

Initiative Overview

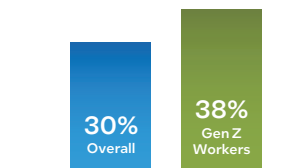
Intel® Skills for Innovation



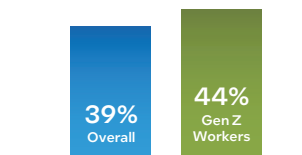
Reinventing technology's role in education to build skills for success in a changing world

Technology's job impact over the next three years,
% of responders

Concerned that their role will be replaced by technology



Concerned about not getting sufficient training in
digital and technology skills from their employer



Base Gen Z = 5,506
Overall Surveyed = 52,195

Figure 1. Younger workers are more concerned that technology will replace their roles.²

Ready for a Reset: An Opportunity to Boost Education Systems' Relevance and Strengthen Resilience

With increasing automation and the rise of AI, the world of work is changing faster than ever. Seventy-seven percent of employers globally report struggling to find workers with the right blend of technical skills and human strengths such as critical thinking, communication, and creativity.¹

Efforts to prepare students with the necessary skills are expanding but face headwinds from teacher shortages, gaps in education infrastructure, and pandemic-related learning losses.

The skills gap is growing, impacting the well-being of communities worldwide and heightening urgency for a new, more relevant and resilient approach to teaching and learning. In a world of constant change, how can educators equip students with the skills to help their societies thrive? What is the best way to prepare students for the workforce when many of the jobs they will do don't even exist yet?

The Intel® Skills for Innovation (Intel® SFI) Initiative offers answers to these questions. Supported by the Intel SFI Implementation Framework, the Initiative guides decision-makers and educators in adopting technology and creating learning opportunities that actively engage students in all types of learning environments. By inspiring teachers and learners to reach their full potential through a technology-supported, skills-based approach, the Intel SFI Initiative and Framework empower them to build their skills anywhere and maximize outcomes that prepare them for a changing world.

Based on a McKinsey Future of Work report, it is expected that automation is more likely to change jobs than to displace them.

Wanted: New Skills, New Ways of Thinking and Collaborating

The ongoing evolution of technology and, particularly, artificial intelligence is transforming every industry and virtually every aspect of our lives. AI-driven automation is already taking over routine, repetitive tasks in many industries and is being used for some complex, specialized efforts as well. Over time, “traditional” jobs will continue to decline while jobs requiring different skill sets—often technology-based—will increase. A 2023 World Economic Forum survey projects a net decrease of 14 million jobs over the next five years or two percent of current employment.³

Transformation of Jobs & Skills Requirements

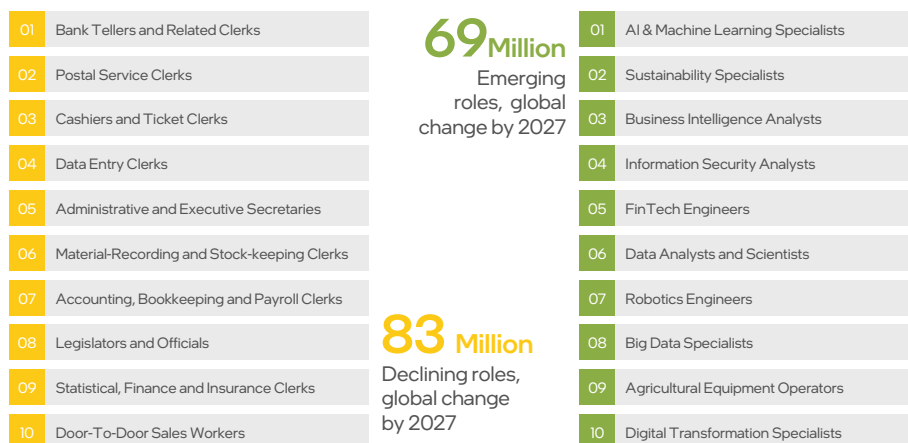


Figure 2. Forecasts show a net loss of two percent of current employment in the next few years as new jobs that require different technology skills displace some traditional jobs.³

While some displacement is likely, a recent McKinsey report estimates that 70 percent of workers whose jobs are displaced will remain in the same occupation or occupational category.⁴ This suggests that automation is more likely to change jobs than to displace them.

Given the blistering pace of change, employers need workers who not only understand current technologies but can flexibly modify their thinking and problem-solving to adjust to shifting circumstances.

Going forward, successful workers will need the skills and adaptability to learn and imagine new ways of responding to the challenges that come their way. Surveys show employers already prioritize higher-order cognitive and problem-solving skills among current and prospective employees.⁵ Educators and education decision-makers are focused on implementing strategies to foster students’ development of these skills.

Educators use Bloom’s Taxonomy⁶—which orders skills by increasing cognitive complexity—to classify learning objectives and outcomes that move students to higher-order cognitive abilities. In future-ready classrooms, technology should foster teachers’ and students’ active engagement in developing skills, and the technology needs of educators and students increase as students acquire ever-more complex skills.

Teaching and learning guides for higher-order thinking and skills development, as well as for developing assessment methods.

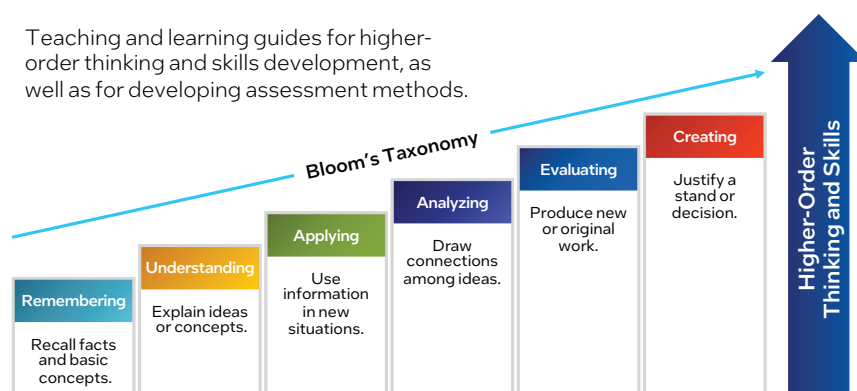
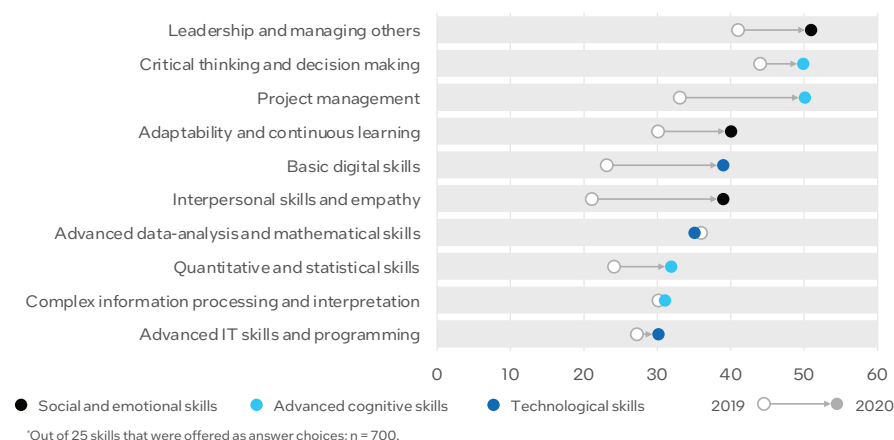


Figure 3. Bloom's Taxonomy orders skills by increasing cognitive complexity.

Social-emotional skills such as emotional intelligence and cooperation are also more critical than ever, as the world of work relies more on collaboration and team-based problem-solving. Today's students will need to learn to collaborate with team members in other countries and time zones, some of whom they may never meet in person. Finding new ways to empower teachers and learners to build these essential skills is a top priority for education stakeholders worldwide.

Skills that companies have prioritized to address through reskilling,*
% of respondents



Intel® Skills for Innovation Initiative

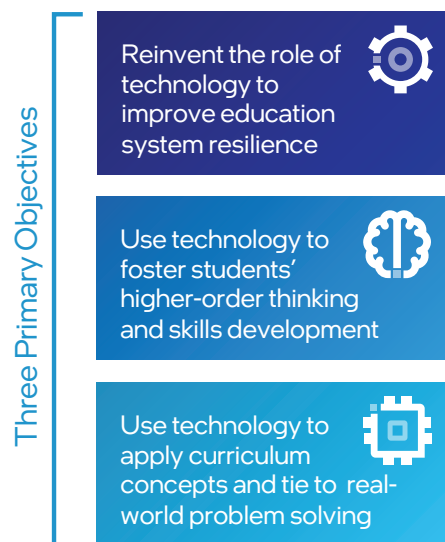


Figure 5. Intel® Skills for Innovation Initiative focuses on three primary objectives to foster skills critical for students' future success.

Figure 4. Companies are increasingly focused on developing employees' social, emotional, and advanced cognitive skills.⁷

Intel Skills for Innovation Initiative and Implementation Framework Promote Skills-based Learning

In response to the growing demand for a technological transformation in education, Intel has developed the Intel SFI Initiative. Broadly, Intel Skills for Innovation envisions a world in which students learn the key skills necessary to thrive in the evolving Fourth Industrial Revolution job market—where they are empowered to innovate and problem solve as they prepare for, imagine, or possibly create the jobs of the future.

Specifically, the Intel SFI Initiative represents a new approach to education that embraces and fosters skills critical for students' future success by focusing on three primary objectives, shown in Figure 5.

To achieve these objectives and bring the vision to reality, Intel has developed the Intel SFI Implementation Framework, with a focus on seven essential mindsets and skillsets, a four-step adoption plan, helpful resources, and a suite of programs that can be readily rolled out. The Intel SFI Framework integrates skill-building technology activities into everyday teaching and learning, bringing real-world relevance to curriculum content while equipping students with the skills needed to flourish in the workplace of the future.

The Intel SFI Initiative and Framework put technology at the center of building advanced learning skills rather than simply using technology to provide access to existing educational content.

To see this shift in concrete terms, consider two examples of using technology in learning:

- **Scenario 1:** Students make online flashcards to drill math concepts. They may find the process more engaging because they are using technology, but the application is limited to improving the accessibility of the content. The students' learning is *enhanced* using technology. In Bloom's terms, technology helped the students improve the remembering process.

In the Intel SFI Framework, technology is used not only to enhance but also to *transform* what and how students learn.

- **Scenario 2:** Intel has created a unit on the mathematics of pandemics, in which high school students learn how to visualize data to help researchers and policymakers better understand how a virus behaves and how epidemics spread. Students learn about the importance of global health security to pandemic prevention while acquiring and practicing several future-oriented skills: arithmetic and geometric progressions, design thinking, and data science—all while learning the tools of spreadsheet software and Geographic Information Systems (GIS). The students gain skills, and their learning is *transformed* using technology. In Bloom's terms, technology helped the students improve the understanding, applying, and analyzing processes.

This unit is one example of how curricula can be adapted to build future-ready skills while engaging students in current, real-world scenarios at a deeper level. When technology enables higher-order thinking skills, students learn not just new skills but new modes of learning and thinking that prepare them to be the workforce of tomorrow.

Skills Required for the Workforce of the Future

Job markets of the future will increasingly rely on higher-order thinking skills such as higher cognitive, social-emotional, and technological skills.

In response to these shifting needs, Intel created this new framework based on the following set of principles and approaches:

- Flexibility in augmenting curriculum with technology activities and content, so curriculum planners and educators can easily adapt to changes, and the whole system enables "anywhere learning"
- Teachers facilitate the process of learning and help students discover knowledge and foster student agency
- A focus on developing higher-order thinking skills with students taught complex cognitive processes—such as computational and design thinking—that prepare them to be self-driven innovators, creators, and problem solvers
- Emphasis on integrating hands-on technology activities into existing curricula and real-world scenarios to better prepare students to solve real-world problems.

Empowering Today's Students to Become Tomorrow's Innovators

Using the Intel SFI Framework, educators learn how best to integrate technology into their programs and plans to help students develop their cognitive, technical, and social-emotional skills. Having the right technology tools, with reliable, manageable, and secure access, means students can practice skill-building activities from anywhere. These tools help them analyze, evaluate, and create using the information they learn, develop advanced skills, and prepare for the jobs of the future.

"Teachers (who) may not have used technology before in the classroom can now feel confident to do so with their learners and ultimately make the learning experience way more enjoyable and engaging."

— James Culley

Chief Technology Officer
London Design and Engineering UTC

For examples of how Intel® Skills for Innovation promotes skills-based learning, see [case studies at skillsforinnovation.intel.com](https://www.skillsforinnovation.intel.com).

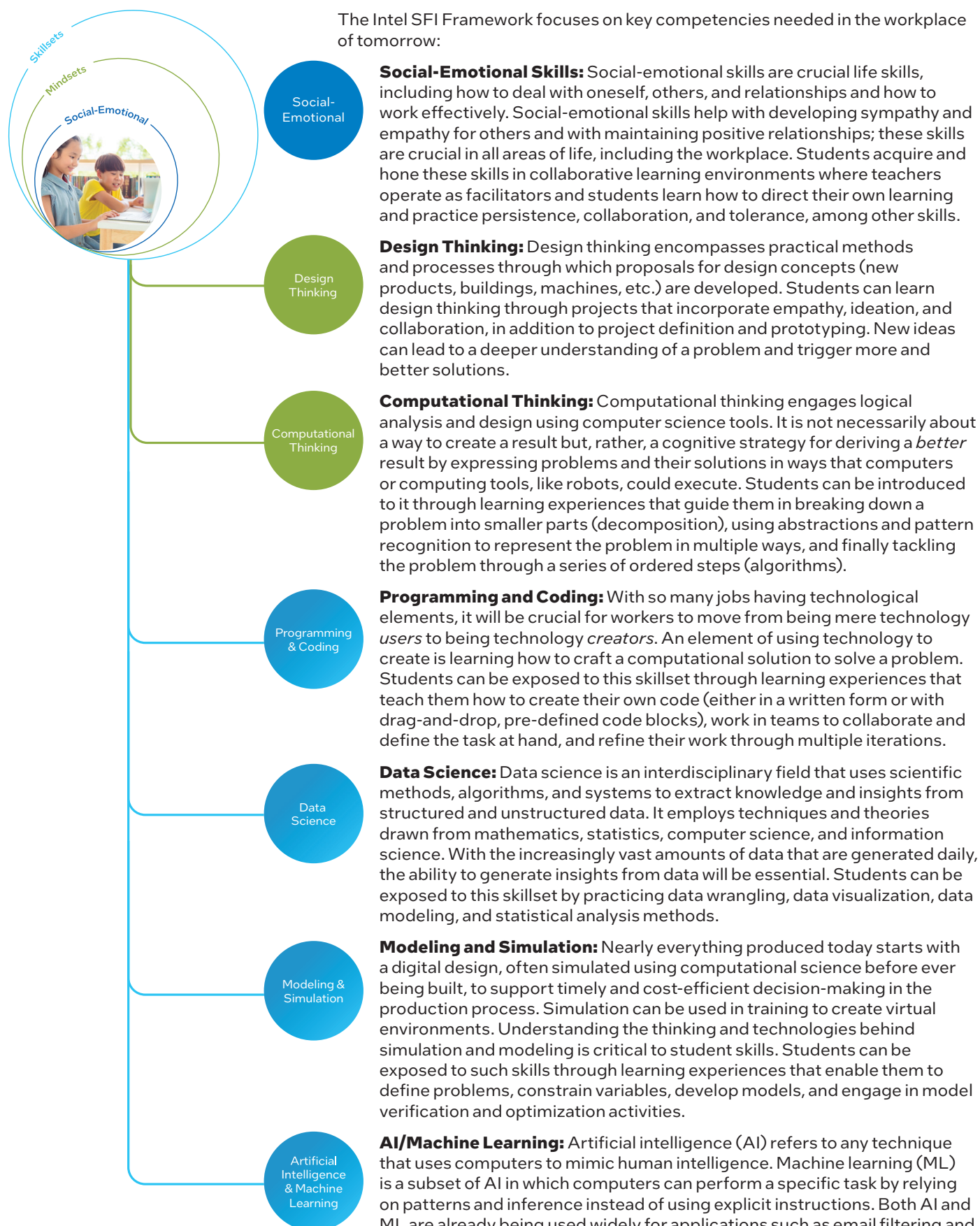


Figure 6. Intel® Skills for Innovation framework focuses on the development of mindsets and skillsets.

A future-oriented model shifts educational planning from short-term fixes to long-term visions.

Getting from Where You Are to Where You Want to Be

As education planners build a vision and identify steps to reach it, it helps to keep a couple of important concepts in mind:

The first is adaptability. A future-oriented model shifts educational planning from short-term fixes to long-term visions. Intel SFI is designed to transform systems to become future thinking.

A second, related concept is robustness. Technology resources must be easy to access and use, adaptable to various workloads and learning modalities, and able to withstand the test of time. New technologies must deliver reliable, secure access to learning resources and help ensure richer experiences that build skills for tomorrow.

Roles will inevitably evolve as part of transforming education systems. Decision-makers, educators, and students will all see their practices shift as the framework is implemented, and a change in one aspect of the learning environment will impact the rest of the system. Decision-makers who first agree on a vision can more proactively manage change as curricula and learning environments are adapted to meet new learning modalities. As students increasingly become self-directed learners rather than simply information consumers, educators will become facilitators and coaches, developing students' higher-level cognitive skills and often using technology to make it happen. Considering these evolving reciprocal relationships while planning can help set up the system for long-term success.

Adaptability, robustness, and flexibility are all key components of a resilient education system. Together with carefully chosen technology, these qualities help form the basis of a relevant learning environment that will help students build skills for tomorrow.

The Intel SFI Framework provides technology recommendations, tools, and training to support decision-makers and educators as they develop and implement a vision for enriching curriculum and designing the learning environment to meet skill-building goals.

Path to Adopting Intel® Skills for Innovation (Intel® SFI)



Figure 7. Intel provides support along the multi-step path to integrating Intel® Skills for Innovation into an educational system.

Plan. The process begins with a series of workshops where education decision-makers and stakeholders come together to assess the current state of their environment, align stakeholders to a common vision, and craft a detailed action plan. Intel created the Intel SFI Planning Toolkit to facilitate the planning process. The Toolkit offers a series of presentations, discussions, exercises, and insights from existing programs, together with hands-on experience with lesson plans for skill building, to help stakeholders deepen their understanding of the new skills requirements, align those requirements with their curriculum goals, and rethink the role of technology in education to foster building these new skills.

Experience. The next stage of the process involves giving educators and learners an authentic experience of how the new vision will manifest in practice. The experience stage is critically important to ensure sufficient buy-in for

About Intel® Skills for Innovation Framework

The Intel Skills for Innovation Framework, now in use in over 47 countries, empowers today's students to become tomorrow's innovators. Using this framework, educators can integrate technology into their programs and plans to build skills of the future, and help students develop their cognitive, technical, and social-emotional skills.

Having the right technology tools, with reliable, manageable, and secure access, enables students to practice skill-building activities from anywhere. These tools help them analyze, evaluate, and create using the information they learn, develop advanced skills, and prepare for the jobs of the future.

system-wide changes to take root. Educators have a choice of 70 activities with more than 140 hours of class time, spread across a wide range of subjects and grade levels, in the Intel SFI Starter Pack to tap for this purpose.

Learn. The Intel SFI Framework supports educators as they assume their role as the leaders of digital learning experiences and facilitators of future skill building. Intel SFI Professional Development provides 80+ hours of e-learning to support educators as they build new competencies, guiding them through creating new lessons and modifying existing lessons for remote learning. It inspires teachers to embrace skill-building activities and new ways of teaching that help students build future-ready skills.

Deploy. When the time comes to roll out the new, skills-focused vision broadly, Intel offers a wide range of resources and solutions to support a successful deployment at scale. These include a robust network of partners that can help implement solutions tailored to fit the needs and goals of your specific education environment. Please talk to your Intel representative to discuss the unique deployment help available.

The Intel SFI Framework allows decision-makers and educators to understand, experience, and implement their unique vision for technology-supported, skills-based learning across their education system. It is a highly customizable approach designed to empower students to reach their full potential, build future-ready skills, and be prepared for the Fourth Industrial Revolution.

Ready to Get Started?

As education leaders redouble efforts to prepare for the future and the unexpected, ensuring education system resilience, access, and equity to make anywhere learning possible is a top priority. Educational and workplace transformations will continue to accelerate. Tomorrow's job market will require more higher-order thinking, social-emotional, and technological skills than ever before.

In this fluid environment, how can you ensure that students are prepared to be thinkers and actors in this ever-evolving workforce? And how can you equip your educators to facilitate this effort?

The Intel SFI Framework is designed to support educational systems throughout the world in enriching curricula, shifting pedagogy, and developing future-ready learning environments. Are you ready to take the next step? We are. For more information about how to apply the Intel SFI Framework to your educational environment, please visit skillsforinnovation.intel.com.

Resources

For more on the need to build digital skills, see the [white paper at skillsforinnovation.intel.com](https://skillsforinnovation.intel.com).

For examples of how Intel® Skills for Innovation promotes skills-based learning, see [case studies at skillsforinnovation.intel.com](https://skillsforinnovation.intel.com).



Sources

¹ (77% of employers) Manpower Group. Employment Outlook Survey. Q3 2023. https://go.manpowergroup.com/hubfs/MPG_MEOS_Report_Q3_2023.pdf

² (Technology's job impact graphic) Global Workforce Hopes and Fears Survey 2022. March 2022. <https://www.pwc.com/gx/en/issues/workforce/hopes-and-fears-2022.html>

³ (2% job loss) Future of Jobs Survey 2023. World Economic Forum. April 30, 2023. <https://www.weforum.org/reports/the-future-of-jobs-report-2023/digest/>

⁴ (70% remain in current occupational category) The future of work after COVID-19. McKinsey & Company. February 18, 2021. <https://www.mckinsey.com/featured-insights/future-of-work/the-future-of-work-after-covid-19>

⁵ (Employers prioritize higher-order cognitive skills) McKinsey & Company. McKinsey Global Surveys, 2021: A year in review. December 2021. <https://www.mckinsey.com/-/media/mckinsey/featured%20insights/mckinsey%20global%20surveys/mckinsey-global-surveys-2021-a-year-in-review.pdf>

⁶ (Bloom's Taxonomy) "Bloom's Taxonomy," Wikipedia, last modified July 5, 2020, https://en.wikipedia.org/wiki/Bloom's_taxonomy

⁷ Reimagining our futures together: A new social contract for education. UNESCO. 2021. <https://unesdoc.unesco.org/ark:/48223/pf0000379707>

Intel technologies may require enabled hardware, software or service activation. No product or component can be absolutely secure.

Your costs and results may vary.

© Intel Corporation. Intel, the Intel logo, and other Intel marks are trademarks of Intel Corporation or its subsidiaries.

Other names and brands may be claimed as the property of others.

0923/AM/MIM/PDF

343927-008