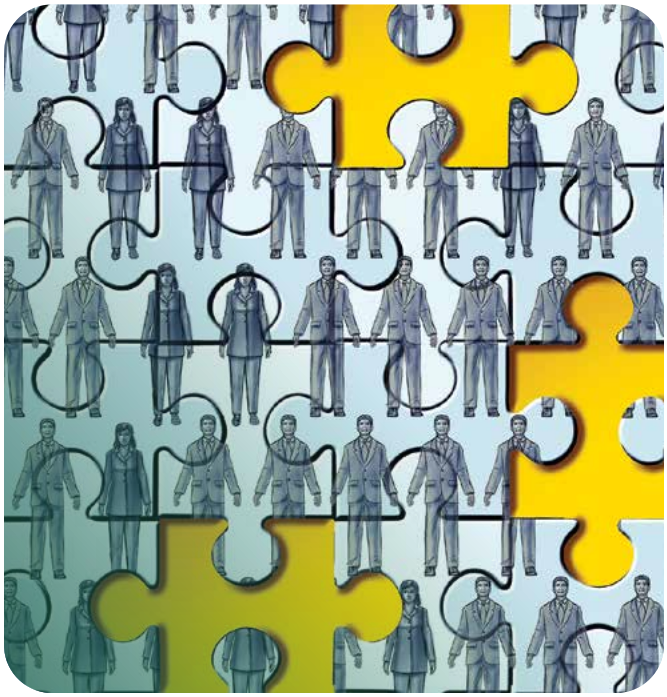
These barriers to developing new skilled tradespeople are contributing to the shortage today and will continue to contribute to the shortage of tomorrow if the barriers are not addressed.

Applying immersive training solutions

Immersive training is a viable option to reduce the infrastructure, number of instructors, costs and time associated with training people for skilled trades. Immersive solutions provide realistic, 360 degree and 3D environments where trainees can learn a trade—from the overview to processes, standard operating procedures and safety requirements.

Immersive training solutions using virtual reality (VR), augmented reality (AR) and mixed reality (MR) technology provide a highly realistic, 360–degree training environment for developing new skilled tradespeople. Immersive solutions reduce the time-to-competency by providing a realistic, immersive experience where trainees learn the process of their trade, safe operating procedures, tool manipulation, and key lexicon and terminology. Immersive solutions can also include fail conditions where trainees get rapid feedback on their performance, where they have made mistakes and what to do next time.

Immersive solutions require less supervision and interaction from instructors, compared to relying on live training only. Immersive solutions put less demand on instructors, allowing for larger classes and cohorts. Automated voice recognition and fail conditions identify student errors immediately, making corrections faster. The reduced load on instructors and rapid feedback shortens time-to-competency for students.



Range of skills

Immersive solutions can train people for a wide range of skills—both procedural and for human interaction—across a wide range of job roles.

Companies and organizations with highly diverse needs—skilled trades, healthcare delivery and military—have all used immersive training solutions to reduce the time-to-competency for skills development. Immersive training solutions prepare people for process-driven roles and for human interaction and soft skills.

Immersive solutions are highly versatile and can deliver training for a wide range of different skills for any job roles.

Process focus: Immersive solutions train students to follow a process for executing a task. Skilled trades in construction, industry, hazardous materials, natural resources and agriculture all include standard processes for executing tasks. Medical jobs also provide a process for triage, diagnosis, treatment and administration. Immersive solutions train people on processes in a 360-degree environment to keep the audience engaged throughout the process.

Safety focus: Training for roles where worker, environmental or public safety could be at risk is serious business. Mistakes in those jobs can have major consequences—whether on the job or during live training. For safety-focused roles, immersive solutions emphasize safety in the learning process and provide fail conditions for safety violations. Trainees can make mistakes in a virtual environment with very low risk of harm and an emphasis on the importance of safety.

Decision-making: Presenting realistic and complex situations and conditions in immersive environments trains students to use their skills and judgement to make decisions. This kind of immersive training is valuable for complex tasks where strict processes may not always apply. Decision-making training can include fail conditions for clear errors in judgement, while providing an assessment of other aspects of student performance.

Soft skills: Many roles require interaction with other people. This applies to jobs in the retail sector, the health sector, and even high-demand skilled trades like carpentry, industrial mechanics (millwright), automotive service and welding.[21] Communicating and understanding others is essential to roles where interaction with peers, colleagues, leaders, customers and stakeholders is part of the job. Using immersive training technologies, students can practice social interaction and other soft skills in a virtual environment to improve interpersonal skills.

How has Calian delivered immersive training solutions?

Calian has delivered immersive solutions for a wide range of customers, meeting learning needs for skilled trades, medical staff and the military. These immersive solutions deliver highly realistic training environments to prepare learners for job tasks.

Hydro Ottawa delivers electricity to more than 3.3 million homes in Ottawa and the National Capital Region. Hydro Ottawa's workforce of technicians connects homes to the grid to ensure a safe, reliable connection of power.

Calian worked with Hydro Ottawa to develop a virtual reality (VR) trainer for hydro technicians connecting houses to the grid, using a meggering sequence. The VR solution immerses trainees in a virtual environment and prompts them to select the right tools and equipment to safely connect a house to the grid. The sequence prepares the technician for the job, verifying that everything was done safely.

The VR trainer accelerated the process of training new technicians, reduced the risk of training accidents, improved the competence of recently trained technicians, and reduced the number of instructors required to deliver training. Hydro Ottawa continues to use this immersive solution to train new technicians on connecting houses to the grid.

calian.com/learning/case-studies/hydro-ottawa/

Parkland is the largest independent supplier and marketer of fuel and petroleum products in Canada and the Caribbean, employing many fuel delivery drivers to sustain operations.

Calian worked with Parkland to develop a virtual reality (VR) training solution for delivery drivers. The student is immersed in a 360–degree environment, including tanks, the truck, tools, gauges, valves, measurement equipment and personal protective equipment. The VR solution trains drivers on the process and safety protocols for transferring fuel, focusing on driver and public safety.

Parkland is using VR as an improved training tool for new drivers doing fuel delivery. Allowing drivers to repeat and practice fuelling processes shortens the time-to-competence, reduces fuel waste and reduces the risk to drivers and the public from fuelling accidents.

calian.com/learning/case-studies/fuel-handling-experience/

ST JOSEPH'S HEALTH CENTRE TORONTO

McMaster University

St. Joseph's and McMaster collaborated with Calian to develop an immersive virtual reality (VR) solution to train medical staff in forensic psychology settings for managing critical incidents, where a risk of violence or major incident exists.

We developed the training scenarios working directly with leaders at St. Joseph's Health Centre and McMaster University to prepare doctors, nurses and other medical professionals for routine, complex and possibly dangerous situations. The scenarios are based on real-life clinical events to prepare clinicians for things that have happened. These scenarios exercise judgement and decision-making skills in proven clinical situations.

Using VR, the training solution immerses the trainee in an environment that simulates clinical situations, allowing clinicians to put their skills to the test in a lower-risk environment. The VR training solution allows the user to make mistakes in a virtual environment to develop soft-skills and decision-making before putting skills to the test in a real-life environment.

calian.com/learning/case-studies/forensic-psychology-training/

ROYAL CANADIAN NAVY MARINE ROYALE CANADIENNE

The Royal Canadian Navy (RCN) conducts replenishment-at-sea (RaS) operations while underway, transferring fuel, equipment and bulk goods. RaS operations are expensive and require fully crewed vessels to go to sea for weeks to train in a real-life environment.

Calian developed a mixed reality (MR) training solution to prepare sailors for RaS operations onshore. Using realistic representations of the Canadian patrol frigate (CPF) and auxiliary oil replenishment ship (AOR), sailors are immersed in a realistic synthetic environment. The MR solution allows sailors to watch demonstration of the RaS process to familiarize themselves with the process, and then to lead the RaS process as the station captain.

The RaS solution is an immersive, realistic training solution that is much less costly than putting ships to sea, with a very low risk of injury for sailors. The RaS solution prepares sailors onshore to build confidence and improve proficiency before performing the RaS process while at sea and underway.

calian.com/learning/case-studies/replenishment-at-sea/

Other applications of immersive training solutions

Calian has delivered immersive solutions for non-training purposes, including market research, promotional purposes and for museums. The immersive solutions deliver a realistic, engaging experience that showcases their value.

Nielsen

Nielsen is a respected, global research firm that delivers insights to customers. We developed a research solution for Nielsen for the customer buying journey in a retail setting, measuring customer engagement with different products and promotion. This solution provided valuable data about preferences for products, colours, and the buying journey.

calian.com/learning/case-studies/nielseniq/

VISA

Visa is a global payments leader and a sponsor of the Olympics. Calian developed an immersive experience of the bobsled track for the 2018 PyeongChang Winter Olympics. This immersive experience was intended to give the user a sense of what it feels like to ride the bobsled down an Olympic-grade track.

calian.com/projects/ visas-virtual-reality-bobsled-experience/

CANADA SCIENCE AND TECHNOLOGY MUSEUM

The Canadian Science & Technology Museum hosts many locomotives in their collection. Calian developed an immersive experience to allow any visitor to work in the steam cabin of a steam locomotive, to learn how it functions and how to operate it. This provides an immersive experience in a synthetic environment alongside the real locomotive—CN6400—from 1939.

calian.com/projects/cn6400-steam-locomotive-vr-experience/

Benefits

Immersive training helps deliver qualified workers cheaper, faster, more safely and with greater knowledge retention than relying on classroom or live training environments alone.

Cheaper than live training alone

Using immersive solutions to deliver training is much cheaper than relying on live training alone. Immersive solutions do not replace live training; they allow trainees to build confidence with processes, tools and outcomes without using real infrastructure or equipment. Immersive solutions build confidence and capability before confirming skills in live simulation.

Faster

Immersive solutions reduce time-to-competency compared to relying on classroom and live simulation alone. Faster training means shortening the on-boarding process for new hires and reducing time away from their core functions when upskilling existing team members. Immersive solutions allow organizations to reduce the time cost for new hires and streamlines upskilling.

Higher retention

Providing a digital, 360–degree, 3D environment engages learners and improves uptake of lessons and practical knowledge. Immersive solutions allow learners to focus on the job in a gamified environment, improving retention of knowledge and delivering greater efficiency on your training investment.

Safer

The risk of injury or harm to people or hazardous material contamination is always present for industrial processes and for many skilled trades. The use of immersive technologies significantly reduces the risk of injury. All the tools and equipment are simulated, meaning that mistakes are only simulated—not real. With almost no risk to the user, mistakes can be corrected in a simulated space where trainees can learn and develop their skills.

See our overview video on immersive training solutions: youtube/zZpkaLZQGFI

What does it all mean?

The labour force in Canada is facing major challenges. A wide range of skilled trades are facing shortages, impacting multiple sectors of the Canadian economy. Training new skilled tradespeople requires instructors and apprenticeships, and those are also in short supply. An ongoing shortage of workers and insufficient capacity to train new people means the shortage is likely to endure. This impacts existing fields and sectors, impacts the capacity to upskill workers or retrain them for different sectors, and impacts the growth of skilled tradespeople in green and renewable energy jobs.

Immersive technologies for learning provide an attractive option for accelerating the pace of training people across a range of sectors, including skilled trades, healthcare and other roles. Immersive technologies provide a safer, faster, cheaper and more effective alternative to relying on traditional classroom and live simulation training alone. Calian has worked with a wide range of customers to deliver immersive training solutions to build the skills of their workforce faster and more effectively than before.

The potential of immersive training technology to address labour shortages is significant. Providing training faster—while improving quality—is a game-changer for developing new talent. Reducing the time-to-competency means more cohorts of trainees annually, increasing the rate at which Canada can train new people. Widespread adoption of this technology can help close the growing skills gap in Canada by training more people, faster.

Simulation-based training has been used for years. The aviation industry, the military and the natural resources sectors have been using simulation-based training to build skills in safe environments at a fraction of the cost of relying on live training alone. Immersive simulation has similar potential to accelerate the pace of training for skilled tradespeople and other process and safety-focused job roles.

Get in touch

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linkedin.com/company/calianlearning/

See other content from Calian

- Joint Terminal Attack Controller: calian.com/learning/case-studies/jtac-vr/

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Confidence. Engineered.

Calian® helps people communicate, innovate, learn and lead safe and healthy lives. Every day, our team embodies our core principles of unwavering customer commitment, integrity, innovation and teamwork, to engineer reliable solutions that solve complex problems. That's Confidence. Engineered.

We are a growing company headquartered in Ottawa with offices and projects spanning North American, European and international markets with a focus on innovative healthcare, communications, learning and cybersecurity solutions.

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