

Artificial Intelligence at Work: The Shifting Landscape of Future Skills and the Future of Work

Insights From the Survey of Employment and Skills



The Diversity Institute conducts and coordinates multi-disciplinary, multi-stakeholder research to address the needs of diverse Canadians, the changing nature of skills and competencies and the policies, processes and tools that advance economic inclusion and success. Our action-oriented, evidence-based approach is advancing knowledge of the complex barriers faced by underrepresented groups, leading practices to effect change and producing concrete results. The Diversity Institute is a research lead for the Future Skills Centre.



The Future Skills Centre (FSC) is a forward-thinking centre for research and collaboration dedicated to driving innovation in skills development so that everyone in Canada can be prepared for the future of work. We partner with policy makers, researchers, practitioners, employers and labour, and post-secondary institutions to solve pressing labour market challenges and ensure that everyone can benefit from relevant lifelong learning opportunities. We are founded by a consortium whose members are Toronto Metropolitan University, Blueprint and The Conference Board of Canada and are funded by the [Government of Canada's Future Skills Program](#).



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Authors

Dr. Wendy Cukier

Founder and academic director, Diversity Institute, Ted Rogers School of Management
Professor, Entrepreneurship & Strategy, Toronto Metropolitan University

Dr. Alyssa Saiphoo

Senior research associate, Diversity Institute

Dr. Andrew Parkin

Executive director, Environics Institute for Survey Research

Contributors

Dr. Guang Ying Mo

Director of research, Diversity Institute

Carter Man

Research assistant, Diversity Institute

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About the Survey on Employment & Skills

The Survey on Employment and Skills is conducted by the [Environics Institute for Survey Research](#), in partnership with the [Future Skills Centre](#) and the [Diversity Institute at Toronto Metropolitan University](#). In early 2020, the Survey on Employment and Skills began as a project designed to explore Canadians' experiences with the changing nature of work, including technology-driven disruptions, increasing insecurity and shifting skills requirements. Following the onset of the COVID-19 pandemic, the survey was expanded to investigate the impact of the crisis on Canadians' employment, earnings and work environments. A second wave of the survey was conducted in December 2020, a third wave in June 2021, a fourth wave in March–April 2022, a fifth wave in March 2023, a sixth wave in October–November 2023, and a seventh wave in May–July 2024. Each wave of the study consists of a survey of over 5,000 Canadians aged 18 years and over, conducted in all provinces and territories. A total of 34,740 Canadians were surveyed across the six waves. The survey includes oversamples of Canadians living in smaller provinces and territories, those under the age of 34 years, racialized Canadians and Canadians who identify as Indigenous, in order to provide a better portrait of the range of experiences across the country. Unless otherwise indicated, the survey results in this report are weighted by age, gender, region, education, racial identity and Indigenous identity to ensure that they are representative of the Canadian population as a whole.

Survey reports can be found online at:

> www.environicsinstitute.org/projects/listing/-in-tags/type/survey-on-employment-and-skills

> fsc-ccf.ca/research/2020-survey-on-employment-and-skills/

> www.torontomu.ca/diversity/research/future-skills/survey-on-employment-and-skills/

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Executive Summary

Introduction

Canada is a leading talent hub for artificial intelligence (AI). Despite this, Canada is falling behind globally in AI adoption. Barriers to AI adoption that Canadians experience include a lack of awareness of AI tools that can be used in the workplace, as well as ethical and privacy concerns with integrating AI into operations. However, the top barrier to AI adoption noted by Canadian businesses is difficulty finding employees with the necessary skills and expertise to support the integration of this technology into operations. Yet, if the data shows that there are plenty of AI professionals in Canada ready to work, then why are employers experiencing this difficulty?

Research design

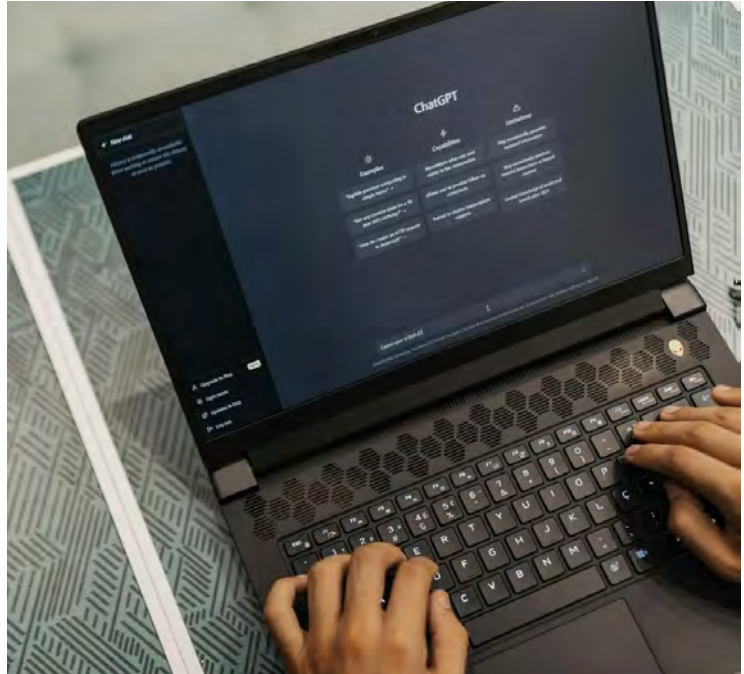
In the seventh wave of the Survey on Employment and Skills, conducted by the Environics Institute for Survey Research in partnership with the Diversity Institute at Toronto Metropolitan University and the Future Skills Centre, this disconnect was investigated. The survey was first administered in 2020, and as of the seventh wave in 2024 now has over 40,000 participants. In the most recent wave of the survey (n=5,855), questions about familiarity, use, perceptions and training on AI were added to investigate Canadians' perceptions of this emerging technology.

Findings

Survey findings showed that most respondents are somewhat familiar with AI tools to use in the workplace. Just under one-third of those who were employed indicated they have used AI at work to help with tasks, with positive effects; most reported that using AI had made them more productive and more creative at work.

Despite this, those who were the most familiar with AI tools in the workplace were those who were the most worried about their jobs becoming automated.

Perceptions of new technologies were mainly mixed or positive, with the exception of training at work: just over one-half of respondents felt that their employer was not providing enough training in new technologies. Consistent with this, most respondents who had used AI at work indicated that they had done so largely without any training or without a lot of formal guidance from their employer. Instead, many employees are taking it upon themselves to learn how to use these tools, either learning on the go while using the technology, or seeking out and engaging in training and governing use of these tools on their own.



Group differences were also identified. Younger age groups, men, Indigenous, racialized and immigrant respondents were more likely than their counterparts to be familiar with and have received training on AI tools in the workplace.

Conclusions and implications

The results from this wave of the survey highlight the urgency for employers to create policies and implement training on using AI tools in the workplace. Employees are already using these tools, with or without guidelines from employers and this is likely to increase as AI tools become more widespread. If employers do not put policies into place and provide training soon enough, then adoption of AI into business operations down the line will be more difficult if employees already have their own informal rules about this.

Further, the relationship between familiarity and worry about automation suggests a need for AI literacy. Data suggests that AI adoption is associated with job creation rather than job loss, but a lack of understanding and fear-mongering in the media about these tools might contribute to this worry. Increasing AI literacy in the general population could go a long way to reducing skepticism about these technologies and increasing AI adoption.

These results also highlight an important shift to self-guided training. Employees are taking it upon themselves to keep up with these new technologies and not waiting for their employer to offer training or guidance. Overall, employers need to catch up to employees and expand the talent pool if Canada is to keep its lead in the global AI race.

Introduction

Canada is positioned to become a global leader in artificial intelligence (AI). Already, Canada is a leader in AI talent, with more than 140,000 AI professionals in 2023; this is a 29% increase from 2022.¹ Canada also leads in gender diversity in AI. Within most technology fields, there is a known gender gap when it comes to employment and wages. However, Canada saw a 67% growth in the number of women in AI from 2022 to 2023—the largest year-over-year growth seen worldwide.²

Several Canadian companies are adopting AI. Drivers of AI adoption by Canadian businesses include making operations more accessible and reducing operating costs.³ A report by IBM showed that AI adoption is being seen mainly in larger organizations,⁴ and mostly in information and cultural industries.⁵ The specific AI applications used by Canadian businesses varies across industries. Natural language processing is most commonly used in information and cultural industries; image and pattern recognition is used most commonly in professional, scientific and technical industries; and virtual agents or chatbots are most commonly used by the finance and insurance industry.

Artificial intelligence adoption is most commonly seen in marketing, sales and business administration. However, its application varies significantly across industries. In goods-producing sectors, AI is primarily used for production and information and communications technology (ICT) security, whereas in service-based industries, its use in production is minimal. Instead, these industries focus on using AI for ICT security, sales, business administration and enterprise solutions.^{6,7} The adoption of AI tools into business operations requires changes within the business to accommodate the new technology. When businesses that used AI in the production of goods or delivery of services were asked about the adjustments made during implementation, the most common changes included retraining existing staff to use AI tools (39%), developing new workflows (35%), and modifying data collection or management practices (21%).⁸

Despite leading in AI talent, Canada lags behind other countries in terms of AI adoption. A survey by KPMG showed that 35% of Canadian businesses are using AI in their operations. While this is over one-third of businesses surveyed, it pales in comparison to AI adoption in the U.S., where nearly three-quarters of businesses surveyed (72%) are using AI.⁹ Similarly, while almost two-thirds of U.S. companies (65%) say they are using the generative AI platform ChatGPT to improve operations, only about one-third (37%) of Canadian businesses say they are looking into it.¹⁰

Canada is not only behind in AI adoption within North America, but also globally. Canada falls far behind leading countries, with less than 4% (3.7%) of firms indicating that they have adopted AI into their operations. This is much lower than other countries that have AI adoption rates more than double those of Canada's, with Denmark having the highest at 24%.¹¹

What barriers to AI adoption are Canadian businesses experiencing? Despite Canada leading globally in AI talent, the top barrier cited by Canadian companies to AI adoption is difficulty finding employees with AI expertise. About one in five (21%) of organizations





surveyed said they do not have employees with the adequate skills to use AI tools they plan to integrate, and just under one in five (17%) cannot find new employees to fill this gap.¹² Two in five Canadian organizations (41%) in one survey said that limited AI skills and expertise was the top barrier to AI adoption.¹³ Over one-half (54%) of Canadian businesses in another survey said they are concerned about the accuracy of the AI algorithms they are using and that they might be making decisions based on poorly designed algorithms. However, just under one-half (45%) in the same survey said they lack the expertise among their workforce to validate and verify the algorithms they have in place.¹⁴

Lack of awareness of the AI tools that are available is also a barrier to adoption often cited. This may make identifying the business case for AI a challenge; nearly three-quarters (69%) of Canadian businesses say they struggle to identify the business base for AI.¹⁵ Another barrier to adoption cited by Canadian businesses is ethical concern and mistrust of

AI tools.¹⁶ These tools are often associated with a “black box,” meaning that even if people are experienced users they might not understand how these tools work “behind the scenes.”¹⁷ The uncertainty about just exactly how these tools work can lead to skepticism and a lack of trust in them. Canada has one of the lowest levels of trust in AI technology.¹⁸ This also highlights the need for governance policies for using these tools in the workplace.

Here, we see a disconnect. On the one hand, the data shows that Canada is leading in AI expertise. We have a highly skilled workforce that is ready to meet the increasing demand for AI skills as AI adoption increases. On the other hand, Canadian businesses say they are struggling to find workers with the AI skills they need. What is the cause of this disconnect? In the most recent wave of our Survey on Employment and Skills, conducted in partnership with the Environics Institute for Survey Research and funded by the Future Skills Centre, we aimed to understand this disconnect and determine how to bridge this gap.

Methods

To bridge the gap between employers and employees in regard to AI adoption and skills, we must first better understand the gap and its source. As such, the analysis asked the following research questions:

1. How often are Canadians using AI in the workplace?
2. How familiar are Canadians with AI tools that can be used in the workplace? Are there any group differences in familiarity?
3. How does familiarity relate to perceptions of AI in the workplace?
4. How much training and guidance do employees receive from their employer on how to use AI in the workplace?

To answer these questions, we used data from the Survey on Employment and Skills. The survey began in early 2020 as a project designed to explore Canadians’ experiences with the changing nature of work, including technology-driven disruptions, increasing insecurity and shifting skills requirements. Following the onset of the COVID-19 pandemic, the survey was expanded to investigate the impact of the crisis on Canadians’ employment, earnings and work environments. A second wave of the survey was conducted in December 2020, a third wave in June 2021, a fourth wave from March to April 2022, a fifth wave in March 2023, a sixth wave from October to November 2023 and a seventh wave from May to July 2024.

Each wave consists of a survey of more than 5,000 Canadians aged 18 years and over, conducted in all provinces and territories. A total of 40,595 Canadians has been surveyed across the seven waves. The survey includes oversamples of Canadians living in smaller provinces and territories, those under the age of 34 years, racialized Canadians and Canadians who identify as Indigenous, to provide a better portrait of the range of experiences across the country.

Data presented in this report is based on the seventh and most recent wave of the survey (n=5,855). Given the increasing interest in AI, this wave included several questions about perceptions of AI in the workplace, the use of AI in the workplace, and training and guidance received on using AI in the workplace (Table 1).

Table 1.
Questions about perceptions, usage and training on artificial intelligence in the workplace added to Wave 7

Question	Options	Asked of
How familiar would you say you are with artificial intelligence (AI) programs that people can use in the workplace?	Not at all familiar Not very familiar Somewhat familiar Very familiar	Entire sample
Have you ever used any of these AI programs for any of the following?	For your own personal use or enjoyment	Entire sample
	To help with assignments at school, college or university	Students only
	To help with tasks at work	Those who were employed

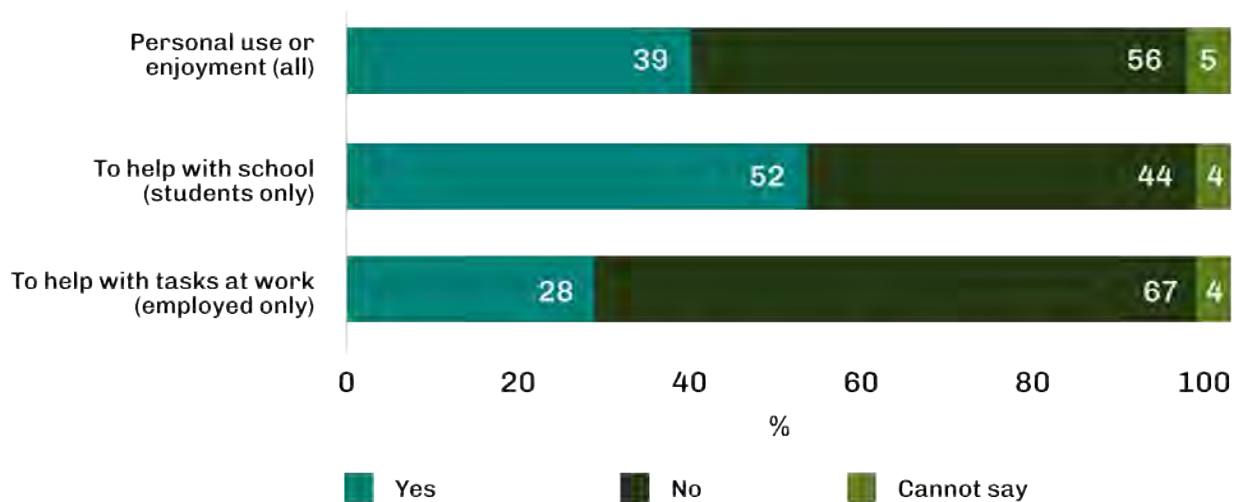
Question	Options	Asked of
Which specific AI program or programs did you use?	Open-ended	Those who said they used AI at work
Please think about the impact that using an AI program has had on the way you do your job. Would you say that it has made you:	<p>A lot less productive/creative</p> <p>A little less productive/creative</p> <p>Neither more nor less productive/creative</p> <p>A little more productive/creative</p> <p>Much more productive/creative</p>	Those who said they used AI at work
Did you receive any training to help you learn how to use AI programs at work?	<p>Yes, and this training was provided by my employer</p> <p>Yes, but this training was not provided by my employer</p> <p>No, I did not receive any of this kind of training</p>	Those who said they used AI at work
More generally, how much guidance has your employer given you about using AI programs at work?	<p>A lot of guidance—my employer has written guidelines about using AI programs at work</p> <p>Some guidance—my employer has talked to me about using AI programs at work</p> <p>Not much guidance—I am figuring out how to use AI programs at work on my own</p>	Those who said they used AI at work
<p>Do you strongly agree, somewhat agree, somewhat disagree or strongly disagree with each of the following statements about the impact of new information or computer technologies on your job:</p> <p>My workplace has been too slow to adapt to the opportunities offered by new information or computer technologies.</p> <p>I find it hard to keep up with the changes at work that have been caused by new information or computer technologies.</p> <p>I worry that I might lose my job in the coming years because the work I do will soon be automated (in other words, it will soon be done by computers or robots).</p> <p>I haven't received enough training at work enable me to take advantage of the opportunities offered by new information or computer technologies.</p>	<p>Strongly disagree</p> <p>Somewhat disagree</p> <p>Somewhat agree</p> <p>Strongly agree</p>	Those who said they used AI at work

Results

Artificial intelligence tools are being used in the workplace in beneficial ways

All survey respondents in Wave 7 were asked if they have used AI for their personal use or enjoyment. Just over one-third (39%) indicated that they have used AI for this purpose (Figure 1). Results also show that students are more likely to use AI at school than employees are to use AI at work: 52% of students surveyed indicated they have used AI at school, while only 28% of those who were employed said they have used AI at work to help with tasks (Figure 1). For those who use AI at work, the impact is positive: most say it has made them more productive (78%) and more creative (69%).

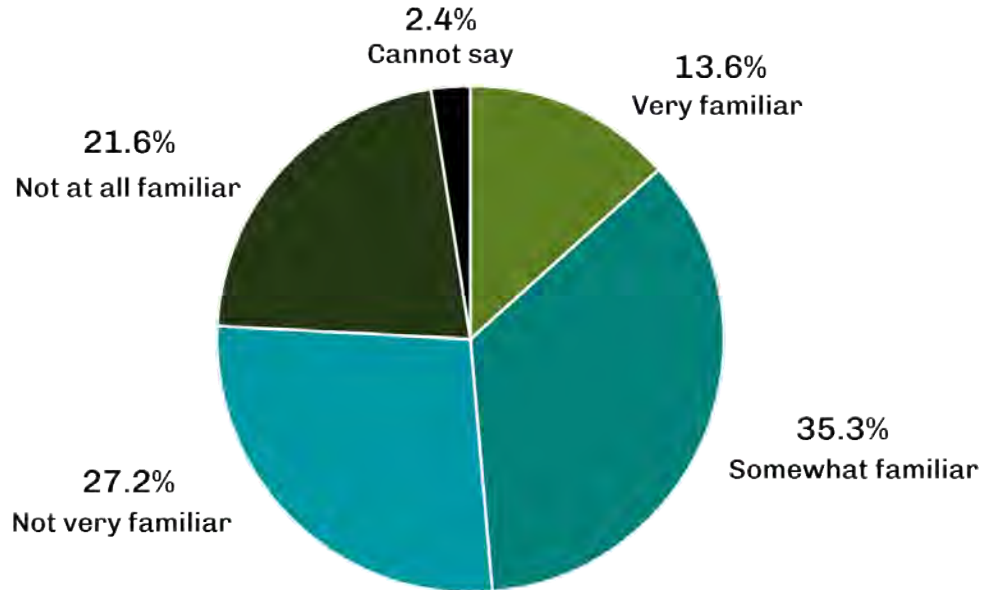
Figure 1.
Use of artificial intelligence by respondents



Most respondents are somewhat familiar with artificial intelligence tools

Just under one-half of survey respondents (49%) say they are familiar (very and somewhat combined) with AI programs to use in the workplace. Of this, most—just over one-third (35%)—are only somewhat familiar with AI tools that can be used in the workplace. This leaves less than one in five (14%) who are highly confident in their familiarity with AI tools to use in the workplace (Figure 2). This suggests that there is still work to be done to improve confidence in using AI tools at work.

Figure 2.
Familiarity with artificial intelligence in the workplace



Perceptions of new technologies in the workplace

As seen in Table 2, overall perceptions of new technologies like AI in the workplace are mainly mixed or positive. Perceptions of the speed at which their workplace is adapting to new technologies is mixed, with 43% agreeing that their workplace is too slow in their adaptation and 44% disagreeing (13% cannot say). On the other hand, most respondents (56%) are not finding it difficult to keep up with changes at work caused by new technologies, and most (56%) are not worried about automation. Perceptions about training provided by their employer are slightly negative, with 47% of respondents agreeing they haven't received enough training on new technologies in the workplace.

Table 2 also shows the breakdown of perceptions by education level. Here, we see a slight relationship between education and worry about automation: as educational attainment increases, worry decreases. Those with less than a high school education are more likely to be worried, with 48% indicating that they are worried about their role becoming automated. However, those with at least a high school education are more likely to be unworried about their role becoming automated and the gap between those who are and are not worried increases. As seen in Table 2, 49% of those with a high school education disagree that they are worried about automation, and this increases as educational attainment increases. This trend suggests that respondents may believe that further education might protect their jobs against automation.

Table 2.
Perceptions of new technologies in the workplace, overall and by educational attainment

		Overall (%)	< High school (%)	High school (%)	Trades (%)	College degree (%)	Bachelor's degree (%)	Graduate degree (%)
My workplace has been slow to adapt to new technologies.	Agree	43	48	43	39	38	45	48
	Disagree	44	36	43	51	47	45	44
It's hard to keep up with changes at work caused by new technologies.	Agree	36	34	40	39	29	34	40
	Disagree	56	51	50	54	61	60	55
I'm worried about my job becoming automated.	Agree	36	48	41	36	29	32	35
	Disagree	56	43	49	59	63	62	59
I haven't received enough training on new technologies.	Agree	47	56	47	42	41	48	51
	Disagree	41	31	39	48	44	43	42

Note: Bold indicates a higher proportion between agree and disagree; agree and disagree responses may not sum to 100% due to "cannot say" responses, which are excluded here.

Familiarity with artificial intelligence and perceptions of new technologies

To investigate the relationship between perceptions of new technologies and familiarity with AI, we looked at the distribution between the two variables. We saw a slight trend between the two, where those who were most familiar with AI in the workplace also held the most negative perceptions of new technologies: they were most likely to strongly agree that their workplace was slow to adapt to new technologies, they found it hard to keep up with changes at work due to new technologies and did not feel that they were receiving enough training on new technologies. Most interesting was the relationship between familiarity with AI and worry about automation, where the more familiar respondents indicated they were, the more worried they were about their job becoming automated. (Table 3).

Nearly one-half (44%) of those the most worried about their job becoming automated were those who said they very familiar with AI in the workplace, while just over one-half of those who were the least worried about automation (i.e., strongly disagreed) were not very familiar (30%) or not at all familiar (25%) with AI in the workplace.

Table 3.
Relationship between worry about automation and familiarity with artificial intelligence as a proportion of those who are worried about automation

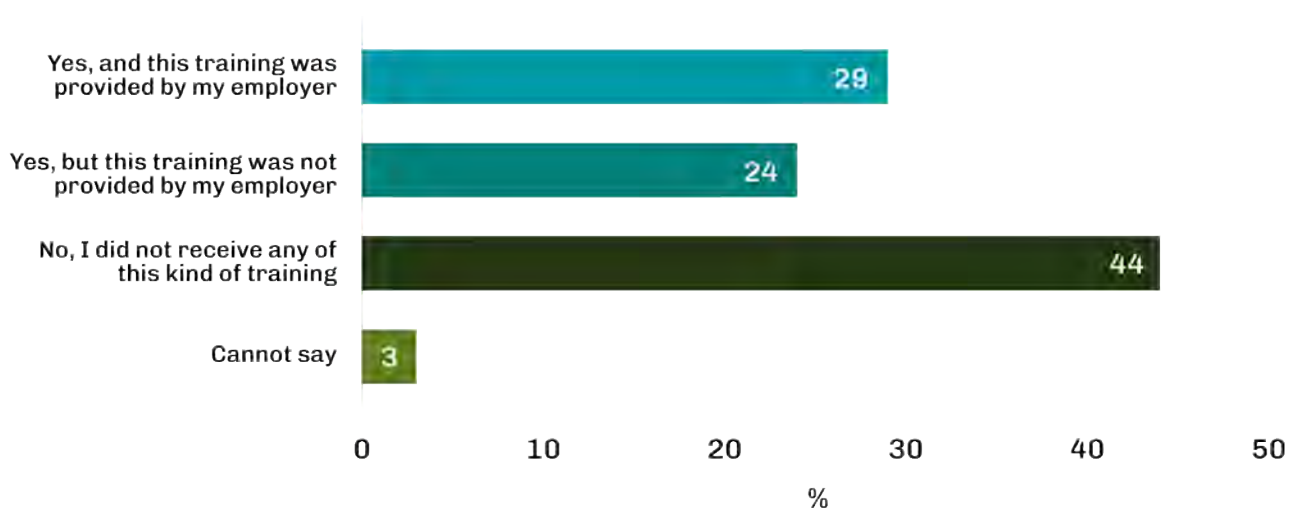
		Worried about automation			
		Strongly agree (%)	Somewhat agree (%)	Somewhat disagree (%)	Strongly disagree (%)
Familiarity with artificial intelligence	Very familiar	44	22	11	12
	Somewhat familiar	30	48	46	31
	Not very familiar	12	21	27	30
	Not at all familiar	13	8	16	25

Note: Columns may not sum to 100% due to “cannot say” responses, which are excluded here.

Artificial intelligence training and guidance from employers

Of those who use AI at work, just over two in five (44%) have not received any training in AI. The remaining 53% who have received training are roughly split on whether the training was or was not provided by their employer. Slightly more (29%) had training that was provided by their employer (Figure 3). Overall, these results show that almost three-quarters (68%) of those who used AI at work are doing so on their own—whether that means they are learning to use the tools without any training (44%) or they are using the tools with self-guided training (24%).

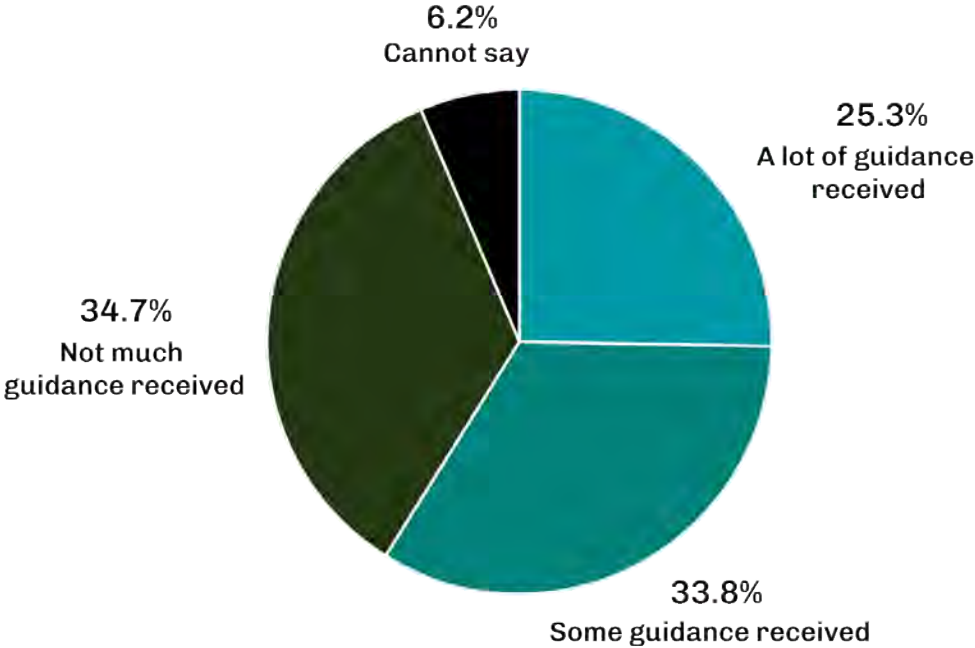
Figure 3.
Training received on artificial intelligence by those who have used it at work



Of those who say they have used AI tools at work, about one-third (35%) are doing so without any guidance from their employer. The remaining two-thirds have received guidance to some extent; 25% have formal, written guidelines about the use of AI at work; and 34% have had conversations about using AI at work, but no formal guidelines are in place (Figure 4).

Figure 4.

Employer guidance received for those who have used artificial intelligence tools at work



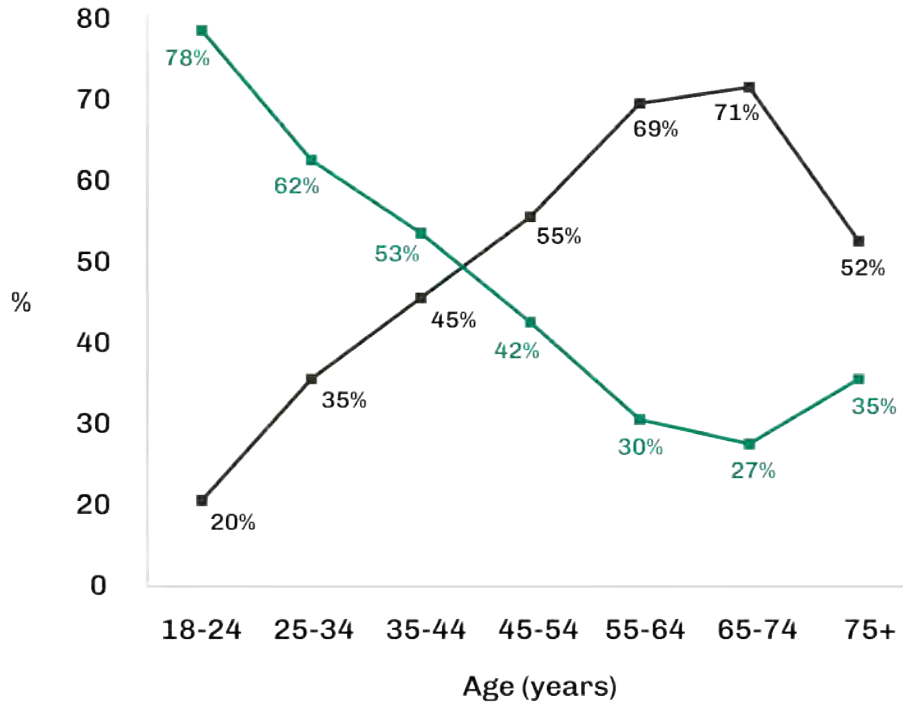
Group differences

To understand perceptions of AI in the workplace and the disconnect between employees and employers, we investigated group differences in responses for all AI-related survey questions for Wave 7.

Age

For familiarity, there is a consistent trend where likelihood of familiarity with AI tools in the workplace decreases with age until 55 to 64 years and then plateaus (see Figure 5). Artificial intelligence tools are slowly but surely being integrated into secondary and post-secondary education in Canada. As such, younger age groups are more likely to have had some experience with AI tools as soon as they come out of secondary education, while older age groups are unlikely to have had this experience.

Figure 5.
Familiarity with artificial intelligence tools in the workplace across age groups



A similar trend is seen for use of AI: younger age groups are more likely than older age groups to have used AI for personal enjoyment, school work and at work. For example, 42% of those aged 25 to 34 years have used AI to help with tasks at work, while only 34% of those aged 44 to 54 have done the same (see Table 4).

Table 4.
Percentage of respondents who use artificial intelligence in different settings, by age group

Age (years)	Personal use or enjoyment (%)	To help with school (%)	To help with tasks at work (%)
18-24	70	56	36
25-34	52	31	42
35-44	41	Too small to report	34
45-54	34	Too small to report	19
55-64	22	Too small to report	12
65-74	16	Too small to report	11
75+	26	Too small to report	Too small to report

Note: Proportions may not sum to 100% due to “cannot say” responses, which are excluded here.

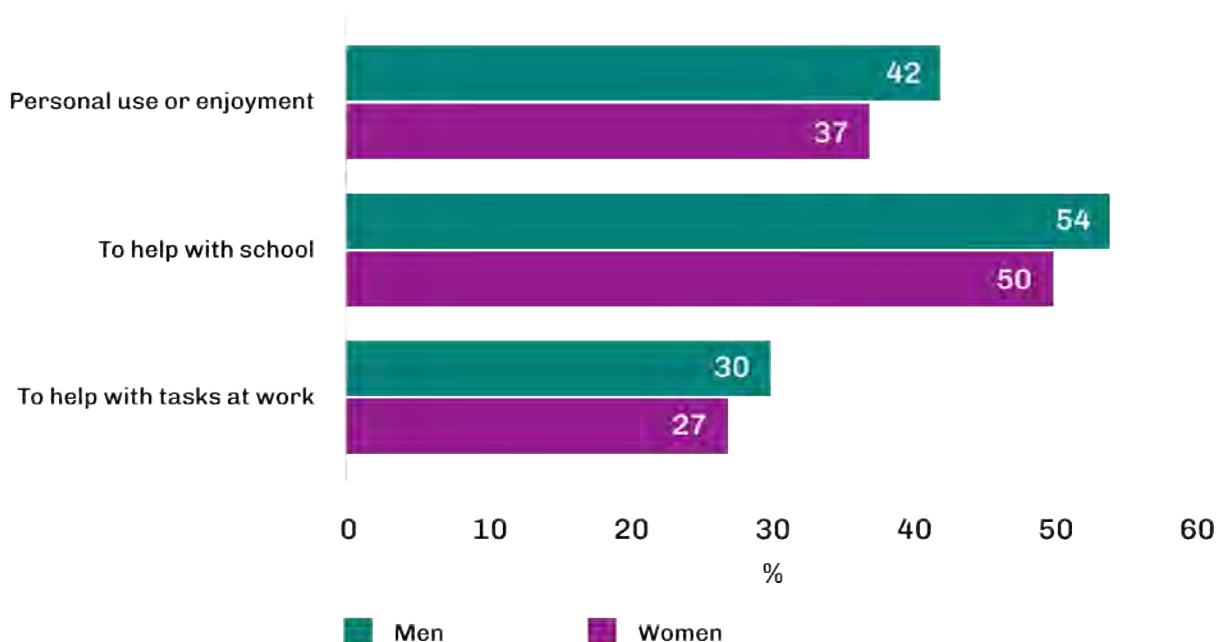
We also see interesting differences in training by age group. Those nearing and at retirement age (55 to 75 years and older) are more likely than younger age groups not to have received any training on AI tools they have used in the workplace. Fifty-two per cent 52% of those aged 55 to 64 years say they have not received any training on AI tools in the workplace, while only two in five (40%) of those aged 25 to 34 say the same. The same trend is seen for guidance: 44% of those aged 55 to 64 years have not received any guidance on using AI in the workplace from their employer, while only 30% of those aged 25 to 34 say the same.

For perceptions of new technologies, younger age groups are more likely to agree that their workplace has been slow to adapt to new technologies, while older age groups are more likely to disagree: more than one-half (51% to 52%) of 18- to 34-year-olds believe that their workplace has been slow to adapt, but less than one-half of those aged 35 and older (26% to 58%) agree with this statement. Overall, people are largely unconcerned by automation, and worry decreases as age increases. For example, less than one-half (44%) of 18- to 24-year-olds agree that they are worried about their jobs becoming automated, while less than one-quarter (23%) of 55- to 64-year-olds are worried.

Gender

There are some gender differences in familiarity with AI, with 53% of men compared to 47% of women indicating that they are familiar (somewhat and very combined) with AI programs to use in the workplace. However, this is significantly less than the gender gap in technology roles overall, where, despite representing one-half of the workforce, women hold only 30% of roles.¹⁹ Gender differences are also seen for the use of AI for personal enjoyment, at school and in the workplace. As seen in Figure 6, men are more likely than women to use AI in all settings. However, the difference between men and women is larger (about five percentage points) for personal use (42% vs. 37%) than it is between men and women for AI use at school (54% vs. 50%, respectively) and AI use in the workplace (30% vs. 27%, respectively).

Figure 6.
Use of artificial intelligence tools in different settings, by gender



When it comes to training on AI tools to use in the workplace, men and women are equally as likely to engage in self-guided training and to receive training from their employer. Just over two-thirds (68%) of men and women who have used AI at work have done so self-prompted, either by engaging in training they sought out themselves or without any training and learning as they go, while the remaining one-third (28% to 29%) have received training from their employer. However, there is a slight difference between men and women when it comes to seeking out training themselves or learning as they go: men are more likely to seek out training (26% of men vs. 22% of women engaged in training not provided by their employer), while women are more likely to learn as they go (47% of women who used AI at work did so without any training vs. 42% of men). For employer-provided guidance on using AI in the workplace, roughly 6% more men (62%) than women (56%) have received some sort of guidance from their employers on using AI in the workplace, whether that is formal (28% of men, 22% of women) or informal (33% of men, 34% of women) guidance.

For perceptions of new technologies, slightly more men than women have negative perceptions. For example, 46% of men agree that their workplace has been slow to adapt to new technologies, while only 39% of women agree with this statement.

Racialized and Indigenous participants

Survey results for Indigenous, racialized and white participants can be found in Table 5. More racialized and Indigenous respondents were familiar (very or somewhat) with AI tools in the workplace; just over two-thirds (68%) of racialized respondents and just under one-half (48%) of Indigenous respondents were familiar with AI tools, versus only 42% of white participants. Racialized respondents were the most likely to use AI for personal use and to help with school work compared to Indigenous and white participants, while Indigenous participants were most likely to use AI at work.

For training, just under one-half (47%) of white respondents have not received any training on using AI tools in the workplace, while this is less common for racialized (43%) and Indigenous (29%) respondents. Fewer white participants have engaged in training on AI tools in the workplace—employer-provided (25%) or self-sought (22%)—compared to respondents who are racialized (employer-provided: 30%; self-sought: 26%) or Indigenous (employer-provided: 45%; self-sought: 26%).

Despite this, white respondents are more likely to disagree that their employer has not provided enough training on new technologies (46%), while racialized and Indigenous respondents are more likely to agree (61% and 57%, respectively).

Similarly, white respondents were most likely to not have received any guidance on AI in the workplace from their employer, followed by racialized respondents. On the other hand, Indigenous respondents were most likely to have received a lot of guidance from their employer.

Table 5.
Survey results for Indigenous, racialized and white respondents

	Indigenous (%)	Racialized (%)	White (%)
Familiar with artificial intelligence (AI) tools in the workplace	46	68	42
Used AI for personal use and enjoyment	42	55	33
Used AI to help with school work	29	57	41
Used AI at work	41	39	22
AI at work made me more productive	90	82	73
AI at work made me more creative	79	76	63
Training			
No, I did not receive any of this kind of training	29	43	47
Yes, and this training was provided by my employer	45	30	25
Yes, but this training was not provided by my employer	26	26	22
Guidance			
Not much guidance	24	35	37
Some guidance	25	38	32
A lot of guidance	49	24	22
My workplace has been slow to adapt to new technologies			
Agree	52	53	38
Disagree	42	37	48
It's hard to keep up with changes at work caused by new technologies			
Agree	49	44	31
Disagree	46	48	60
I'm worried about my job becoming automated			
Agree	49	45	31
Disagree	43	46	62
I haven't received enough training on new technologies			
Agree	61	57	41
Disagree	34	33	46

Immigration

Survey results by immigration status can be found in Table 6. First- and second-generation immigrants are more likely to be familiar with AI tools in the workplace compared to the Canadian-born population. For training, first-generation (26%) and second-generation (18%) immigrants in the survey were less likely than third-generation-plus respondents (36%) to have received training on AI tools from their employer. They were also more likely to agree that their workplace has been slow to adapt to new technologies.

Table 6.
Survey results by immigration status

	First-generation immigrants (%)	Second-generation immigrants (%)	Third-generation-plus immigrants (%)
Familiar with artificial intelligence (AI) tools in the workplace	65	52	42
Used AI for personal use and enjoyment	52	41	34
Used AI to help with school work	74	35	41
Used AI at work	36	31	24
AI at work made me more productive	82	71	78
AI at work made me more creative	78	57	68
Training			
No, I did not receive any of this kind of training	46	49	41
Yes, and this training was provided by my employer	26	18	36
Yes, but this training was not provided by my employer	26	30	20
Guidance			
Not much guidance	41	33	32
Some guidance	35	42	30
A lot of guidance	21	18	31
My workplace has been slow to adapt to new technologies			
Agree	51	43	40
Disagree	37	45	47
It's hard to keep up with changes at work caused by new technologies			
Agree	43	35	33
Disagree	48	56	59
I'm worried about my job becoming automated			
Agree	45	38	32
Disagree	46	57	60
I haven't received enough training on new technologies			
Agree	57	46	43
Disagree	32	44	44

Discussion and Conclusion

The purpose of this analysis was to illuminate the gap between employers and employees when it comes to AI expertise in Canada. While these results do not offer a single solution, they offer insights into the way forward. Key findings are discussed below.

People are using artificial intelligence at work and are doing so mainly self-guided

In Wave 7 of the Survey on Employment and Skills, about three in 10 of employed adult Canadians indicated they are using AI at work. But most of those who are using AI say they are doing so mostly without any training or without a lot of guidance from their employer. So, while Canadian businesses are slow to adopt AI into their operations, some employees are using these tools on their own initiative. This may suggest a shift to self-guided training for employees. Rather than receiving training from their employer, employees are left to identify learning, reskilling and upskilling opportunities on their own; they are recognizing a need for additional training and not waiting for their employer to provide it. This shift to self-guided training is important, as data from Microsoft shows that 66% of leaders say they wouldn't hire someone without AI skills.²⁰

Survey results also indicated that slightly over one-half of respondents believe their employer is not providing enough training in new technologies. While our results show that many employees are independently seeking out training for new technologies, this does not mean that employers do not need to provide training. If employees are using AI on their own in the workplace, then the integration of AI in the workplace is likely to be disjointed and disorganized without any guidance from the employer. Instead, this highlights the importance of Canadian businesses to provide training to their employees. Indeed, in 2023, the top area of AI investment for nearly one-half (42%) of Canadian businesses surveyed by IBM is reskilling and workforce development,²¹ suggesting that employers are aware of this need and are in the process of implementing it. However, because employees are going ahead on their own and using these tools in the workplace, these results highlight the urgency for employers to update their training programs and to develop guidance and policies for using AI in the workplace.



The results show that older respondents were less familiar and less likely to use AI tools in the workplace compared to younger respondents. Importantly, those approaching retirement age were less likely to have received employer-training on AI tools in the workplace than were their younger counterparts. Other research shows that older workers are often stereotyped as unadaptable and resistant to change,²² which may lead employers to overlook them when thinking about training programs. To fill the AI skills gap, employers must ensure they are reskilling and upskilling the entire workforce.

Other group differences show that men were slightly more familiar than women with AI tools in the workplace, but this gap was not as large as it is for technology roles overall. This is perhaps emerging evidence that certain forms of AI can narrow the gender gap in terms of the use of tools, as well as the development of systems using “low-code, no-code applications.” This is an area that needs further exploration. While many of the “deep AI” and machine-learning roles remain men-dominated, there is evidence that generative AI



applications require different skills and offer opportunities for graduates across disciplines, as opposed to more traditional science, technology, engineering and math disciplines. Given disciplinary and occupational segregation for women and other equity-deserving groups, notably Indigenous Peoples and Black people, this is an important observation that warrants further exploration.

Further, these results have implications for post-secondary education. When employers are asked, they often say they are struggling to fill AI-related roles, but data shows that there are certainly workers in Canada with AI-related skills. Results from this survey also indicate that despite claims from employers, employees are using AI in the workplace but

are doing so without training. Together, this suggests a misalignment between post-secondary curricula and employer needs: graduates may not be coming out of school with the AI skills that employers are looking for, which might be driving employees to seek out their own training.

The finding from other data that employers struggle with filling their AI-related roles combined with the finding here that employees are quite familiar with AI and are using it in the workplace on their own also suggests that employers might not be looking in the right places. As such, it highlights the need to expand the talent pool. Women, racialized people and Indigenous Peoples are historically under-represented in technology roles and often experience barriers to entering these workforces. Regarding AI, these survey results show that immigrants, racialized and Indigenous participants were more familiar with AI tools in the workplace and more likely to have some training with these tools than were white and Canadian-born respondents. If employers are having difficulty filling AI roles specifically, then it could very likely be that they are not looking in the right places because their existing hiring processes are exclusionary to certain groups. Bridging the AI gap will most certainly require expanding the talent pool.

Most aren't worried about automation, and they shouldn't be

Results from this wave of the Survey on Employment and Skills show that most respondents surveyed are not concerned about automation. This is consistent with data from the U.S. that also shows that most are not worried about automation, although worry has been steadily increasing since 2017.²³ While the overall trend in this survey was that most are not worried, nearly two in five are. Other evidence suggests that worry is unnecessary; AI may change jobs, but it is unlikely to make them obsolete. Instead, it is likely that AI adoption will create jobs. Data from Statistics Canada shows that over three-quarters of businesses (79%) reported no change in employment levels after AI implementation, while nearly one in five (18%) actually saw an increase in employment.²⁴ The threat to jobs is not AI; rather, it is failing to support reskilling and upskilling of the workforce.

Further, this does not only affect direct AI positions. While those with expertise in AI will be needed, the widespread adoption of AI will also require people that can assist with the transformation of workplace operations. A case study to demonstrate this is from the mining corporation Rio Tinto. Rio Tinto Canada is exploring AI applications across various fields. In 2019, the company hired several data specialists, scientists and engineers with a mix of AI and data science expertise, advanced technical skills and knowledge of cloud-based AI platforms to support AI adoption. In addition to these roles, Rio Tinto Canada also sought a human resources (HR) data science lead and two HR data scientists to support this transformation. The company also provides AI upskilling opportunities for current employees and new recruits. Further, the company is expanding the talent pool by considering Indigenous communities and diversity in their hiring processes.²⁵

The need for artificial intelligence literacy

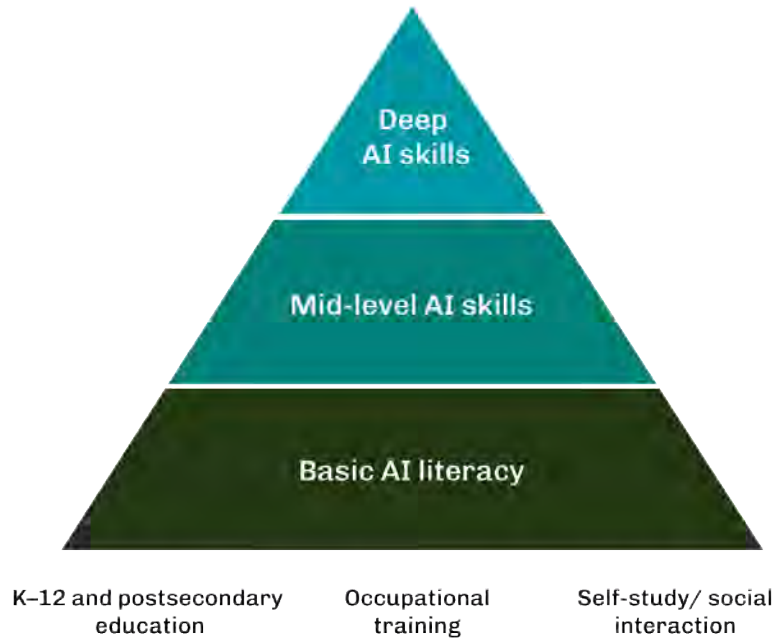
We observed a trend between familiarity with AI and fear of automation, where the more familiar respondents were with AI tools in the workplace, the more worried they were about their jobs becoming automated. While this may seem counterintuitive, these results are consistent with data from the U.S.²⁶ Despite this, these results should be interpreted with caution. Future research should clarify what is meant by “familiar.” When respondents in the survey select “very familiar” or “somewhat familiar” with AI tools, what are they indicating? Are they skilled at using AI tools in the workplace and understand how the technology works, or have they just heard a lot about AI tools without using them? If the latter, then what have they heard?

These questions are important to ask considering the skepticism and media coverage surrounding AI. Headlines often highlight negative aspects of AI, such as the role of AI in misinformation²⁷ and how generative AI can disrupt creative industries.²⁸ Most importantly, several news stories have covered the predicted, significant job losses that will occur because of AI.²⁹³⁰ These stories are based on models and predictions; however, this is not consistent with the data. As noted above, companies that have adopted AI already have mostly experienced an increase in jobs.

These results highlight the importance and need for skills development at various levels. At the most fundamental level, AI literacy—the ability to understand how to use and critically evaluate AI technologies—is key.³¹ The second level is AI innovation skills, which includes the competencies needed to match AI solutions to organizational needs, coupled with an understanding of the policies and processes organizations need to adopt and manage AI tools responsibly to achieve their goals. Building on foundational skills, AI adoption skills are for people in “bridging” or “hybrid” roles who focus on matching technology to needs. The third level—deep AI skills—are those needed to design and implement custom AI systems and solutions to solve complex problems and generally require extensive formal technology education (Figure 7).



Figure 7.
Employment-focused framework for developing artificial intelligence skills
across all skill levels



■ Deep AI skills

- Knowledge of AI development frameworks and machine-learning models
- Advanced knowledge of AI applications in specific fields.
- Deep understanding of ethical AI development, ensuring fairness, transparency and accountability in AI systems; and managing risks such as data breaches or ethical dilemmas

■ Mid-level AI skills

- Understanding how AI is used in different industries, such as AI-powered chatbots and recommendation systems
- Competence in using generative AI technologies like ChatGPT or Microsoft Copilot for content generation, analysis and problem-solving
- Mid-level expertise in working with datasets

■ Basic AI literacy

- Knowledge of core AI concepts, including machine learning, deep learning; and supervised, semi-supervised and unsupervised machine learning
- Familiarity with generative AI tools such as ChatGPT, Gemini, Microsoft Copilot and others
- AI in the value chain
- Awareness of key ethical considerations, such as bias and privacy

More work is needed to develop a competency framework that takes into account the different knowledge, skills and behaviours required at each level, as well as wayfinding among the growing range of courses, microcredentials and certifications available.

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Month

Year

March

April

May

Total Balance

\$ 20,000

50%

Income \$ 2,200

50%

Expens

TED ROGERS SCHOOL OF MANAGEMENT

DiVERSITY INSTITUTE



Future Skills Centre / Centre des Compétences futures

Environics Institute

For Survey Research

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