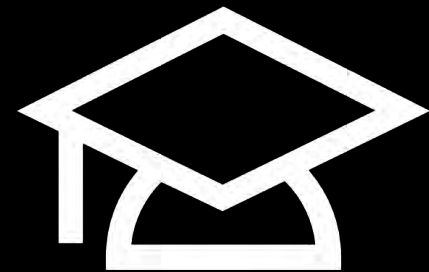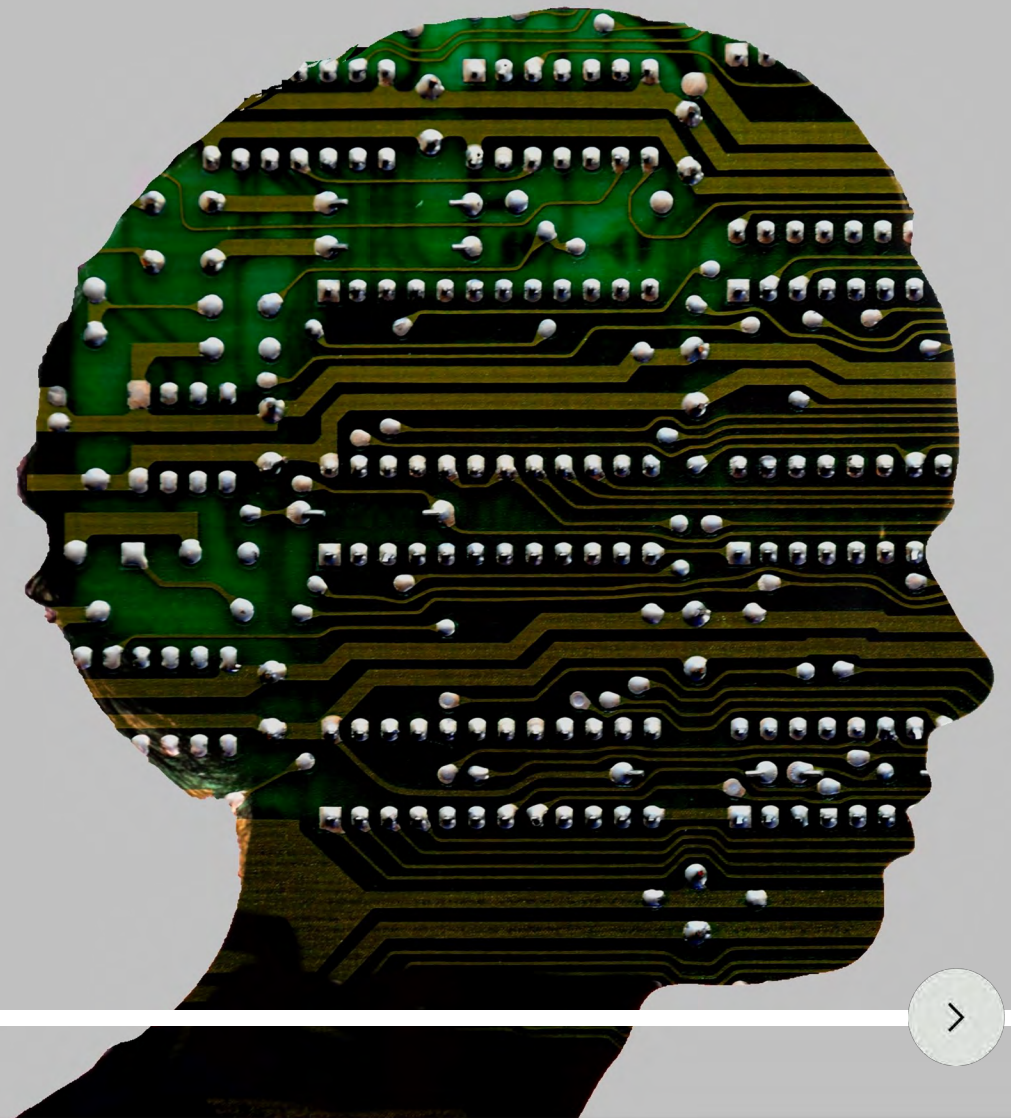# AI in Education

How Artificial Intelligence is impacting the classroom and the school system.

verizon

Artificial Intelligence (AI) has exploded in capability and applicability over the past decade. Once mostly confined to research labs, AI systems now impact our daily lives in multiple ways. At Verizon, we rely on AI for optimal performance in our cybersecurity platforms and networks.

As a leader in networking and technology innovations in education, Verizon sees tremendous potential for AI technology to transform learning and education for the better. We aim to provide schools, universities and other education providers with secure, reliable connectivity along with AI-powered solutions tailored for every classroom. There are numerous current and emerging uses of AI in education, along with some key challenges.

Part 1: Powering education with AI

Current AI applications in education

There has been a lot of discussion (and debate) around generative AI, or GenAI, in education. OpenAI's launch of ChatGPT in November of 2022 changed the game in education – teachers used it for lesson plans, students used it for homework. That site now has more than 1.5 billion visits each month and has led the way for other major Large Language Model (LLM) programs like Google's Gemini and Microsoft's CoPilot. But there is so much more to AI in education besides content creation.

Personalized and adaptive learning

One major benefit of AI in education is enabling a personalized, adaptive learning experience that meets each student at their particular level. Sophisticated machine learning algorithms can analyze a wealth of student data – including aptitude, progress, interests and learning style – to create custom lesson sequences, assignments and reviews. As students work through these materials, the system continuously assesses performance and recalibrates to enhance knowledge acquisition.

For teachers, AI can guide, deliver, monitor and adapt the learning plans they make for their classes. Each student could have a customized version of the lesson plans teachers create.

For administrators, AI systems provide invaluable analytics to determine learning gaps, target interventions and demonstrate growth. Online courseware is integrating AI to track student mastery of concepts, which can then tailor instructions to address knowledge gaps and ensure better concept retention.

Individualized test prep

Standardized testing continues to impact admissions, placement, scholarships and even graduation. AI can make test prep more efficient and effective with customized study guides, practice questions and simulations generated for each student's ability level and exam focus area. Detailed explanations for right and wrong answers help shore up knowledge gaps. As progress unfolds across practice tests, platforms adjust to concentrate the preparation for where it's most useful. For school districts, universities and other learning providers, these AI tutors scale affordable, personalized exam preparation to support enrollment demands.

Intelligent tutoring systems (ITS)

These AI systems offer personalized instruction, feedback, and recommendations for students. Platforms can adapt in real-time to a user's strengths and witnesses. These intelligent tutors can increase student test scores by 16 to 40 percent, according to the National Institutes of Health (NIH).

ITS usually begins with the broad concepts of how learners learn. As they progress, students can be moved away from the visual presentations to harder problems. But they would get real time feedback on what they were doing.

Unlike one-size-fits-all curricula, an ITS continually tailors instruction to deliver the right content at the right level for each learner. As students work through assignments and projects in the system, it responds dynamically to strengthen the mastery, remediate gaps and challenge emerging capabilities. ITS platforms make automated, personalized learning practical at scale, while capturing valuable data for educators on effective content sequencing and best practices for differentiated support. The result is equitable access to the data-driven instructions that accelerate achievement by acknowledging students' diverse requirements for guidance.

Automated grading and assessment

Evaluating student work and providing meaningful feedback remains an enormous challenge for instructors. AI can support grading tests and assignments, often much faster than humans alone can. Not only are question/answer formats like multiple choice and true/false checked almost instantly, but written assignments can be assessed for style, grammar, content, concept mastery and more. Through computer vision and natural language processing, these systems evaluate written responses for quality, provide edit suggestions and flag potential plagiarism.

These AI-based assessment tools free teachers to focus on other instructional activities while still benefiting from rubric-aligned scoring.
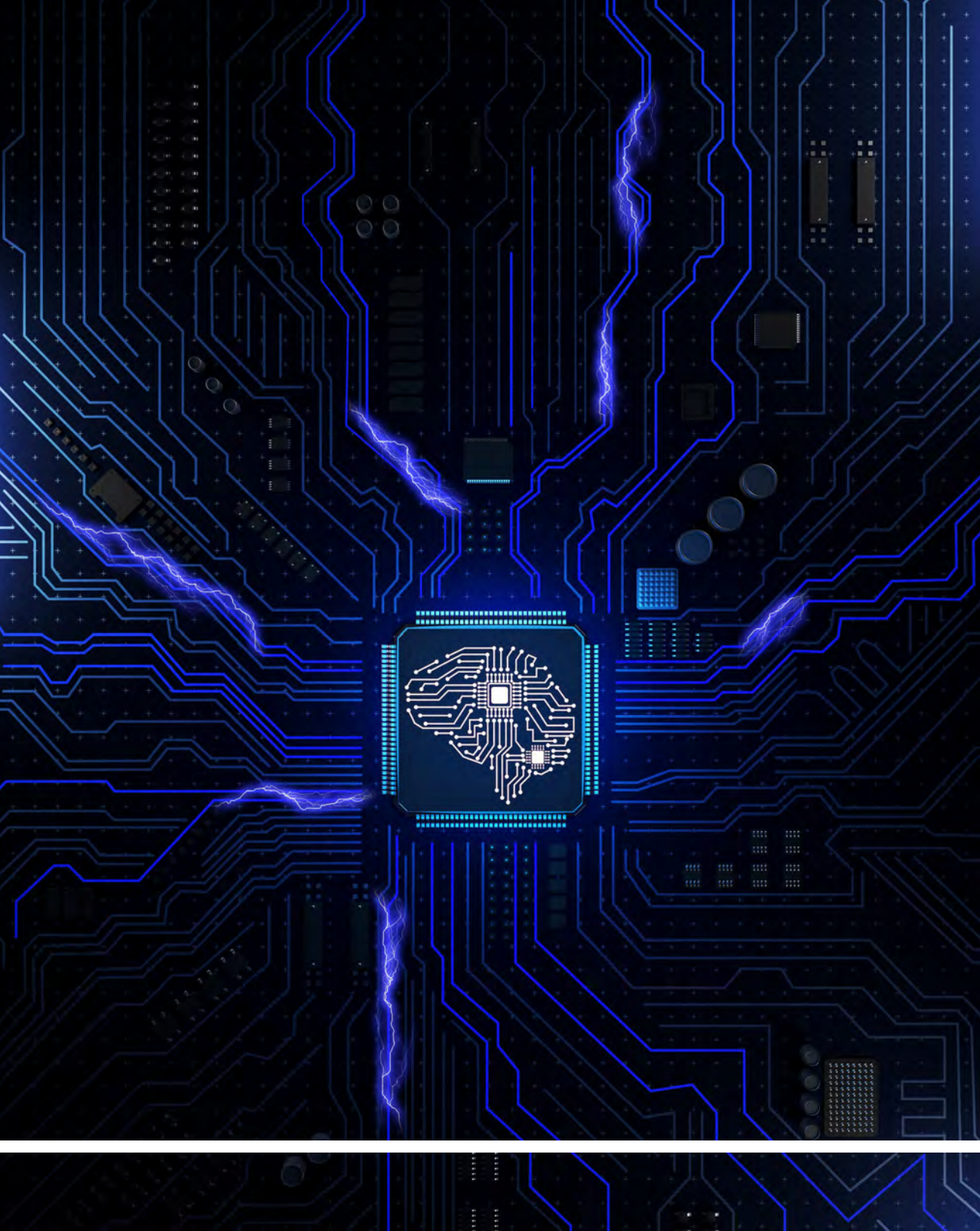
Virtual facilitators

Lifelike AI avatars are able to supplement human teachers — conducting lessons, managing classwork and answering student questions. They can also provide learning consistency for remote students. These smart coaching systems offer around-the-clock learning support by acting as on-demand digital teachers, making assistance user-friendly and relatable.

Powered by sophisticated algorithms, virtual facilitators have unlimited patience and can present instructional material in a custom sequence according to each student's needs. These automated e-learning guides are always on hand to motivate, answer questions and advance progress for learners.

AI assistants

Virtual assistants for education offer support for educators by performing such functions as building bespoke lesson plans, creating presentations and writing personalized student reports. They also generate ideas for educational activities tailored to each lesson and test creation.

These intelligent tools can also manage routine tasks like taking attendance, scheduling, document filing, and data entry to give educators more time for lessons and student interactions. By continuously gathering and examining institutional data, AI assistants compile reports, alerts and dashboards that can inform teaching practices and guide administrative decisions. The result is data-driven visibility into what's working most effectively across classrooms and systems.

AI assistants for students can go well beyond personal tutors — they serve as translators for students who speak English as their second language (or not at all) and can assist with other personalized learning.

Predictive analytics

AI data systems can track student progress, attendance, assignment completion and other factors. Predictive algorithms can then flag at-risk students for early intervention to improve overall outcomes. These automated aids also synthesize successful teaching strategies and inform long-term plans around graduation rates, resource allocation, hiring and curriculum planning to optimize achievement.

Predictive analytics empower education leaders with actionable intelligence to preemptively enhance experience and success trajectories, benefitting both individual students and broader institutional performances.

Administrative efficiency

From registration to graduation, AI is transforming how educational institutions complete essential administrative tasks. Intelligent processes are streamlining essential functions through automated workflows. Automated systems can now handle routine procedures like applying business rules, triggering responses, filling out forms and updating records. Chatbots can field common inquiries from parents, students or applicants regarding deadlines, schedules and paperwork. AI performance management systems synthesize school data to inform recruiting, interviews and other communications with ease.

AI and machine learning can optimize management planning to position both traditional and virtual learning for sustainability. Administrators are better able to focus their resources on supporting teachers, students and learning outcomes.
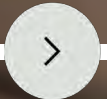
Part 2: Key challenges around AI in education

Explainability

The recommendations and predictions made by AI must be explainable and transparent to build user trust. Black box systems, which rely on inputs and operations that aren't visible to users, can possibly lead to unethical decisions.

Guardrails implemented during the training of AI systems can allow for removal of risky data and responses. These guardrails can include:

- Implementing curation
- Building bias detection
- Algorithmic model adjustments and explainability techniques
- Continuous human oversight

Biases

All AI platforms risk inheriting the problematic biases from their programming or training data. These biases could create disadvantages for certain student groups.

Job displacement

One of the greatest public fears around AI is that it will overtake many human jobs. In education, widespread adoption of intelligent tutors and automated graders may substantially alter teaching roles and employment prospects in the education workforce. Extensive retraining around the emerging technologies may also become necessary.

But ultimately, AI will likely never be able to match human educators' level of critical thinking, their ability to build relationships with students, their capacity to motivate learners or talent for building a positive learning environment.

Cybersecurity and privacy

Education is already a top target of data breaches. AI systems are imbued with massive amounts of student data that could be extremely enticing to hackers. Appropriate safeguards and an effective cybersecurity posture are needed to protect this vital information.

Access and governance

The capabilities of AI may be restricted only to students and school systems in well-resourced districts, potentially worsening the already concerning issues around internet access and homework gaps. Policy frameworks promoting inclusivity are necessary to avoid these rifts.

Integrity

One of the debates around generative AI programs focuses on honesty; many students use LLM to generate their papers and reports without doing the research or learning the material. Some school systems are already utilizing AI detectors to ensure students are doing their own work. These AI indicators will need to keep pace with the AI technology itself.

Hallucinations and deepfakes

Largely an issue with GenAI models, AI hallucinations occur when the AI program generates inaccurate information but presents it as correct. These hallucinations are usually caused by biases or limitations in training data and algorithms. The result is content produced that contains inaccuracies, is outright wrong, or potentially even harmful.

Deepfakes use AI to create convincing, but unreal, images, audio or videos. Some of them are incredibly realistic and believable and could spread false or even dangerous information. While they pose serious threats, deepfakes do have legitimate uses for areas like entertainment and video games. There are tools to suss out deepfakes in a matter of seconds, and they will likely be needed and evolved to maintain ethical use of AI.
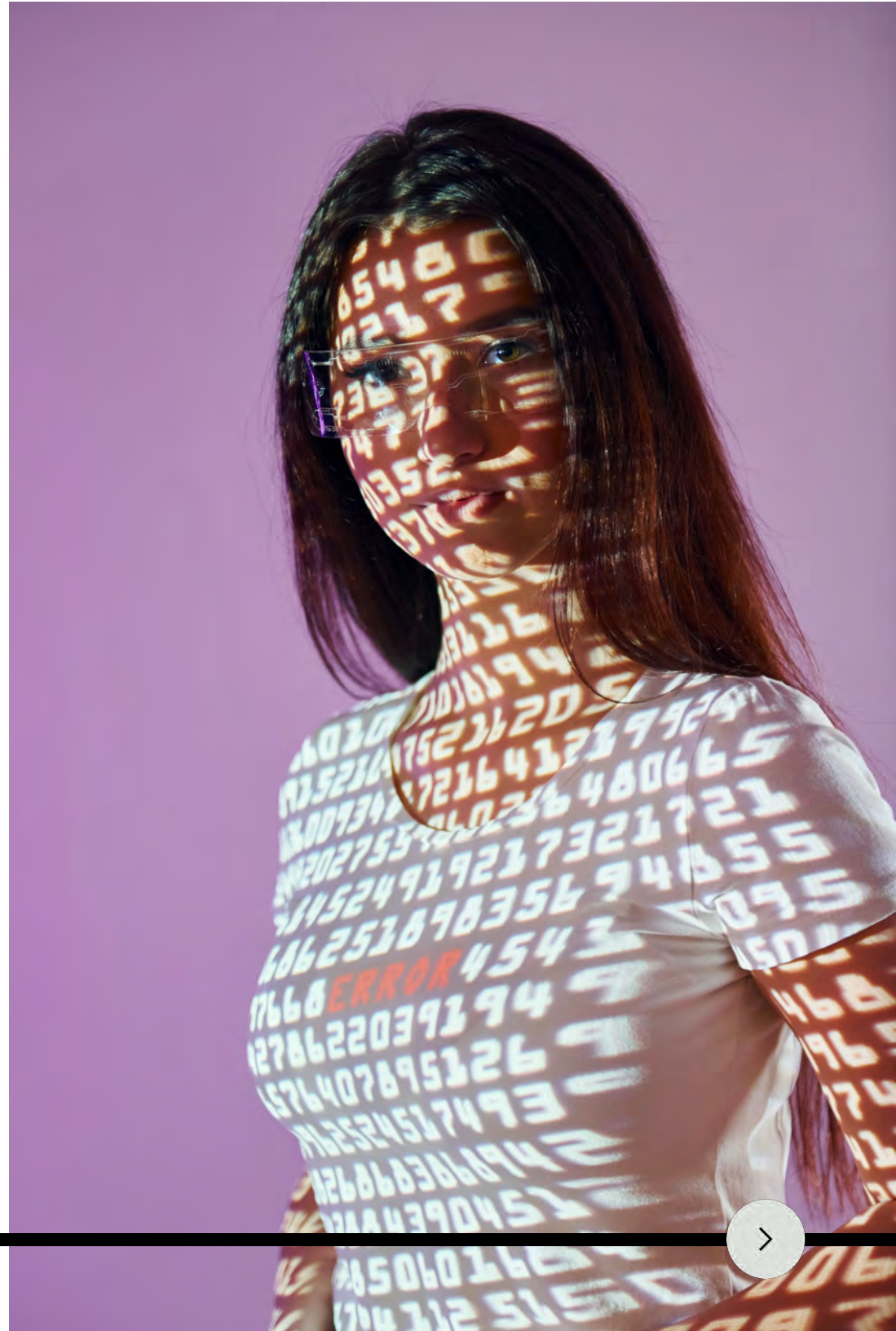
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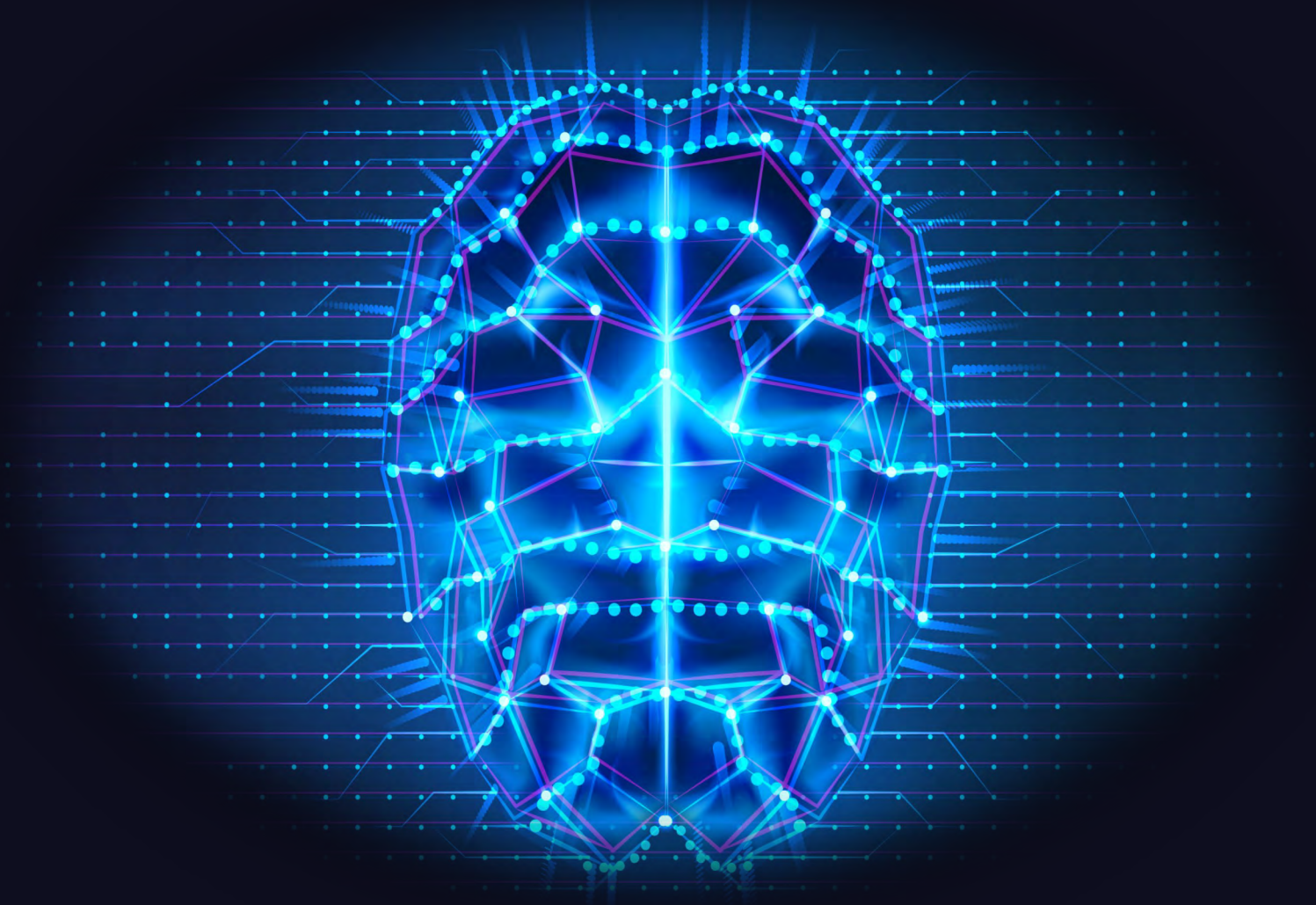
Imagine the Einstein of tomorrow able to consult with the original Einstein in creating a new theory of relativity. That is the power of AI in education.
— Scott Andersen,
Verizon Solutions Architect

The future of AI in education

The challenges presented by AI technologies are very real, but so is the vast potential to improve education. With a responsible, ethical approach, AI can transform online, blended and in-person education over the next decade to:

- Provide more affordable, high-quality learning experiences to knowledge-seekers around the world
- Continuously adapt instruction according to each student's strengths and weaknesses
- Offer students, parents and faculty 24/7 access to expert-level support
- Constantly measure and improve learning outcomes/engagement
- Allow teachers and other educators to focus more on
    - Mentoring
    - Creativity
    - Critical thinking skills

AI will probably never be able to do everything that teachers do or be as effective as human instructors, but this emerging technology can allow educators to use their uniquely human talents where they have the greatest impact. We must all work together to ensure that AI responsibly elevates the potential for every student. At Verizon, we're committed to advancing AI for social good. The future of education is here.

About Verizon technology solutions for education

Verizon partners with school districts and higher learning institutions across the country. We can help inspire great learning through technology solutions that address the needs of students and teachers. As an education partner, Verizon helps students and teachers thrive with advanced digital solutions and services, a reliable network as well as a focus on quality and value. Strengthen and modernize your infrastructure to provide new learning opportunities and achieve your vision of robust, engaging and effective learning experiences for all.

With Verizon's high-speed networks and cloud application support, we empower schools to deliver adaptive learning at scale – whether in general education, higher education, special education, gifted programs or career pathways curricula. Our reliable connectivity implements and supports AI systems for personalized instruction, enhanced assessments, expanded test prep and heightened efficiency.

Our customer support, cybersecurity services, customizable network solutions and emerging technologies establish an ideal infrastructure for transformative education powered by AI. Verizon's investment in 5G, high-speed fiber and Multi-Access Edge Computing (MEC) can minimize latency for resource-intensive applications like AI scoring. By providing this critical backbone for connectivity and innovation, Verizon stands ready to provide cutting-edge solutions to power substantial gains in student achievement along with institutional success.

Learn more about Verizon support for education at verizon.com/education.