

CTE Prepares Learners for the Future of Work

What is the Future of Work?

The world is at the start of the Fourth Industrial Revolution, which is characterized by merging of new technologies in the physical, digital and biological worlds and the infusion of these technologies into nearly every facet of work and life.¹ New technologies are rapidly emerging and evolving, including artificial intelligence, robotics, big data analytics and the Internet of Things. The speed of change in the Fourth Industrial Revolution is taking place at an exponential pace, and the changes will have a significant impact on nearly every industry.²

In many ways, the future of work is already here. The COVID-19 (coronavirus) pandemic has accelerated the pace of technological change, as many industries have quickly adopted remote work technology at scale and some companies are considering automation to protect workers' health and increase efficiencies.¹⁰ Today and into the future, Career Technical Education (CTE) plays a strong role in equipping learners with the foundational, transferrable skills they will need for future jobs and the shifting work opportunities ahead.

How Will the Future of Work Change Employment?

As these new technologies become more extensively used in the workplace, one common concern is how these technologies will impact jobs and workers. The increased adoption of new technologies is likely to have mixed effects: some jobs will be lost because of automation, but the greater shift is likely the ways in which tasks within jobs will change as humans increasingly work alongside and in collaboration with new technologies.

- Routine and predictable tasks or work activities are most susceptible to automation, as machines and artificial intelligence typically are able to complete these tasks more efficiently than humans.¹¹
- Up to 50 percent of work activities could be automated in the near future, and 25 percent of jobs face a high level of disruption from automation.^{12,13}
- Occupations that may face the greatest levels of disruption from automation include office support, food service, production work, and customer service and retail sales.¹⁴

Selected Fourth Industrial Revolution Technologies:

- **Artificial Intelligence:** The simulation of human intelligence in machines that are programmed to think like humans and mimic their actions.³
- **Automation:** The use of technology to reduce the level of human activity needed to complete a particular task by replacing or augmenting labor.⁴
- **Big Data Analytics:** The process of examining big data (large and varied data sets) to uncover information that organizations can use to make informed business decisions.⁵
- **Internet of Things:** Electronic devices that are not traditional computing devices, but are connected to the internet to send data, receive instructions or both.⁶
- **Machine Learning:** A subset of artificial intelligence in which a computer program is "trained" to respond to a particular input in a certain way, with a focus on recognizing patterns in data.^{7,8}
- **Robotics:** A branch of technology that deals with physical robots, which are programmable machines that are usually able to carry out a series of actions autonomously or semi-autonomously.⁹

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- Jobs with tasks that are highly susceptible to automation are disproportionately held by people of color and people with disabilities.¹⁵
- Many workers will likely need to shift to performing different tasks, particularly tasks machines are less capable of doing, rather than losing their jobs altogether.¹⁶
- New jobs will be created: by one estimate, 8 to 9 percent of labor demand in 2030 will be in new occupations that do not yet exist; another estimate suggests that 27 percent of all jobs globally in 2022 will be entirely new.^{17,18}

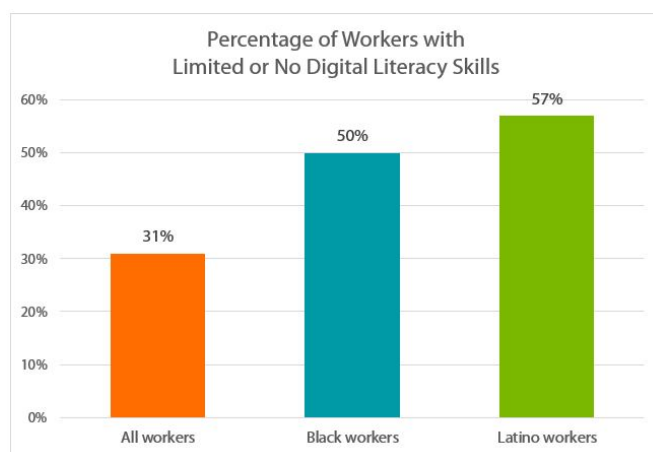
Skills Needed for the Future of Work

While there is not consensus on the magnitude of the impact from new technologies being infused into the workplace, it is clear that workers will require a different set of skills to be successful in the future of work. Recent research by Burning Glass and the Business-Higher Education Forum identified a set of foundational skills that will be critical to workers' success in the Fourth Industrial Revolution and the new digital economy:

- **Human skills:** Critical thinking, creativity, communication, analytical skills, collaboration and relationship building;
- **Digital building block skills:** Analyzing and managing data, software development, computer programming, and digital security and privacy; and
- **Business enabler skills:** Project management, business process, communicating data and digital design.¹⁹

These new foundational skills will be required across a wide swath of occupations. Demand for these skills increased by an average of 32 percent from 2013 to 2018. Further, the number of jobs that will require “hybrid” skills, or a combination of skills that have not previously been found in the same job, is also increasing. More than 12 percent of jobs in 2018 were highly hybridized, and through 2030 these jobs are projected to grow twice as fast as other jobs.²⁰ Jobs that require a high level of hybridized skills are typically highly resistant to automation.

However, there are inherent equity challenges in preparing individuals for the future of work, as not all population groups possess the same foundational set of skills. Recent research shows that 31 percent of American workers today have limited or no digital literacy skills, and workers of color are disproportionately affected by digital literacy skill gaps.²¹ Among Black workers, 50 percent have limited or no digital literacy skills, and 57 percent of Latino workers have limited or no digital literacy skills.



Source: National Skills Coalition, 2020.

<https://m.nationalskillscoalition.org/resources/publications/file/Digital-Skills-Racial-Equity-Final.pdf>

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CTE and the Future of Work

CTE provides a strong pathway for learners to prepare for the future of work by:

- Equipping learners with real-world skills, such as entrepreneurial and employability skills, that are foundational and transferrable across rapidly shifting sectors and work activities;
- Placing learners on a path to postsecondary credential attainment that translates into high-skill, high-wage and in-demand occupations;
- Bringing business and industry to the table to ensure that CTE programs are relevant and future-focused;
- Closing achievement and opportunity gaps by placing an intentional focus on equity and providing each learner with an opportunity for career success;
- Supporting learners' efforts to upskill through programs of study that support stackable and short-term credentials of value; and
- Encouraging partnerships between K-12, postsecondary and industry through program of study frameworks.

Leveraging State Policy to Prepare for the Future of Work

In recent years a handful of states, including California, Indiana, New Jersey and Washington, launched task forces and commissions to prepare their residents for the future of work. Many of these bodies have identified policy recommendations to help current and future workers develop skills they will need in the future.^{22,23,24,25} While these states' task forces and commissions identified and recommended policy responses that are related to skill development, none of the recommendations explicitly mentioned the role of CTE in preparing learners for the future of work. State CTE leaders can engage with state workforce and economic development leaders who are leading future of work efforts and highlight the valuable role of CTE in preparing learners and future workers with the skills they will need to be successful in a rapidly evolving future workplace.

¹ <https://www.weforum.org/focus/fourth-industrial-revolution>

² <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/>

³ <https://www.investopedia.com/terms/a/artificial-intelligence-ai.asp>

⁴ <https://www.aspeninstitute.org/publications/automation-and-a-changing-economy-the-case-for-action/>

⁵ <https://searchbusinessanalytics.techtarget.com/definition/big-data-analytics>

⁶ <https://www.networkworld.com/article/3207535/what-is-iiot-the-internet-of-things-explained.html>

⁷ <https://blog.robotiq.com/whats-the-difference-between-robotics-and-artificial-intelligence>

⁸ <https://blog.robotiq.com/robot-vision-vs-computer-vision-whats-the-difference>

⁹ <https://blog.robotiq.com/whats-the-difference-between-robotics-and-artificial-intelligence>

¹⁰ <https://www.weforum.org/agenda/2020/05/the-future-of-work-is-here-5-ways-to-reset-labour-markets-after-coronavirus-recovery/>

¹¹ <https://www.brookings.edu/research/automation-and-artificial-intelligence-how-machines-affect-people-and-places/>

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¹² <https://www.mckinsey.com/featured-insights/future-of-work/jobs-lost-jobs-gained-what-the-future-of-work-will-mean-for-jobs-skills-and-wages>

¹³ <https://www.brookings.edu/research/automation-and-artificial-intelligence-how-machines-affect-people-and-places/>

¹⁴ <https://www.mckinsey.com/featured-insights/future-of-work/the-future-of-work-in-america-people-and-places-today-and-tomorrow>

¹⁵ <https://www.aspeninstitute.org/publications/automation-and-a-changing-economy-the-case-for-action/>

¹⁶ <https://www.mckinsey.com/featured-insights/future-of-work/jobs-lost-jobs-gained-what-the-future-of-work-will-mean-for-jobs-skills-and-wages>

¹⁷ <https://www.mckinsey.com/featured-insights/future-of-work/jobs-lost-jobs-gained-what-the-future-of-work-will-mean-for-jobs-skills-and-wages>

¹⁸ http://www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf

¹⁹ <https://www.burning-glass.com/research-project/new-foundational-skills/>

²⁰ <https://www.burning-glass.com/research-project/hybrid-jobs/>

²¹ <https://m.nationalskillscoalition.org/resources/publications/file/Digital-Skills-Racial-Equity-Final.pdf>

²² <https://www.labor.ca.gov/wp-content/uploads/2020/04/CA-Future-of-Work-Update-on-Progress-April-2020.pdf>

²³ <https://www.aspeninstitute.org/blog-posts/creating-a-future-of-work-commission/>

²⁴ <https://fowtf.innovation.nj.gov/index.html#about>

²⁵ <https://www.wtb.wa.gov/wp-content/uploads/2019/12/Future-of-Work-2019-Final-Report.pdf>

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