



AI in Education

A Microsoft Special Report



Introduction

The rapid ascent of generative AI is changing the way we as a society create, solve problems, learn, and communicate. It's an inflection point that affects every industry, and in education, the technology can have transformational impact. There is no better time to reimagine education.

AI can enable personalized learning, free up time for educators to focus on what matters most, and help address issues of equity and accessibility. It can also improve operational efficiency, bringing much-needed support to overburdened administrators and IT teams.

But tapping into these advantages requires navigating both longstanding and new challenges in the educational field. The importance of responsible AI, trust, and transparency are amplified when it comes to giving students quality learning experiences and providing them with the skills they'll need in a rapidly changing future.

We're just beginning to understand the future of AI in education. As we continue to learn, we believe it is important to share our early findings. In this report, we'll highlight insights from our research at Microsoft, as well as research from partner organizations and academia. We'll also share recommendations and resources to help capture the opportunities that come with this unique moment.

Key Takeaways

1

Start AI Conversations Today

There is an urgent need to communicate clearly and openly about AI, increase AI literacy, and create usage guidelines at educational organizations.

2

Learn How AI Can Help

There is a clear opportunity for AI to help educators and administrators lighten workloads, boost productivity, and improve efficiency.

3

Explore New Ways to Learn

Early studies demonstrate the potential of AI to improve educational experiences and learning outcomes.

4

Prepare for the Future

Students need to build people skills *and* technical capacity to prepare for a world transformed by AI.

1

Start AI Conversations Today

Start AI Conversations Today

In education, the potential benefits of AI go beyond productivity. AI brings opportunities to provide actionable insights, improve learning outcomes, and make more time for human connection and collaboration. But there are also challenges to navigate and overcome to realize that potential.

To better understand the needs and opportunities around AI in education, we recently surveyed educators, academic and IT leaders, and students from K-12 and higher education institutions about their perceptions, familiarity, uses, and concerns around AI.



Bridging the AI Literacy Gap

We found that the majority of educators, students, and education leaders have already used AI for school-related purposes, yet only a small percentage report a strong familiarity with AI—in other words, their use of AI outpaces their understanding of the technology. This holds true for all groups, though leaders reported having more familiarity with AI than students and educators.

This disconnect points to an urgent need to increase AI literacy and AI integration in strategic priorities, standards, policies, and professional development.

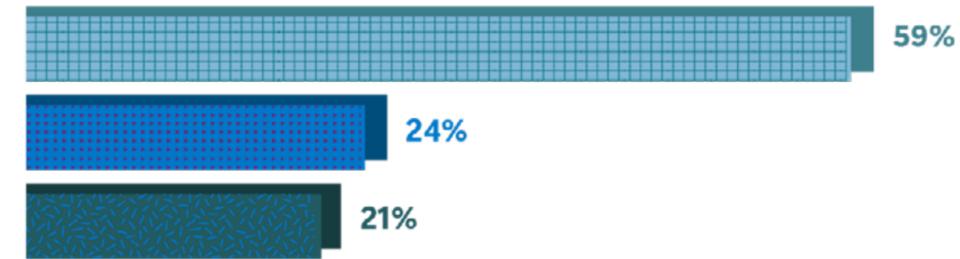


Exploring Unknown Territory

The majority of students and educators are already using AI, despite saying they don't know much about it.

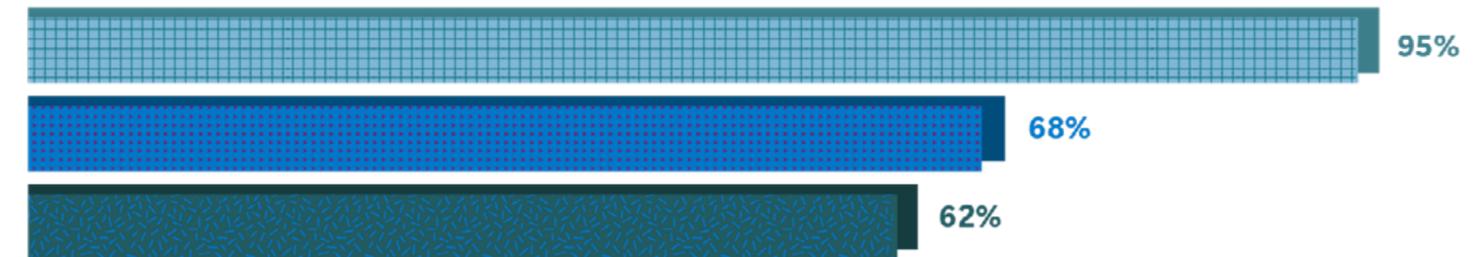
Familiarity with AI

'Know a lot about AI'

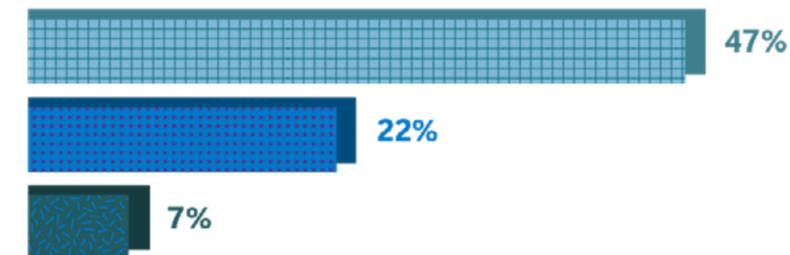


AI Usage in School Settings

Have used it at least once or twice



Daily Use



Source: AI in Education Microsoft Study (November 2023)

Survey questions: How much do you know about AI (prior to taking this survey)? Select only one.

Have you used or tried an AI tool or service before in your role at your educational institution or for school-related purposes? Select only one. How often do you use AI tools/services in your role at your educational institution or for school-related purposes?

Use Cases

Among respondents who report using AI, most people say they use it to enhance productivity, personalize learning, and improve efficiency.

How Is AI Being Used in Education today?

Students most frequently use AI to summarize information, while educators most often use the technology for class planning and materials, and decision makers use it to drive process efficiency.



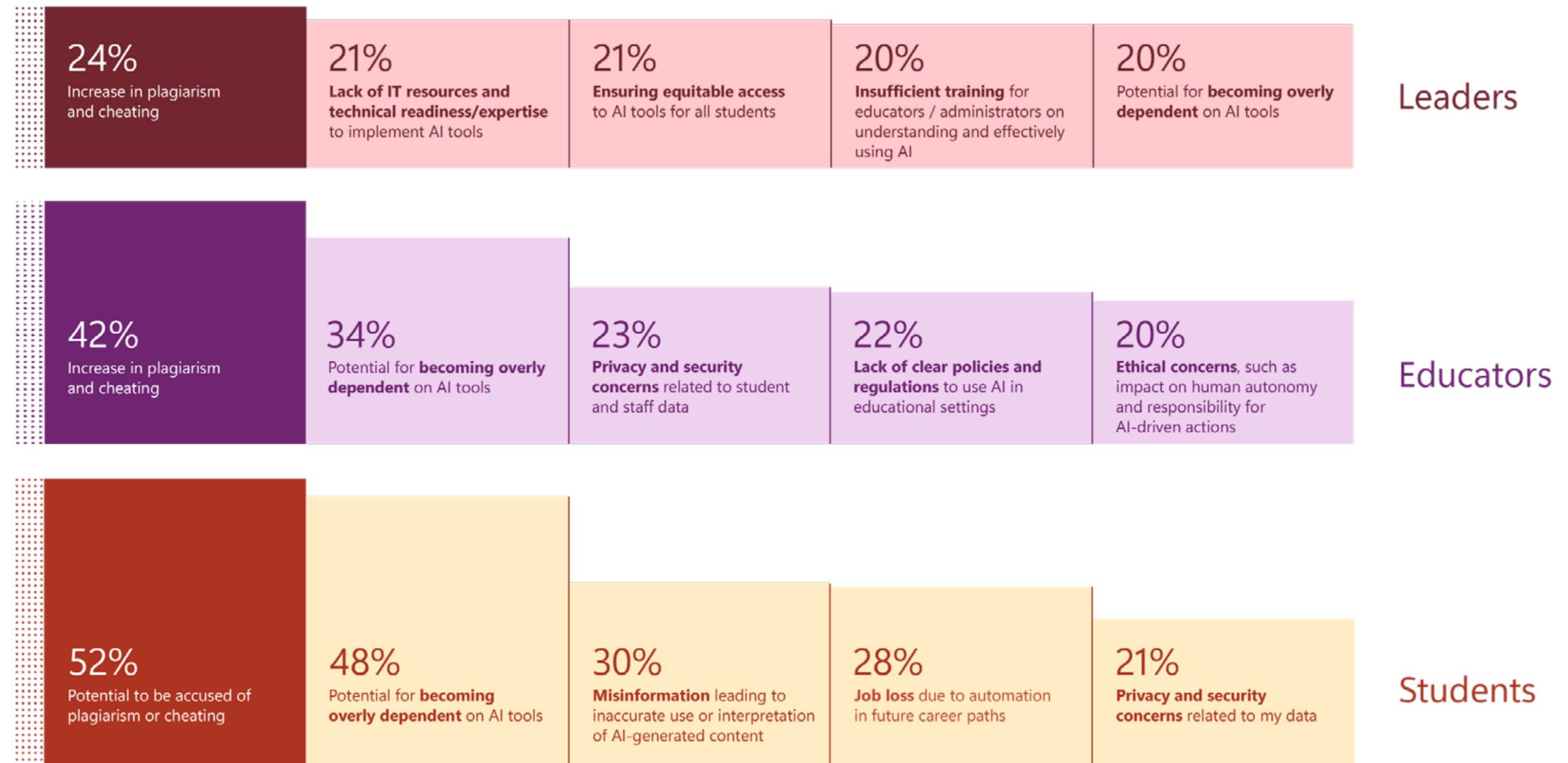
Source: AI in Education Microsoft Study (November 2023)
 Survey questions: For which of the following tasks are you using AI tools in your role?
 For which of the following tasks are you using AI tools as a student?

Challenges

Top concerns highlight important challenges to overcome, including data privacy and security, equitable access to AI tools, and the need to offer training and mitigate overreliance on AI.

What Are the Main Concerns around AI in Education?

Concerns around cheating and plagiarism call for rethinking of academic integrity policy and assessment in a world without reliable AI detection tools.



Source: AI in Education Microsoft Study (November 2023)
Survey question: Please select the top 3 reasons why you may be concerned about AI usage within your school/district/university.

Engage with Educators and Students

Microsoft Research conducted interviews with undergraduate students and educators in the UK,¹ and we learned that educators often simply ask students not to use AI at all, because university guidelines on AI use are often unclear and instructors fear they won't be able to tell if work is plagiarized.

Students, however, said they want AI to support their learning—not supplant it. They still want to do their own thinking, learning, and writing. They're concerned about overreliance on AI, and they double-check the outputs of AI tools for inaccurate or untrustworthy information. Students said using AI for things like summarizing articles, finding source material, checking grammar, receiving feedback, and challenging their ideas made their school work easier, more efficient, and more enjoyable, but they're anxious about using AI or discussing it with educators for fear of being accused of cheating or to be seen as unwilling to do the work.

Ultimately, both students and educators said that students should be taught how to use AI effectively and responsibly, but educators worry that providing this information will encourage academic dishonesty. In fact, educators said they even avoid discussing AI with their colleagues for fear they'll be judged. As a result, educators may be unsure of both how they can use AI for teaching and how to communicate with students about using it.

A recent survey from the [National 4-H Council, Hart Research, and Microsoft](#) found similar needs for additional guidance in K-12 education. 72% of young people aged 9-17 say they are seeking support from adults in learning how to use AI correctly and confidently.

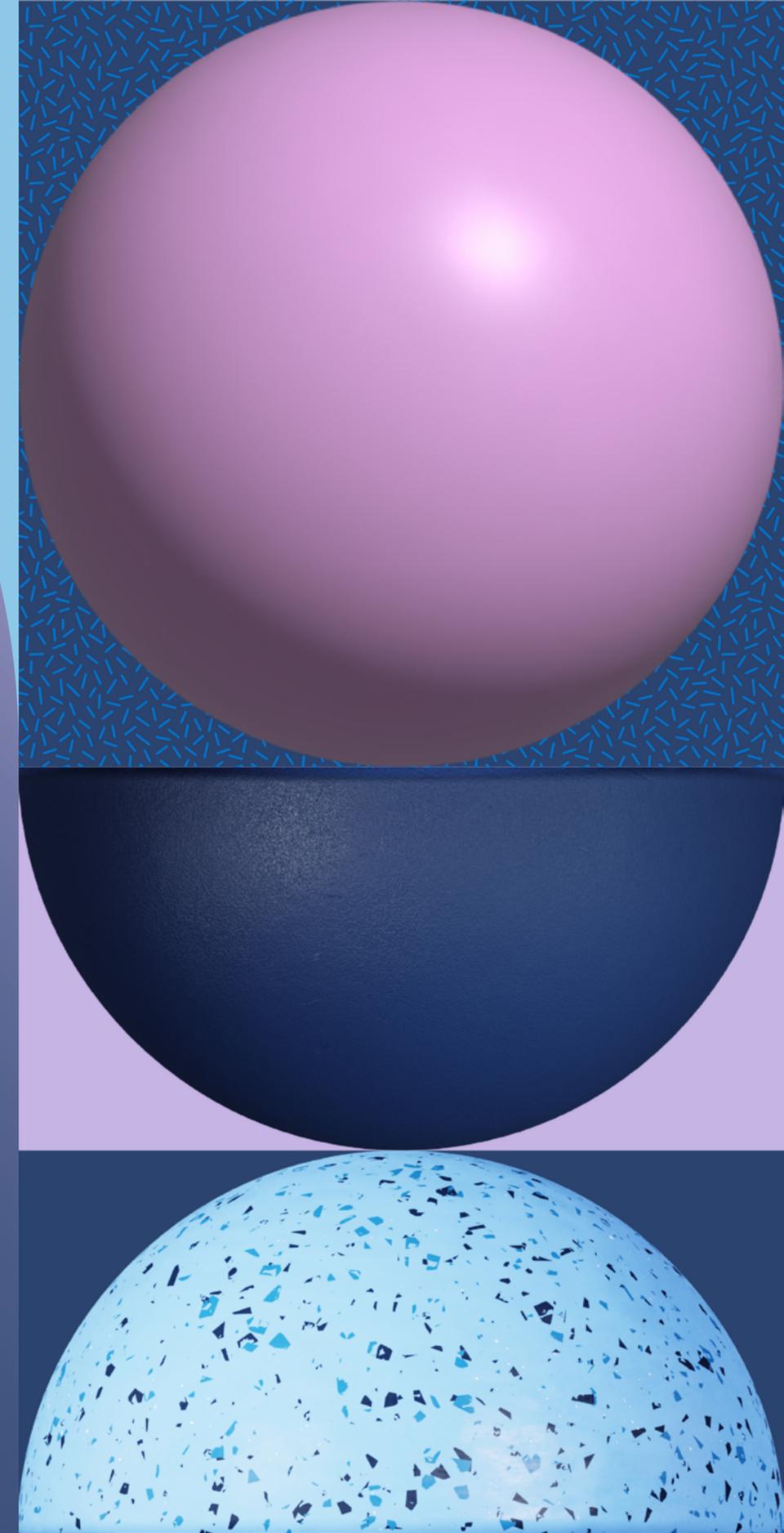
Recommendations

- 1 Engage with students about how they can use AI to enhance learning without compromising academic integrity, and hear their concerns and hopes for AI firsthand.
- 2 Create clear guidelines and policies for the use of AI at your organization. Microsoft Research has found that students and educators alike are often unclear on what guidelines are in place around the use of AI at their institutions.
- 3 Incorporate AI literacy into classroom instruction and staff training to make sure that students, teachers, and leaders understand what AI is, how it works, and what the risks and benefits are for both teaching and learning.



2

Learn
How AI
Can Help



Learn How AI Can Help

AI can lighten workloads and act as a copilot to boost productivity, and the need for these benefits is particularly acute in education.



Learn How AI Can Help

Each month, the heaviest Microsoft 365 education users are receiving more than 500 emails and sending and reading more than 800 chats to get things done.

And Microsoft found that compared to peers in other industries, education professionals are more likely to:

- Have negative feelings about the meetings they attend
- Spend more time than they want checking and responding to chats and emails
- Struggle with not having enough focus time

Despite facing these significant challenges, education respondents also demonstrated ambition, innovation, and adaptability. They are more likely to:

- Prioritize making team and individual work processes more efficient
- Maximize the performance of their creative content
- Benefit from identifying recent trends related to their jobs

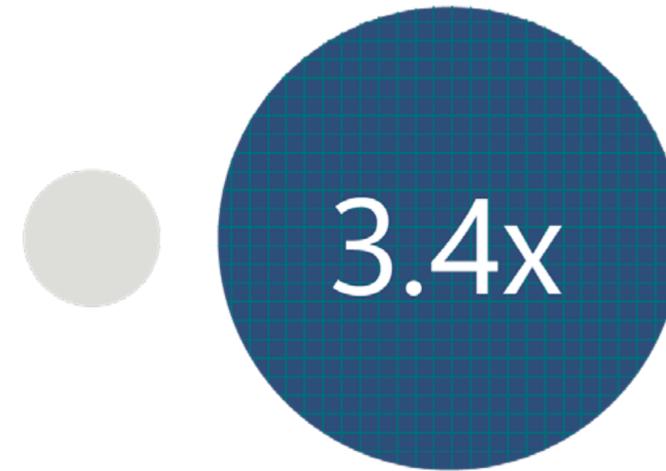
AI tools can help education professionals ease pain points and make better use of opportunities. The [2023 LinkedIn Future of Work Report](#) found that while more than half of an educator's job involves specialized people skills best performed by humans, like classroom management and instruction, AI can enable greater productivity in tasks like lesson planning and curriculum development, which make up 45% of teachers' responsibilities. That frees up time for educators to do the things only humans can do—like connect with students.

Learn How AI Can Help

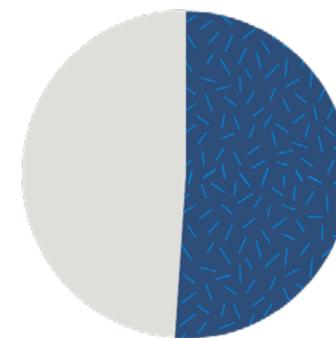
An IDC Study on the opportunity of AI in education found that, while it is still early for many institutions, education respondents believe that they are getting an average of 3.4x return on their investment for AI initiatives, citing benefits including faster innovation, reduced institutional risk, and faster time to market for new education services and experiences.

An Outsized ROI

Educational institutions that have adopted AI achieved a significant return on investment over a relatively short time—important factors in a sector where budgets and timelines are typically tight.

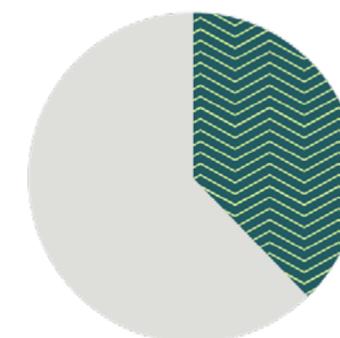


Education respondents believe they are getting an average of 3.4x return on their investment for AI initiatives just 15 months after implementation.



52%

of education respondents reported average AI timelines of 6 months or less



40%

of respondents across all other industries reported timelines of 6 months or less

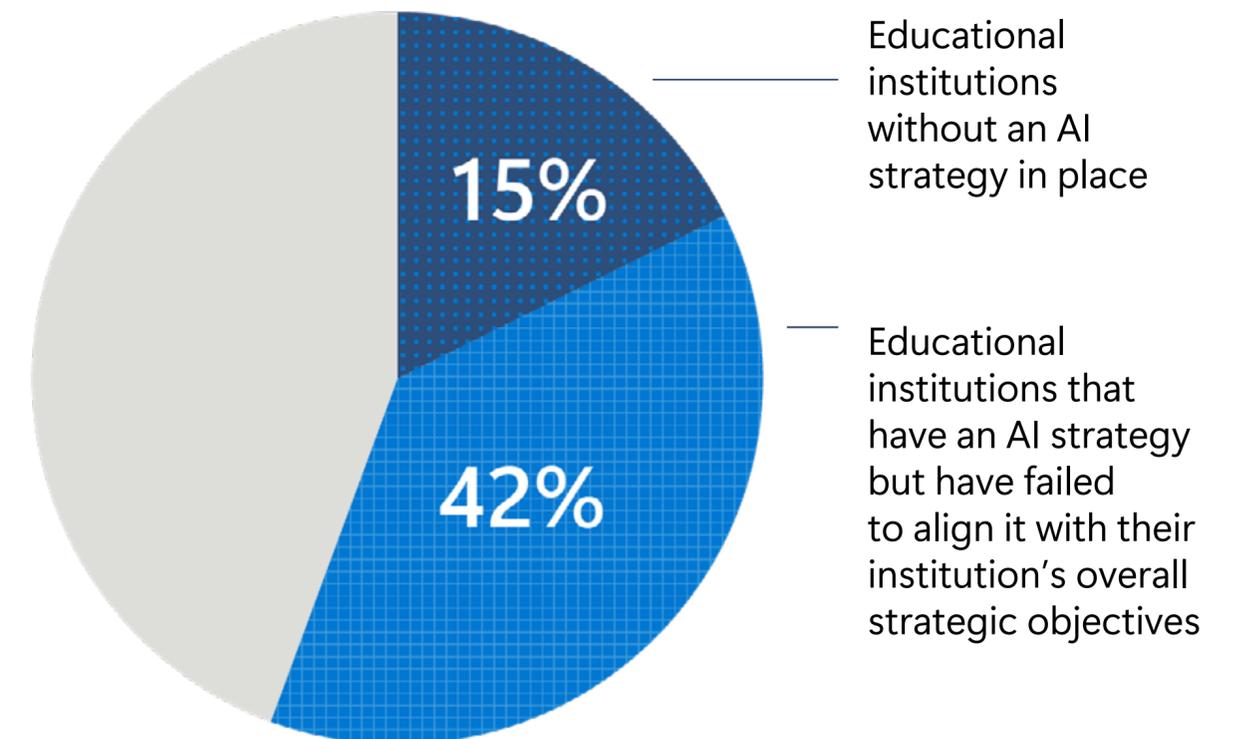
The Preparedness Paradox

Educational institutions are moving fast when it comes to AI, and they're seeing significant returns on their investment. However, IDC's research found that education leaders feel less prepared for AI-driven change than their peers in other industries.

This is likely due to two key factors: lack of skilled talent and lack of strategy. In fact, 60% of education respondents in IDC's survey noted that "lack of skilled talent" was the most significant challenge they face when it comes to implementing AI. That survey also showed that 57% of educational institutions either do not have an AI strategy in place at all, or they have an AI strategy but have failed to align that strategy with their institution's overall strategic objectives—compared to just 36% of organizations across industries.

The Need for AI Strategy

The majority of educational institutions lack an integrated AI strategy, which is key to safely and effectively capturing the opportunities presented by new technologies.



Recommendations

- 1 | **Establish an oversight committee or governing body** to define and steer AI strategy, responsible use policies, governance models, and priorities.
- 2 | **Prepare for change** by building a centralized, cross-functional AI team that can connect AI initiatives to the organization's existing priorities and create training opportunities.
- 3 | **Prioritize high-value, low-complexity** AI use cases. Start small, collect and respond to feedback, and plan for scalable and impactful solutions.



3

Explore
New Ways
to Learn

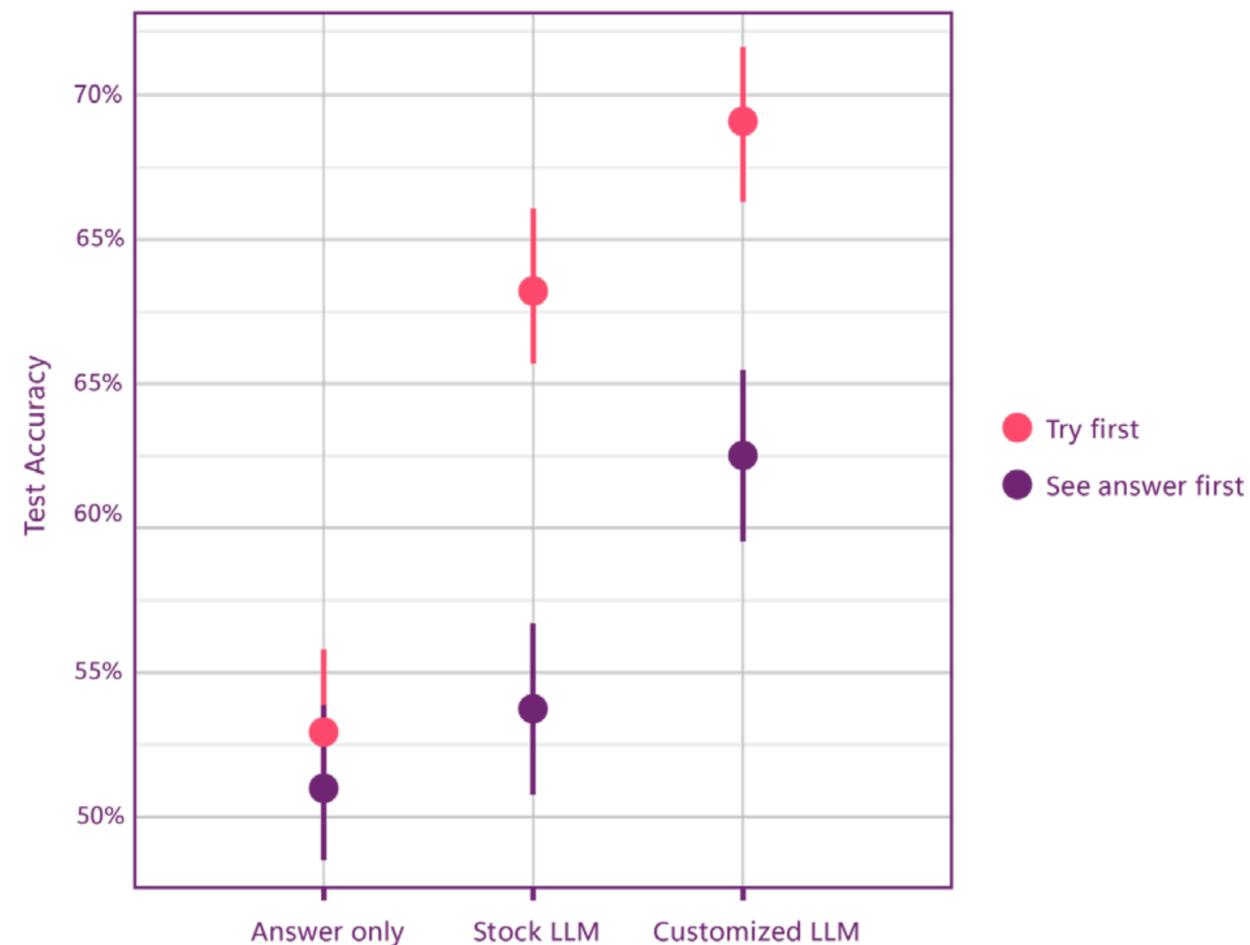
Explore New Ways to Learn

One of the most important questions yet to be answered about generative AI is if it can truly improve student learning at scale. Research to date indicates that it can, particularly when AI is intentionally designed to act as a personalized tutor.

Recent studies point toward the importance of designing tools to act as coaches that encourage learning and engagement rather than simply giving responses. In one of the first randomized experiments on large language models (LLMs) and education, [Microsoft Research and Harsh Kumar from the University of Toronto](#) found that LLM-based explanations positively impacted learning relative to seeing only correct answers, but the benefits were largest for students who attempted problems on their own before consulting the LLM.

How AI Helps Students Learn

AI has the most positive impact on learning when students first try to solve problems on their own, with AI providing explanations along with correct answers.



Source: Kumar, Harsh and Rothschild, David M. and Goldstein, Daniel G. and Hofman, Jake M., *Math Education with Large Language Models: Peril or Promise?* (November 22, 2023) Error bars show one standard error above and below average accuracy in each condition.

Embracing AI to Empower Students

Educational institutions worldwide are exploring opportunities to empower students by embracing AI that is intentionally designed to act as an educational coach.

- New York City Public Schools created an AI-powered teaching assistant that answers questions and provides real-time feedback. Over a two-week period, nearly 100 students in three classes asked the AI assistant more than 2,000 questions, far more than the three teachers could have answered. The chatbot responds to questions by offering hints in order to push students and keep them thinking rather than giving an answer right away.
- The South Australia Department for Education built EdChat to offer 24/7 access to a safe source of instantaneous information. EdChat ensures that students can get quick answers before discussing more complex and nuanced questions with teachers. So far, educators say EdChat is also helping with metacognition—students' understanding of how they learn, ask the right questions to get the information they need, and evaluate the outputs of AI models.



Increasing Access to Coaching

A 2023 study by Harvard University and Yale University professors found that AI has the potential to give students in very large classes an experience that approximates an ideal one-to-one relationship between educator and student. Harvard University's CS50: Introduction to Computer Science is a massive open online course (MOOC) that has more than 5 million registrants—needless to say, many of those students never have the chance to speak with an instructor. Harvard created course-specific AI tools to give students customized, 24/7 support that guides them toward solutions rather than offer answers. Students in the study said they appreciated the always-available coaching, but perhaps more importantly, they asked the AI questions they may not have felt comfortable asking an instructor.

One student noted that it “felt like having a personal tutor...I love how AI bots will answer questions without ego and without judgment, generally entertaining even the stupidest of questions without treating them like they’re stupid.”

Recommendations

- 1 **Encourage a growth mindset.** Lead by example to develop a culture of learning, iteration, and curiosity.
- 2 **Learn from others.** Explore the growing list of resources focused on AI in education, learn about examples of innovation, ask questions, and talk to your peers about their experiences with AI.
- 3 **Be intentional in your design of new AI experiences.** Focus on the desired outcome: what is your goal and how might AI help you achieve it?



4

Prepare for
the Future

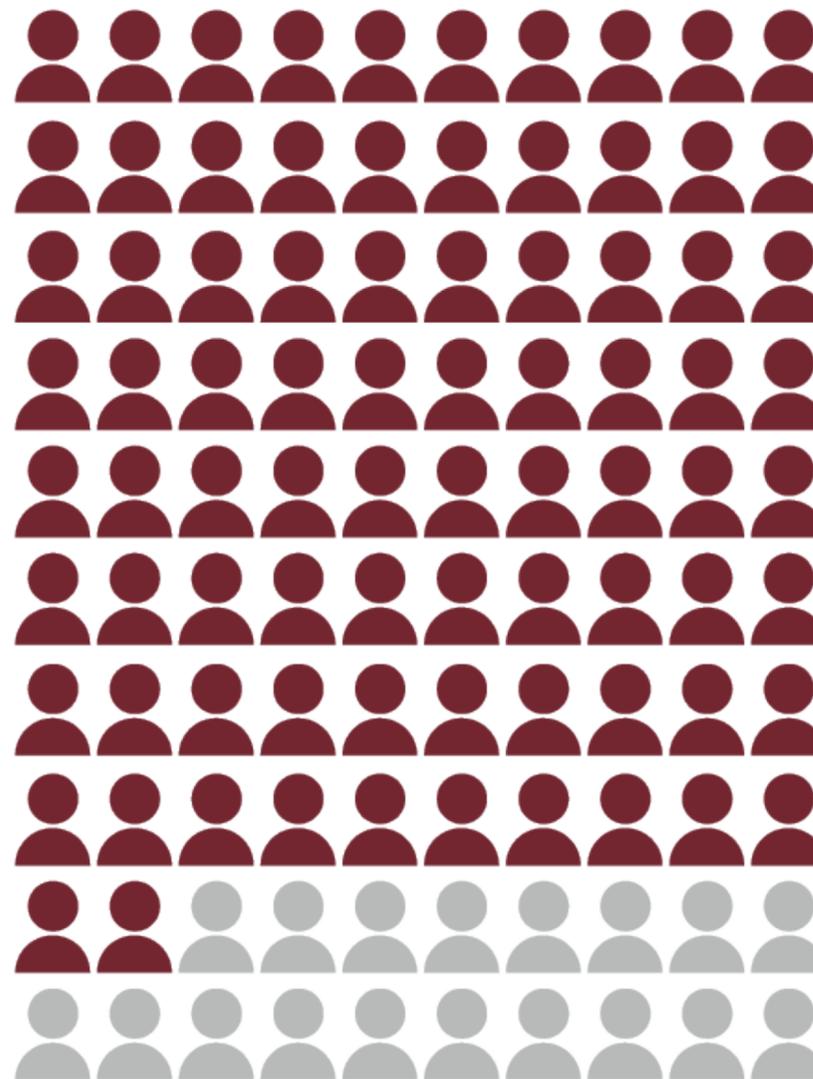
Prepare for the Future

Just as the future of education is evolving, so are the career skills students need for the AI-powered future of work. The ability to work effectively and iteratively with AI using natural language will be essential for every employee. 82% of leaders surveyed for Microsoft's 2023 Work Trend Index say employees will need new skills to be prepared for the growth of AI.



New Skills for an Evolving Future

The jobs of the future will demand capabilities that students need to develop now.



82%

of business leaders say employees will need new skills to prepare for AI

*Source: Microsoft Work Trend Index: Annual Report (May 9, 2023)
Survey question: Based on your current understanding of artificial intelligence (AI), how much do you agree or disagree with the following statements? I anticipate my employees will need to learn new skills or upskill to be prepared for the growth of AI.*

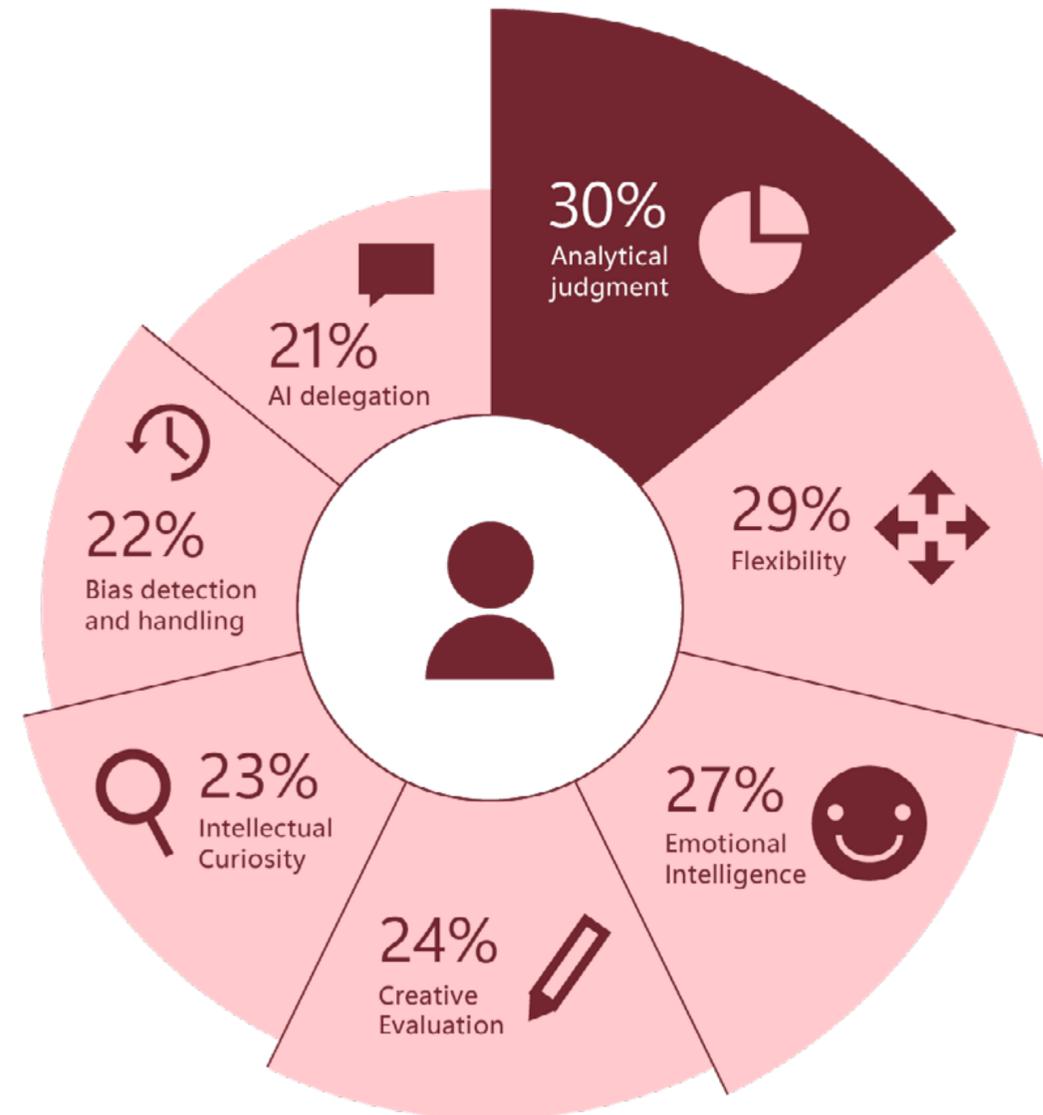
Prepare for the Future

The most important skills for the future include analytical judgment, flexibility, emotional intelligence, creative evaluation, and directing and evaluating AI.

Indeed, the Microsoft New Future of Work Report notes that as AI is increasingly used to find, summarize, and generate content, the skills that are most important for employees will be focused on analyzing and integrating AI outputs rather than searching for information and creating content from scratch.

The Capabilities Needed for the AI Era

Learning to work alongside AI is not just about technical skills. It will be necessary to develop new analytical, emotional, and critical thinking skills.



Source: Microsoft Work Trend Index: Annual Report (May 9, 2023)
Survey question: Some believe that it is likely that artificial intelligence (AI) will usher in a new era of technological advancements. Which of the following skills do you think will be most essential for your employees to learn to evolve with these potential changes?

Prioritizing People Skills

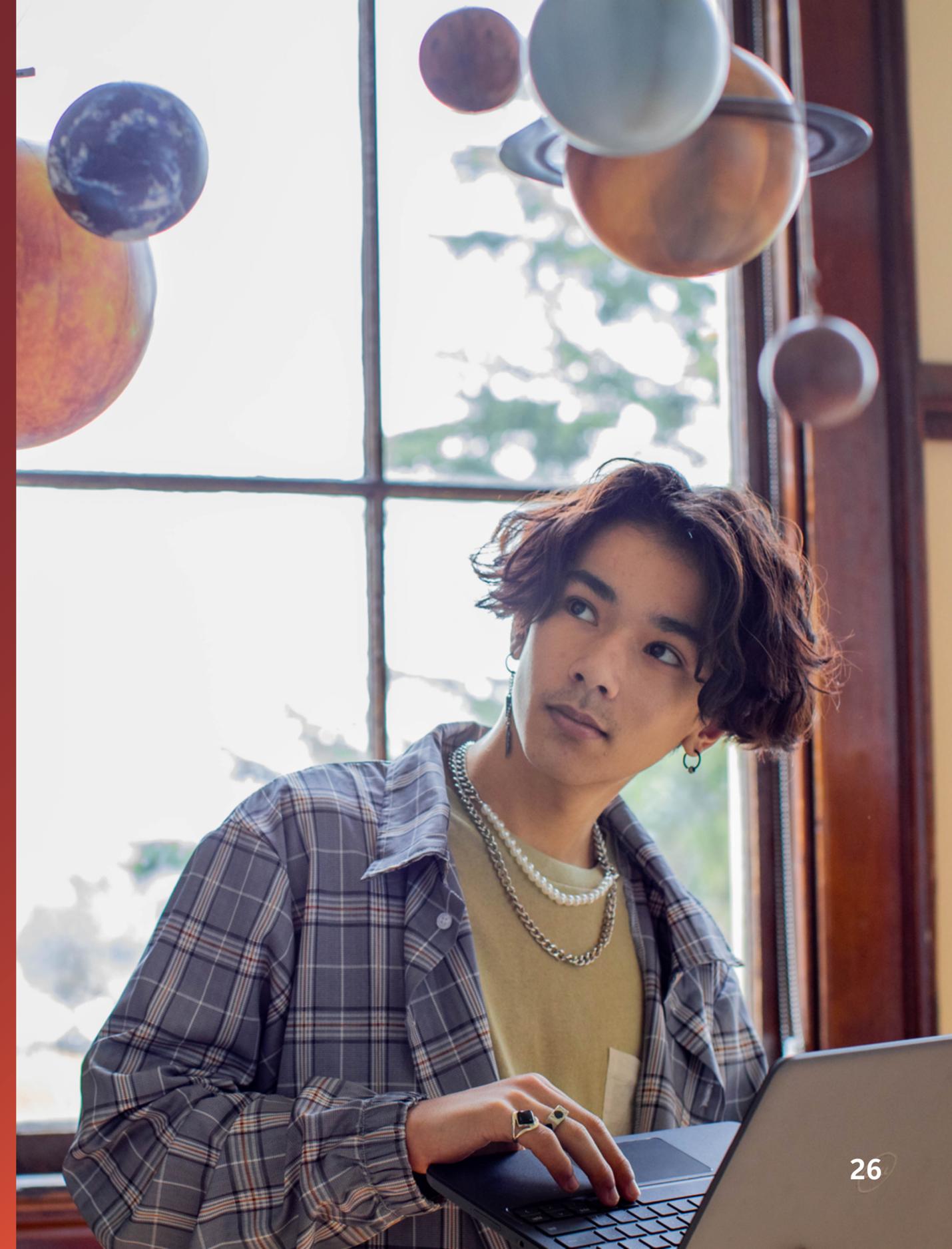
In an AI-augmented world, employers are prioritizing capabilities that are uniquely human. Since the launch of ChatGPT, some of the fastest-growing skills in job postings in the US are people skills. According to the [2023 LinkedIn Future of Work Report](#), 92% of US executives agree that people skills are more important than ever. Communication is an in-demand skill, and employers are increasingly looking for capabilities such as flexibility, professional ethics, social perceptiveness, and self-management.

New [IDC research sponsored by Microsoft](#) confirms that business leaders are seeking new hires with soft skills like flexibility and creative problem-solving. And when evaluating technical skills, they rank effective use of Microsoft Office, data management and analysis, project management, and business intelligence at the top. This points to the need for educators to develop a new mix of skills to prepare students for future careers.



Recommendations

- 1 Teach students **metacognitive skills**, or the ability to analyze, understand, and control their own thought processes. For example, educators might prompt students to explain why they agree or disagree with an AI-generated output.
- 2 Use AI tools as “**provocateurs**” that spark discussion, challenge assumptions, and encourage evaluation rather than provide answers. For example, when using AI to summarize an article, teach students to follow up with queries like, “what further questions should I ask?”
- 3 Don’t **over-index on tech skills**. While technological expertise is important, it’s crucial to develop the human-centered skills that will be prized in a technology-augmented future.



Get Started with Microsoft

Get Started with Microsoft

At Microsoft, we're on a mission to enable equitable education for all. That means providing the tools and the technology for students, educators, administrators, and staff.

Learn about AI and develop key skills

- [AI for Educators Learning Path](#): A resource that explores the potential of AI in education, covering AI fundamentals, enhancing teaching and learning with Copilot, and supporting learners.
- [AI Classroom Toolkit](#): A creative resource designed to help educators have important conversations with students about responsible AI practices in the classroom.

- [Family Safety Toolkit](#): A toolkit with guidance for families on how to navigate the world of generative AI together and how to leverage Microsoft's safety features and family safety settings to support and enhance digital parenting.
- [Copilot Lab](#): A collection of resources and information to help you learn about Copilot, prompting, privacy and more.
- [Microsoft AI Learning Hub](#): Information geared toward helping upskill, prepare for AI, and earn Microsoft credentials.

Develop AI guidance

Microsoft is partnering with organizations such as TeachAI to build resources like the [AI Guidance for Schools Toolkit](#) to help education authorities, school leaders, and teachers create guidelines that enable them to realize the benefits of incorporating AI in primary and secondary education while understanding and mitigating potential risks.

Try AI-powered products available at no cost to educators and students

- [Copilot](#) is Microsoft's AI assistant—be sure to log in with your school account for [commercial data protection](#).
- [Reading Coach](#) improves reading fluency by using AI to help students generate custom stories and provide personalized feedback.
- [Learning Accelerators](#) provide students with real-time coaching and feedback and give educators actionable analytics and insights.
- GitHub Copilot is available at no cost for [verified teachers](#) and [students](#) to help users learn to write code and develop applications.

Read more about Microsoft Education

- [Microsoft Copilot | Microsoft AI](#) can transform productivity for everyone—from staff and researchers to IT pros and developers.
- [Microsoft Education AI Toolkit](#): A resource for education leaders to help develop AI plans for their institutions. Review examples and materials to help you get started, and evaluate and implement AI solutions.
- [Technology Solutions for Schools | Microsoft Education](#): Microsoft annually provides billions of dollars in no-cost and discounted learning tools, software, and services for students, faculty, and staff around the world in order to enable equitable education for all.

Explore the latest insights and research from Microsoft

- [Watch Jaime Teevan's Keynote at Bett UK 2024 - Thrive with AI: Lead Like a Scientist](#)
- [WorkLab: Hard Data, Compelling Stories, Vital Insights \(microsoft.com\)](#)
- [The New Future of Work - Microsoft Research](#)

References

AI in Education study

The AI in Education Microsoft study was conducted in partnership with PSB Insights among 1,800 respondents from K-12 and higher education organizations including students, educators, and academic and IT leaders. Leader data points include both academic and IT decision makers. The online quantitative survey was fielded October 27 - November 21 2023 in the US.

Generative AI & Undergraduate Education – An Interview Study

Preliminary research by Auste Simkute, Viktor Kewenig, Lev Tankelevitch, Sean Rintel, and Abigail Sellen. For further information, contact Lev Tankelevitch (lev.tankelevitch@microsoft.com).

Youth AI Use & Understanding Survey

The survey released by the National 4-H Council, which included 1,510 children ages 9-17, was fielded from November 5-16, 2023 by Hart Research and supported by Microsoft.

Math Education with Large Language Models: Peril or Promise?

Kumar, Harsh and Rothschild, David M. and Goldstein, Daniel G. and Hofman, Jake M., Math Education with Large Language Models: Peril or Promise? (November 22, 2023). Available at SSRN: <https://ssrn.com/abstract=4641653> or <http://dx.doi.org/10.2139/ssrn.4641653>

Teaching CS50 with AI

Rongxin Liu, Carter Zenke, Charlie Liu, Andrew Holmes, Patrick Thornton, and David J. Malan. 2024. Teaching CS50 with AI: Leveraging Generative Artificial Intelligence in Computer

Science Education. In Proceedings of the 55th ACM Technical Symposium on Computer Science Education V. 1 (SIGCSE 2024), March 20–23, 2024, Portland, OR, USA. ACM, New York, NY, USA, 7 pages.

Microsoft 365 usage patterns

Usage patterns in Microsoft 365 in a rolling 28-day period ending in January 2024. Each data point evaluates the top 20% of users by volume within the relevant Microsoft 365 application. Data represents education users in the United States.

IDC infographic, Sponsored by Microsoft, Finding High-Impact Opportunities for AI in Education, Doc. US51871924 (March 2024)

IDC InfoBrief, sponsored by Microsoft, Thriving in an AI-Driven Future: Defining Critical Skills and Tools as Jobs Evolve, IDC Document #US51794024 (February 2024)

References

Work Trend Index Annual Report (May 2023)

The Work Trend Index survey was conducted by an independent research firm, Edelman Data x Intelligence, among 31,000 full-time employed or self-employed workers across 31 markets between February 1, 2023, and March 14, 2023. This survey was 20 minutes in length and conducted online, in either the English language or translated into a local language across markets. One thousand full-time workers were surveyed in each market, and global results have been aggregated across all responses to provide an average. Each market is evenly weighted within the global average. Each market was sampled to be representative of the full-time workforce across age, gender,

and region; each sample included a mix of work environments (in-person, remote vs. non-remote, office settings vs. non-office settings, etc.), industries, company sizes, tenures, and job levels.

Markets surveyed include:

Argentina, Australia, Brazil, Canada, China, Colombia, Czech Republic, Finland, France, Germany, Hong Kong, India, Indonesia, Italy, Japan, Malaysia, Mexico, Netherlands, New Zealand, Philippines, Poland, Singapore, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, United Kingdom, United States, and Vietnam.

References

Work Trend Index Special Report (November 2023)

The survey was conducted by an independent research firm, Edelman Data x Intelligence, among 18,100 full-time employed or self-employed workers across 12 markets between July 21, 2023, and November 1, 2023. This survey was 20 minutes in length and conducted online, in either the English language or translated into a local language across markets. At least 1,000 full-time workers were surveyed in each market, and global results have been aggregated across all responses to provide an average. Each market is evenly weighted within the global average. Each sample included an even distribution across Customer Service, Finance and

Accounting, Information Technology and Tech Infrastructure, Marketing and Public Relations, Sales and Business Development, and Supply Chain and Logistics. The sample also included a mix of work environments (in-person, remote vs. non-remote, office settings vs. non-office settings, etc.), industries including education, company sizes, tenures, and job levels.

Regions surveyed include:

Asia-Pacific, Europe, Latin America,
North America