it starts with

intel

BEYOND THE HEADLINES:

Getting Real About Artificial Intelligence In Education

It’s no secret that AI adoption is accelerating, with generative AI leading the way. As fast as these changes are happening, we know we are only at the beginning of the AI journey. Intel is committed to helping education partners integrate AI into education responsibly, in a way that maximizes successful outcomes while minimizing risk.

Three main principles guide our approach. First, AI should be accessible from anywhere at any time. Second, AI should be widely available to everyone. And third, safety is paramount when using AI in education.

With this eBook, I invite you to explore the benefits that AI brings to educators and students, including productivity and performance gains as measured by outcomes. You’ll learn about exciting, new experiences, supported by AI running on the PC, that streamline and personalize teaching and learning. You’ll also discover resources Intel has created to help educators and students develop the digital skills needed to thrive in this new AI era. At a big-picture level, you’ll find best practices for adopting AI safely and securely in your education system.

My team and I offer this eBook as a guide to support and inspire you as you start on your path to adopt AI. We hope you find it helpful.

Cigdem Ertem
General Manager
Education, Education Center of Excellence
Intel

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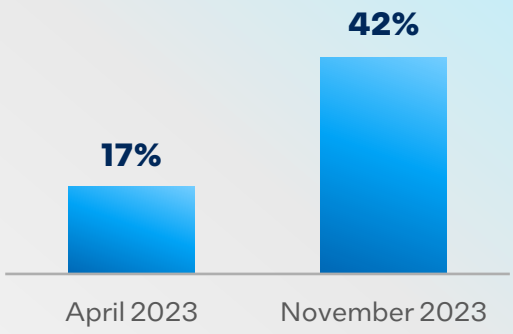
Artificial Intelligence (AI) is everywhere. From crunching massive amounts of data to feeding you content based on past interests and activities to automated chatbots and a host of other applications, AI is increasingly changing the way we live, work, and learn. It's no longer a question of "if" we will rely on AI, but "how" we will use it responsibly while minimizing the risks.

Educator Use of AI is on the Rise

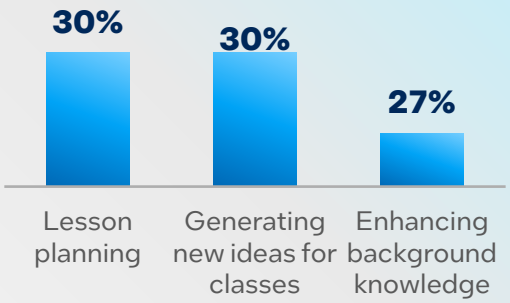
Educators are among the first to explore how AI can help them be more effective and more efficient.

Primary and secondary teachers who used generative AI[1]

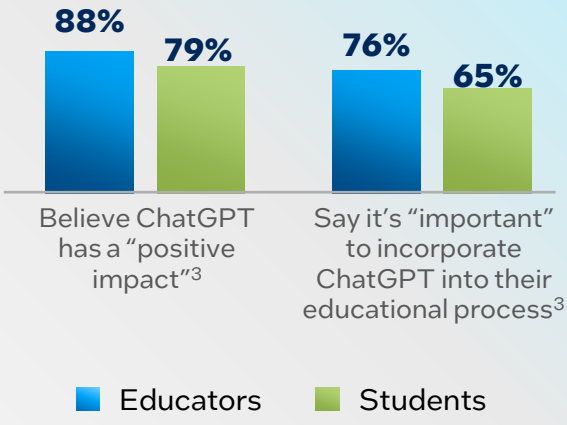


Already early adopters have experienced early gains in productivity.

Teachers in the US used ChatGPT for[2]:



Both educators and students in the US agree that the benefits are palpable.[3]



The Potential for AI to Transform Teaching and Learning

While AI has many practical, hands-on uses, it can also contribute meaningfully to higher-order learning and work-readiness skills. A 2024 report from Educause found that, since generative AI tools were mainstreamed in higher education environments, AI-related strategic planning has been primarily related to supporting students.[4]

Highest-ranked Goals of AI-related Strategic Planning[5]:

- Preparing students for the future workforce
- Exploring new methods of teaching and learning
- Improving higher education for the greater good

Further, most respondents (76 percent[6]) said that their AI-related strategy is "somewhat" or "to a great extent" focused on boosting educational experiences and student services. Time savings is another great motivator: Research by the World Economic Forum, produced in collaboration with Accenture, found that 40 percent of all time spent on tasks could be affected by large language models.[7]

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?

Innovative Ways to Teach, Manage, and Learn in Educational Institutions

The following use cases demonstrate the power of AI for educators, students, parents, and administrators.

AI Is Changing the Way Educators Manage Work and Improve Student Learning

Because AI assistants adapt and interact in real time, they can be an engaging and effective complement to human instruction, freeing up teachers to devote more time and energy to what is truly important: Developing engaging lessons, building meaningful relationships with their students, and giving them constructive feedback.

Helping gauge student progress and providing real-time feedback

Example
Khan Academy's Khanmigo uses AI to assess students' learning styles and progress, identifies knowledge gaps, and responds like a tutor to guide students toward critical thinking

Assisting teachers in providing teaching accommoda-tions

Example
AI Autism Assistant and Omnibridge, support people with disabilities

Providing tutoring and answering students' questions anytime

Example
Upstage writeupAI uses AI prompts to help writers of all levels create better stories

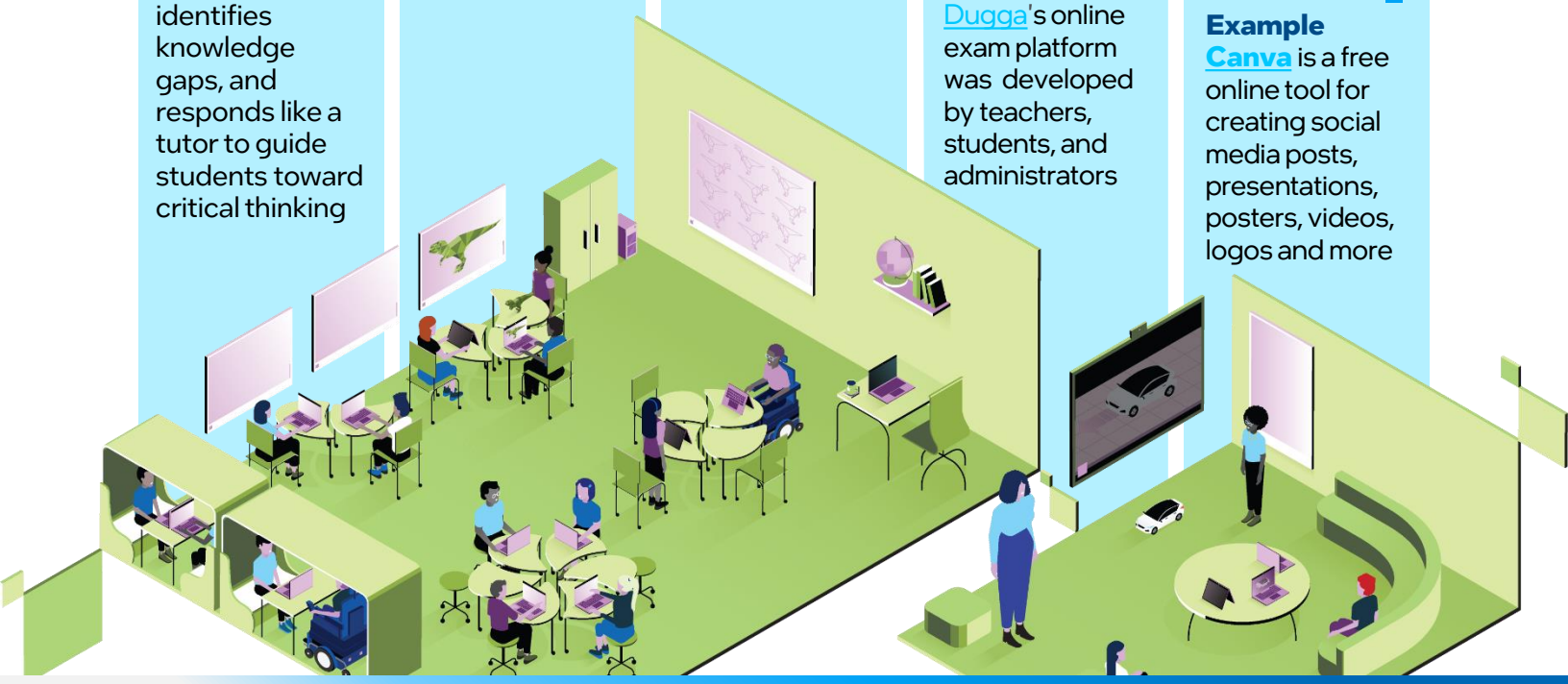
Automating routine tasks such as taking attendance and scoring exams and essays

Examples
Examroom.ai offers virtual proctoring solutions

Dugga's online exam platform was developed by teachers, students, and administrators

Helping teachers create livelier, more engaged classrooms by providing a visually rich learning platform

Example
Canva is a free online tool for creating social media posts, presentations, posters, videos, logos and more



AI Automates Administrative Tasks and Accelerates Data-Driven Decision-Making

Not only can AI guide students with hyper-personalized, captivating lessons, it can securely manage student data, automate routine tasks to improve personal productivity, provide valuable analytics that help optimize resource allocation, and enhance communication and collaboration among team members.

Already there are apps available that use AI to:

- Automate student registration and attendance
- Analyze student performance, attendance records, and resource utilization--and identify insightful trends that help improve school operations
- Search teacher availability, academic requirements, and student preferences and create schedules that work for everyone
- Instantly respond to everyday inquiries from students, parents, and staff, providing basic information--and even offering guidance--while keeping confidential information safe and secure
- Optimize physical resource allocation by looking at historical patterns and trends, and suggesting efficient, cost-effective resource allocation strategies

Examples

The number of AI-based apps that help automate administrative tasks is growing every day. There's even a community-based ranking site that breaks them out by category.

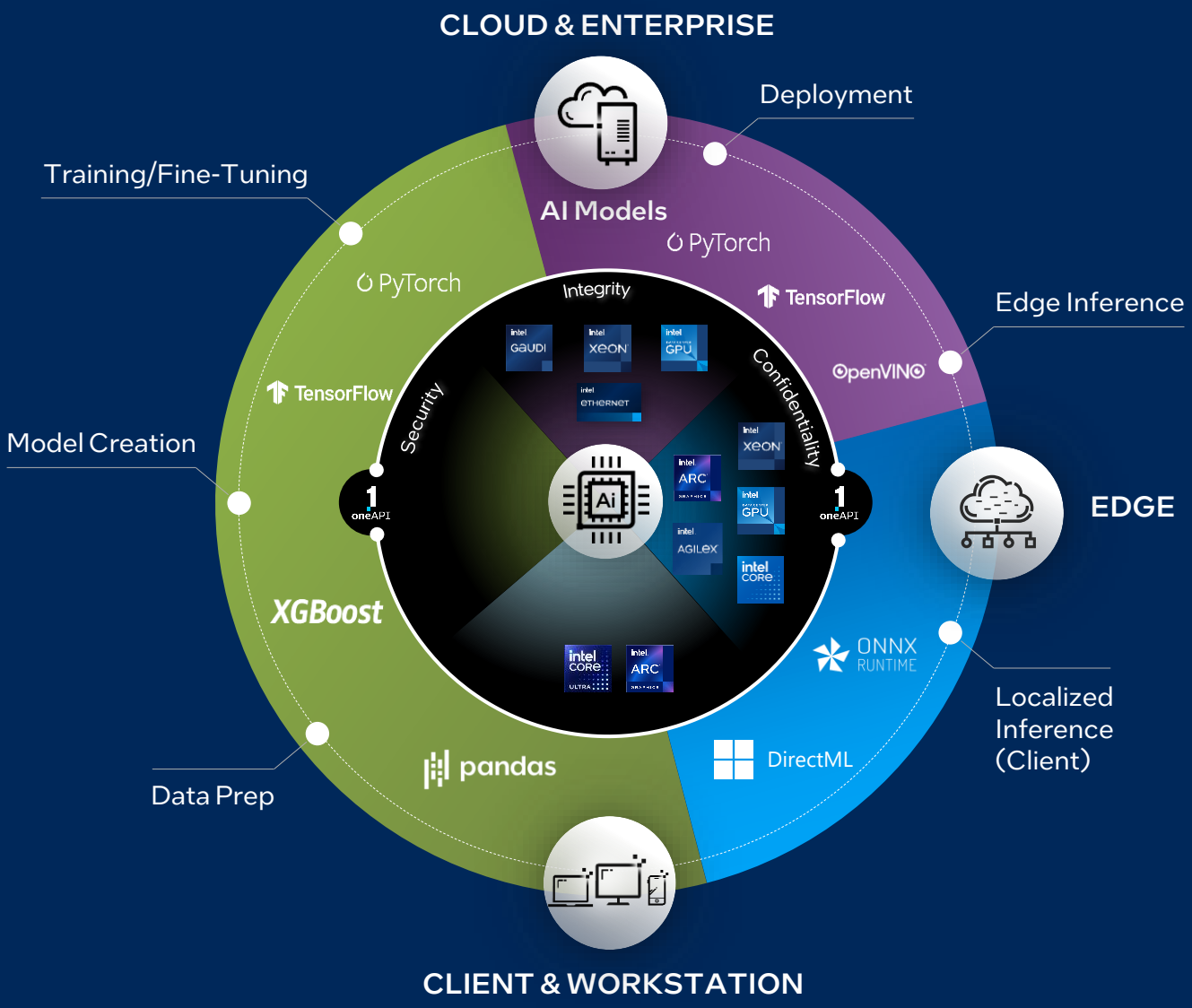
The list below will get you started. For each app listed, it's important to think about these questions: How much customization will the app require to meet your needs? Is it designed to grow as your needs grow? Perhaps most critically, how well does the app meet expectations around responsible AI considerations such as privacy and bias?

Canva
Clever
Classlink
Data317
Instructure
Khanmigo
Magic School
Microsoft Co-Pilot
Microsoft Power BI
Parlay Genie
Perplexity
Write Up

Bringing AI Everywhere: Intel's Unique Approach

Until now, most of the AI processing took place in the cloud. Now with scale, privacy and cost considerations, we see more AI computing shifting to the local devices. Bringing AI Everywhere depends on a diverse range of hardware and software. **Intel is the only company with technologies that span this spectrum.**

Intel infuses AI computing capabilities into all its technologies – from client and edge to data center and cloud. Its heterogeneous architectures consisting of CPUs (Intel® Xeon® and Intel® Core™ processors), GPUs (Intel® Data Center GPU Max and Flex Series, Intel® Arc™ GPU), and accelerators (Intel® Gaudi® accelerators) are competitive, perform, and provide open standards solutions for Intel customers and partners to quickly deploy AI at scale across the full spectrum of workloads and usage models. You can be sure that your diverse AI workloads will remain confidential, regardless of where they reside.



Intel® Technologies Power a Safe, Reliable, and Scalable Learning Environment for All

Many have concerns around the fact that, currently, AI applications for education reside primarily in a public or private cloud. In addition to raising significant data security concerns, this solution also limits access for students and educators who need AI-computing capabilities when offline.

Cognizant of these limitations, and in the interest of furthering both equity and access, Intel brought more than ten years of R&D to bear and developed a new architecture that marries high performance with the flexibility to run AI workloads in the cloud or locally on your PC.

Enter the Intel® AI PC.

What is the Intel® AI PC?

An Intel® AI PC is any PC built on the latest Intel® Core™ Ultra processor with built-in AI capabilities. This new generation of PCs brings computing to a new era of supercharged speed, efficiency, creativity, and productivity while maintaining the highest standards for protecting privacy, and security. For those on the go, the new Intel Core Ultra processors for mobile devices are optimized for AI and the next generation of workloads.

What Educators can do with AI

Personalized Productivity Assistant

Virus/Threat Detection

Enhanced Search

Premium Collaboration Experience

Data Analysis & Insights

Up to 59% better application performance vs. 3-yr-old PC as measured by Crossmark overall score [1]

Up to 132% faster AI video editing (gen over gen) using Adobe Premier Pro Beta [2]

Up to 13% lower power with AI-enhanced collaboration on Teams 10-person call with Windows Studio Effects on NPU [3]

Up to 82% better graphics performance [4]

1. As measured by CrossMark overall score Intel® Core™ Ultra 7 165H vs. Intel® Core™ i7-11850H. 2. As measured by an AI video editing workload using Adobe Premiere Pro Beta Intel® Core™ Ultra 7 165H vs. 13th Gen Intel® Core™ i7-1370P. 3. As measured by system on chip (SOC) package power consumption during a Microsoft Teams 10-person call with Windows Studio Effects on the NPU. Intel® Core™ Ultra 7 165H vs. Intel® Core™ i7-1370P. 4. As measured by 3DMark Time Spy comparing Intel Core Ultra 7 165H vs. Intel Core i7-1370P.
Results may vary. See intel.com/performanceindex for details.
Performance varies by use, configuration, and other factors. Learn more at www.intel.com/performanceindex.

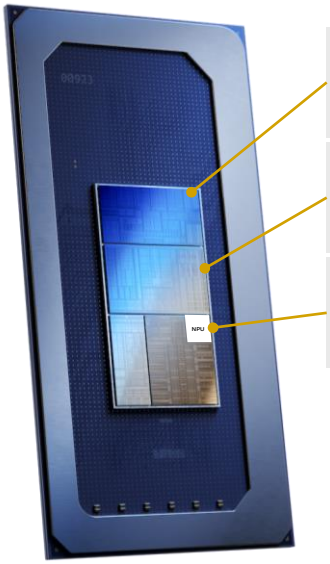
Why Is the Intel® AI PC Important?

The AI PC shifts some workloads, which traditionally run in the cloud, to your PC. Moving these workloads to the AI PC means it's more responsive to the needs of IT managers and users, reducing processing times, maximizing flexibility, and providing additional user data protection by being hosted on premises.

Because your PC has the capacity to offload workloads from the cloud, it decides where each workload should be processed to give you the best performance. The central processor (CPU) provides a fast response and works well for smaller workloads that don't require much computing power. The graphics processor (GPU) specializes in processing large workloads that require high throughput and can process multiple tasks on parallel paths. The neural processing unit (NPU) is ideally suited for parallel tasks and power-sensitive workloads and can help save energy.

Intel® Core™ Ultra Processors

First PC platform from Intel with built-in neural processing unit (NPU) for AI optimization of education workloads for today and tomorrow



CPU	**Fast Response**	Ideal for lightweight, single-inference, low-latency AI tasks
GPU	**Performance Parallelism & Throughput**	Ideal for AI infused in Media/3D/Render pipeline
NPU	**Dedicated Low Power AI Engine**	Ideal for sustained AI and AI offload

The right balance of platform power and performance for AI and the right software tools to scale.

ONNX OpenVINO DirectML W3C Web Neural Network API

A More Secure Foundation for AI

The need for foundational, hardware-level security to supplement software-only security has never been greater. Increasingly, AI is being used to speed up both the volume and sophistication of attacks. Intel is continually raising the bar, delivering a more secure platform from design through development. Protection capabilities for AI PCs include Attack Emulation Tools, LLM Guards, Model Scan and Sophisticated Enterprise Security Policy. Intel vPro® with Intel® Core™ Ultra Processors provides a more secure foundation for AI with cryptojacking detection by Crowdstrike and Intel® Threat Detection Technology (Intel® TDT), and Anomalous Behavior Detection (ABD), also by Intel TDT.

Intel's OpenVINO™ toolkit is an open-source software toolkit designed to optimize and deploy deep-learning models. OpenVINO is open source, thus, curriculum developers for instance, can merge their insights, helping the community to leverage the power of their collective intelligence. This enhances predictive accuracy , provides deeper insights into complex data sets and access to curated and approved content while providing more control over the curriculum.

Strong Partnerships to Optimize the AI Experience

With the most software vendor partnerships in the PC processor industry, Intel is working with partners to bring choice and optimization to PC customers. A growing list of 500+ AI models includes support for Microsoft CoPilot on Windows 11 as well as Adobe, Audacity, Bufferzone, CrowdStrike, GIMP, GoTo , OmniBridge, Skylum, Wondershare, XSplit, Zoom, and many others. This allows decision-makers to select the AI models that fit a specific district's needs and take full advantage of having AI running on their PCs.

As AI tools for education become more widely available, educators need to consider future AI workloads in their technology purchase decisions. Investing now in AI-ready PCs is key to future-proofing students and educators needs.

Intel Is Working to Bridge the Skill Gap and Increase Equity

Educators will play a central role in defining technology's role in delivering customized instruction—and establishing the human guardrails necessary to optimize AI's impact. This includes recognizing its limitations and potential for bias.

Addressing Educators' Skill and Technology Gaps

However, uptake of this role has been slowed significantly due to the difficulty in implementing AI. Often, both administrators and educators lack the skills and technology required to make the shift. Teachers, in particular, aren't being adequately trained to make AI equitable and accessible. According to an EdWeek survey, seven out of ten teachers in the US said they "haven't received any professional development on using AI in the classroom."[10] In a global study, UNESCO found that "only seven countries reported having developed frameworks for training programs on AI for teachers" and only Singapore had built an online repository for using ChatGPT in education.[11] More encouragingly, the RAND Corporation found that by the end of the 2023-2024 school year, 60 percent of districts in the US plan to have trained teachers on AI use.[12]

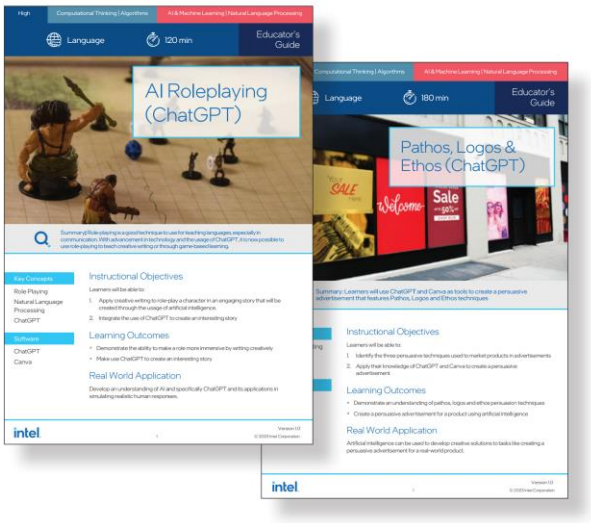
In this section, we'll draw upon Intel's longstanding commitment to collaborating with teachers to integrate technology into their curriculum and we'll take a look at some of the foundational tools and technologies for this more personal—and personalized—educational framework.

Building Educators' and Students' Technology Skills

By collaborating closely with educators and education leaders around the world, Intel has developed three programs to improve digital skills in education.

Intel® Skills for Innovation

Intel® Skills for Innovation (Intel® SFI) Professional Development empowers educators as they assume their role as leaders of learning experiences and facilitators of future-ready skill-building. Intel SFI modules and courses help educators understand new skill requirements, create action plans, test the viability of learning environments, develop competencies, and adopt technology-supported, skills-based learning models across the entire education ecosystem. 21 Starter Packs with AI-infused content engage educators and make it easy to learn as they tackle course design, multi-disciplinary collaboration, and lesson planning for elementary, middle, and high school. Intel SFI is being used in 57 countries by 105 partner organizations; More than 80,000 educators are engaged with Intel SFI and more than 500,000 students have used the program to date.



AI for Youth

The Intel® AI for Youth (AI4Y) curriculum, equips K-12 students with technical knowledge and social skills required for a digital world. Through more than 200 hours of hands-on content including computer vision, natural language processing, and data analytics, the program enhances AI awareness while demystifying and democratizing the technology. Teachers can design activities based on their own pedagogy and preferred method of delivery, using AI to enrich the learning experience for students with different styles of learning. Currently more than a half million students in more than 25 countries are using AI4Y. A sister program, Intel® AI for Future Workforce, is helping students in 113 community colleges and 500 universities and vocational schools in more than 10 countries prepare to join the digital workforce.

oneAPI Academic Program

Intel's oneAPI Academic Program provides university professors around the world industry-shaping concepts that can quickly and efficiently be integrated into STEM courses. The program offers a wide range of educational resources—including teaching kits, access to the Intel® Tiber™ Developer Cloud, and support from Intel for workshops and hackathons—for AI, high performance computing (HPC) and heterogeneous parallel programming. Students benefit from early access to the latest technological developments, invitations to exclusive events and trainings, and a real-life compute environment to conduct class assignments and research. More than 75 universities globally currently participate.

Intel® Edge AI Certification

This self-paced, online training course includes virtual classroom instruction and hands-on projects for computer science students to learn how to use the latest Intel developer tools and platforms to create their own portfolio of edge AI solutions.

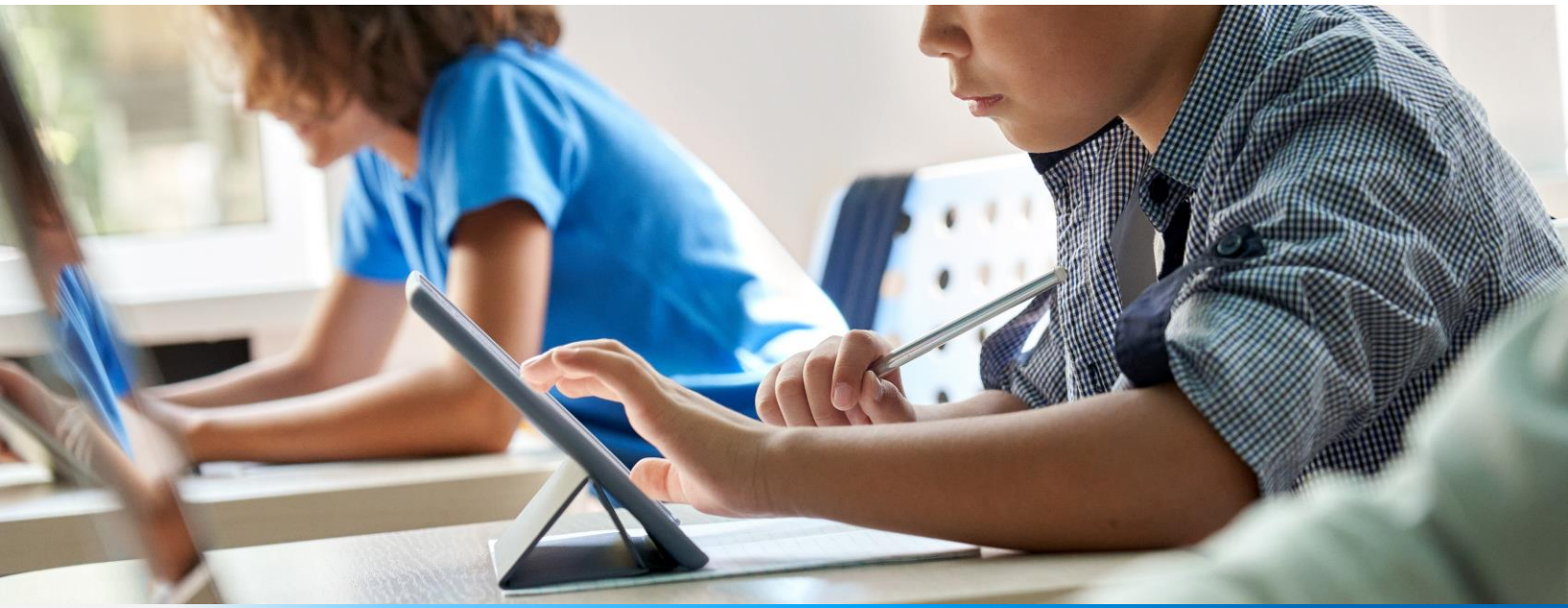
These programs are building equity on a global scale and helping local communities develop high-demand skills that prepare their students to succeed in the jobs of tomorrow.

National and Local Legislators Are Addressing Concerns About AI

The many advantages of AI are more than balanced by concerns about educator and student privacy and worries that data security will be compromised. To that end, lawmakers around the world are working to understand and address these concerns and a legislative framework is emerging. In April 2024, lawmakers in the US introduced the Kids Online Safety Act (KOSA).

> **KOSA would require certain online platforms to provide children with options to protect their information, disable addictive features, and opt out of personalized recommendations.**[8]
>
> Education Week

In the absence of federal protections, several states acted to protect their children. Bloomberg Law reports that "At least 15 states have enacted comprehensive data-privacy laws since 2020, while other states either have narrower laws or have at least introduced data-privacy laws during the current legislative session." [9] While the U.S. Office of Educational Technology is reviewing regulations related to student and family data privacy laws, parallel efforts are being led by UNESCO, the EdSAFE AI Alliance, and research organizations in many countries to consider AI in the European Union, at the United Nations, and throughout the world.



Deploying AI Responsibly and Equitably

The newness of AI in the public square and the rapid pace at which it is advancing make it difficult to implement and regulate in schools. A 2023 UNESCO survey found that "Only around 20 countries had defined any clear regulations on the ethics of AI, including as they relate to education, either as part of national AI strategies or otherwise."[13]

Responsible Artificial Intelligence (RAI) is an approach to developing, assessing, and deploying AI systems in a safe, trustworthy, and ethical way. Responsible AI isn't easy to achieve and no one company or organization has all the answers. Nevertheless, it's a critical element in designing functional and trusted systems.

Responsible AI Requires a Comprehensive Approach

Most institutions are just getting started, and progress is slow. Initial results from HolonIQ's Annual AI Survey show that, by 2024, 30 percent of educational institutions surveyed will have deployed a successful AI solution at their institution (up from 25 percent in the prior year) and 35 percent have successfully started or completed an AI pilot.[14] And research sponsored by RAND indicates that there is a significant gap at the local level. As of fall 2023, only five percent of US districts had adopted a policy specifically about students' use of Generative AI (GenAI).[15]

The European Union is leading the way with its AI Act, a comprehensive legal framework on AI, which addresses the risks of AI and positions Europe to play a leading role globally. This is complemented by the European AI Office, which was established in February 2024 to oversee implementation and enforcement of the AI Act within member states.

Offering a safe and secure alternative.

While other Australian states and territories introduced a ban on Gen AI, South Australia's Department for Education, in contrast, created its own generative AI tool called EdChat to provide a safe and secure alternative to the generic ChatGPT. The Department intended to use EdChat to learn how generative AI might be used in public schools and the challenges and opportunities that emerge. The primary goal of this initiative is to learn as much as possible about the productive use of AI in schools by collecting real-world data about Gen AI use in school.

As governments, districts, and educational institutions themselves are scrambling to keep pace with the advances and availability of AI, they are faced with numerous questions, many of which are pivotal to protecting student and educator privacy. One of these is the choice between running AI "on prem," where software is installed and runs on the institution's own on-premise hardware and is hosted locally, versus running it in the cloud, where the software

is stored and managed on the provider's servers and accessed via a web browser or another customized interface. As these infrastructure choices need to be considered with care, we will address them in greater details in the "Building a Secure and Resilient Education Infrastructure in the Age of AI" companion eBook. We encourage administrators and educators to discuss the pros and cons with their IT teams.

As you work to develop and refine your own AI policies, guidelines, and frameworks, consider this collection of legislation and schools' best practices from Control Alt Achieve.

Intel's Proactive Approach to Responsible AI

Intel established a Responsible AI Program to create a strategic framework for RAI. The multidisciplinary Responsible AI Advisory Council addresses core issues including using systems ethically and human rights. As artificial intelligence surges forward, Intel will continue to adapt and adjust its approach to this technology.

Intel approaches RAI through four critical pillars:

Rigorous multidisciplinary reviews allow us to assess potential ethical risks within AI projects and mitigate them as early as possible. Intel seeks to collaborate with academic organizations across the world to conduct research in areas that can have the greatest impact like privacy, security, human/ AI collaboration, and transparency.

Intel develops platforms and solutions that make RAI pragmatic and manageable for developers, including software tools and algorithmic methods that simplify responsible AI development and improve privacy, security, and transparency to reduce bias. This is all possible through ethnographic research that delves into human thinking and reactions—and ultimately helps researchers understand and address pain points.

In order to foster positive global change while mitigating potentially harmful uses of AI, Intel focuses on an RAI framework with clearly defined and widely accepted global human rights principles, a security-first framework, product quality and reliability standards, and an environment that promotes diversity and inclusion. This model helps unlock the full constructive potential of AI technology.

Building Trust Through AI

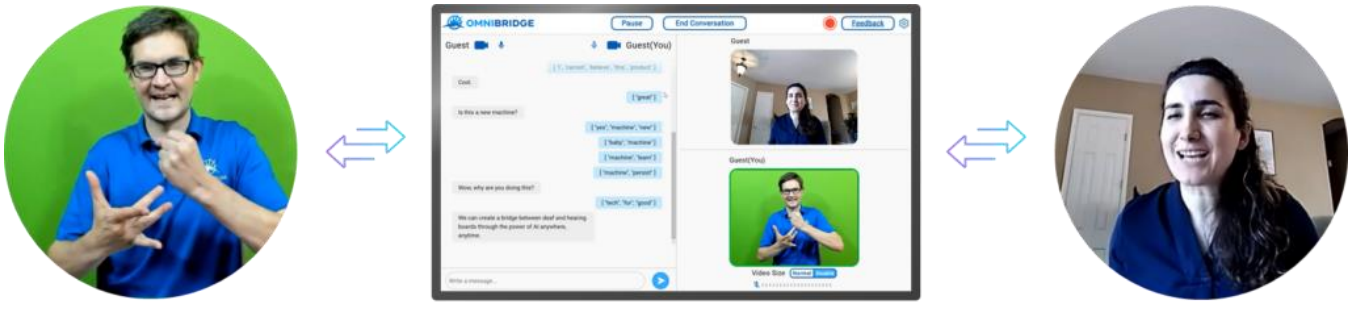
One facet of AI that makes it so valuable—yet challenging— is that it interacts with nearly every aspect of digital technology. This is important in education because—as software, robotics, and other areas advance—their overlaps with AI increase. This results in remarkable opportunities for advancing learning, certainly, but also creates a need to address education-related issues—such as sustainability and equity—that ripple into our broader society.

Intel works closely with an array of academic and commercial collaborators to identify and address problem areas and best practices to encourage adoption of RAI. This includes organizations such as the Private AI Collaborative Research Institute, the DARPA Guaranteeing AI Robustness Against Deception (GARD) program, the Trusted Media initiative, DSAIL at MIT, the National Science Foundation (NSF) National Artificial Research Institutes, the UC Berkeley Center for Long-Term Cybersecurity and others.

Building Equity and Accessibility Through AI

Intel is breaking ground in creating equitable and accessible AI solutions. Existing foundational AI models contain a number of biases that can lead to unfair outcomes and perpetuate existing inequalities . Recently, researchers at Intel Labs used the deep learning capabilities of the Intel® Gaudi® 2 AI Processor to construct innovative datasets which reduced the impact of biases —such as gender, race, and other social attributes—in their AI models by a groundbreaking 20 percent.

To increase accessibility in AI, Intel has invested in partners such as Omnibridge, an Australian company founded by Adam Munder, a profoundly deaf software engineer at Intel. Initially, Adam developed a system to track information informally passed between fellow engineers; eventually, he worked with a small team of developers to create a deaf-to-hearing translation application based on the backend software from this system. Today, the OmniBridge team is busy growing its ASL database as well as building out their product.

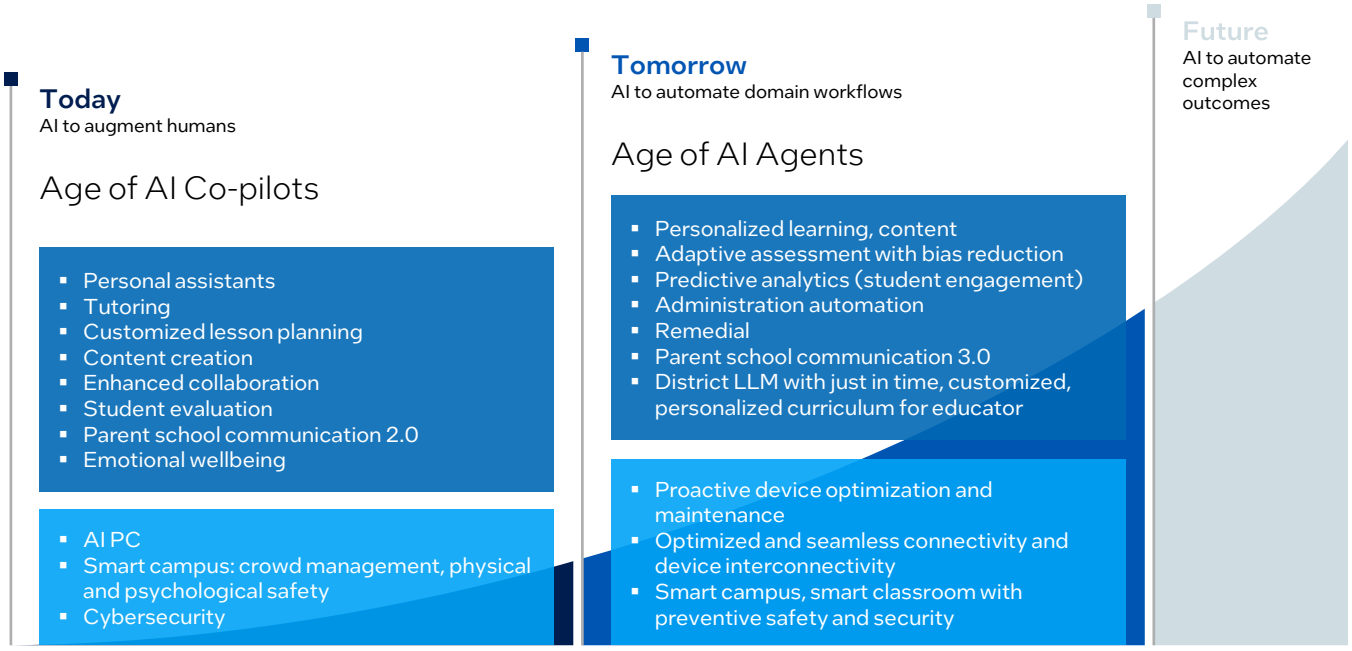


ASL SIGNER | BROWSER-BASED OMNIBRIDGE APP | ENGLISH SPEAKER

Working with local partners, Intel is also developing solutions that allow AI to run on local PCs without requiring connectivity to the internet, hence increasing access to AI in underserved communities.

What's Coming Next?

AI is here to stay and will be an important part of our future. The goal for educators, and the IT teams who support them, is to harness the power of AI to help students plot a course of action that leads them to meeting their educational and life goals.



Today marks the start of an important journey: AI operates mostly with the assistance of co-pilots—virtual assistants that help with complex tasks and improve productivity. Co-pilots provide suggestions and insights and perform tasks that would otherwise require hundreds or even thousands of applications. Tomorrow, we will rely on AI agents—software that performs tasks autonomously. AI agents will interact with their environment, collect data, and use that data to make decisions—and then act on them. They learn and adapt over time. As the figure above shows, the technology is advancing quickly, and it is our responsibility to educate ourselves on the pros and cons of these tools and to use them wisely.

No matter where you are in accelerating your uptake of AI, there are resources available, and you can rely on the guidance of those who have gone before you.

7 Steps to Help You Implement AI Responsibly

Intel stands ready to help. We understand that technology enables progress, but it's up to educators to adopt processes, controls, and workflows that maximize results and minimize risks. We have developed the following seven essential elements to help you implement AI responsibly.

Recommendations for Getting Started

Establish a Responsible AI workgroup or committee

Establish a multidisciplinary Responsible AI workgroup or committee to evaluate technology tools/options.

Encourage pilots

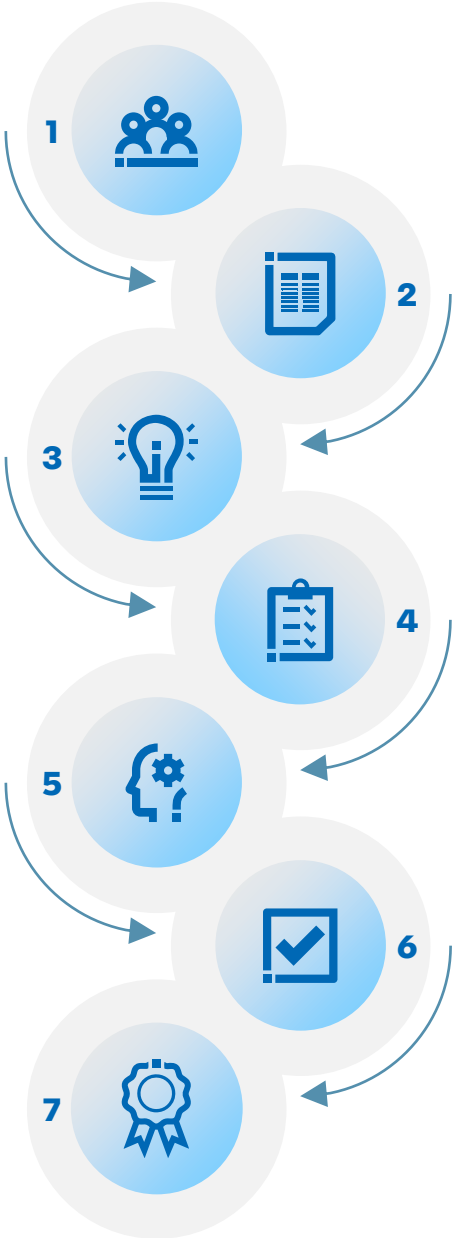
Validate tools, technologies, and programs within a pilot group to eliminate kinks before rolling out on a larger scale.

Provide professional development for educators and staff

Provide professional development for educators and staff to unlock the full potential of AI and other digital tools.

Celebrate success

Celebrate success stories to encourage adoption of methods that lead to superior outcomes.



Publish AI policies and guidance

Publish AI policies, standards, ethical guardrails, processes, and guidance to keep everyone on track and collaborating effectively.

Audit your IT infrastructure

Audit your IT infrastructure with future AI-based use cases in mind.

Review policies regularly

Review and update policies regularly to address issues and essential changes.

Learn more about how AI is ushering in a new age of education and Intel's commitment to the technology:

- Intel.com/education
- Intel.com/ai
- Skillsforinnovation.intel.com
- Intel® Digital Readiness
- Intel Responsible AIProgram
- Intel® Distribution of OpenVINO™ Toolkit Coursework
- Intel® Developer Cloud Training

Endnotes

[1] The Open Innovation Team and Department for Education, *Generative AI in education* (UK Department for Education, January 2024),4, https://assets.publishing.service.gov.uk/media/65b8cd41b5cb6e000d8bb74e/DfE_GenAI_in_education_-_Educator_and_expert_views_report.pdf.

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