**TECHNOLOGY TRENDS IN EDUCATION** 

# How are Al, Cloud and Interconnection Transforming EdTech?

THE INTERSECTION OF INTERCONNECTION





# Introduction

A perfect storm of digital transformation is brewing in educational institutions. Three chief ingredients to the event? Artificial intelligence (AI) can be easily accessed by students, educators and researchers. "Going to class" is as likely to mean attending via the internet as much as being in a classroom or lecture hall.

Connectivity to clouds puts the most powerful computing capabilities and collaboration services into reach for research and development entities everywhere. All of which empowers educators and learners to sail through the storm and be better for it.

In this white paper, we will focus on three key areas driving educational technology (EdTech) transformation:

- ChatGPT and other AI services
- Cloud and its impact on research and development
- Ubiquitous connectivity

# How AI is Revolutionizing Education

4

Education and technology are now so tightly linked that the global EdTech market, which includes K-12 as well as higher education, is expected to reach \$404 billion by 2025.<sup>1</sup>

Almost all forms of technology used in education are beginning to incorporate AI systems.<sup>2</sup> AI promises to advance both educational missions and financial objectives by being a tool to accelerate innovation and reduce operational costs.

### Harnessing Generative AI

ChatGPT is a disruptive technology that serves beautifully to frame the positive and negative potential of AI in education. When ChatGPT was unveiled, many schools blocked access to OpenAl.com, the Al research and deployment company which launched the service. Jenna Lyle, a spokeswoman for the New York City Department of Education, told the Washington Post, "While the tool may be able to provide quick and easy answers

to questions, it does not build critical thinking and problemsolving skills, which are essential for academic and lifelong success."<sup>3</sup> That roughly translates into: It makes it too easy for students to cheat.

ChatGPT also has compelled introspection. Some educators wonder: "If ChatGPT can so easily answer a question that we have been posing for years, is that question worth asking?"<sup>4</sup> For some, the conclusion is "no."

In response, educators have been exploring how ChatGPT and other automation technologies can inspire original thinking, personalize learning and enrich lesson plans. Students can leverage the power of generative AI as a springboard to deeper analysis, creative problem solving and higher-level writing.6



## **Deep Learning** a lá South Park

You know a topic is hot when it becomes the basis for an episode of the TV show South Park. In season 26 episode 4, Cartman, Butters, Clyde and Stan use ChatGPT to write essays and Mr. Garrison uses it to grade the work. The episode was partially written using ChatGPT, adding a twist to the message on the danger of AI running amok in the classroom.<sup>5</sup>

#### 3

### **Addressing Burnout and Retention**

Teacher burnout and retention issues are increasingly disturbing industry trends. In June 2022, 79% of K-12 U.S. educators were dissatisfied with their jobs, compared with 45% in June 2020.<sup>7</sup> A global survey by McKinsey shows that, on average, teachers spend less than half their time interacting with students.<sup>8</sup> Al might prove to be one of the most effective teacher aides, one that can take on:

- Grading papers with high accuracy and speed
- Developing rubrics that ensure clearer assignments and consistent assessment
- Improving workload management
- Personalizing study plans
- Making learning more engaging with chatbots
- Ensuring student integrity

In enterprise companies, one would measure success by increased productivity. In this case, one measure of success is career satisfaction. In turn, more people are attracted to all areas of education and teachers and administrators are motivated to stay on path.



**FIGURE 1:** K-12 teachers can turn to AI to help reduce the amount of time spent preparing for class, evaluting student performance and administrative tasks.

#### #befutureready



Preperation 10.5

Evaluation and feedback **6.5** 

Professional development **3.0** 

Administration 5.0

## **Creating Efficiencies and Elevating Productivity**

Of course, there are efficiency and productivity components to gauging success. Al tools help educators save time and the organization to be more efficient by<sup>9</sup>:



Automating administration tasks New student admissions, managing class schedules, tracking student attendance, processing grades and monitoring placements.



Improving procurement Data analytics can guide inventory purchase decisions and reduce over-buying.



Enhancing admissions and student screening Cognitive technologies can help universities predict the applicants most likely to be accepted and enrolled.

Here are two examples. Broward College saved approximately \$500,000 using Chatbots technology.<sup>10</sup> chatbots helped Temple University reduce call volume by 50%.<sup>11</sup> AI not only reduces costs; the resources who no longer handle those duties can be redeployed to higher-value activities.

# **Cloud – Controlling Costs and Fueling Research and Development**

Cost-savings, scalability and flexibility are three areas where the cloud shines in terms of meeting operational objectives. Virtualization reduces hardware procurement and maintenance, allowing capital to be directed into areas such as student services or other cloud services that automate day-to-day operations. By moving some of the infrastructure off-premises, costs for staffing, powering, cooling and scaling data centers are reduced.

The scalability of the cloud is a foundational pillar of its value. The demands on the educational infrastructure are seasonal at all levels of education. With cloud, schools can

dynamically engage and pay for services as needed, flexibility that enables making collaboration between individual researchers and teams (in the U.S. and abroad) more costeffective.

### **Data Drives** Discovery

What does it take to achieve a scientific breakthrough? How about incremental innovation? Data drives discovery, whether the outcome of research and development (R&D) is on par with accelerating COVID-19 vaccine development or a minor change to a drug formula that reduces side effects.

Cloud computing enables transforming data into information at the scale needed to accelerate research. The first COVID-19 vaccine was produced in record time because collaborating entities - pharmaceutical companies, hospitals, non-profit organizations and government agencies as well as data scientists - were able to rapidly analyze the massive R&D data sets generated in experiments and clinical trials.

Future vaccine enhancement, built on the shoulders of the unprecedented team effort and IT technology, will probably be considered incremental innovation.



**Al and Cloud** 

Open data sharing is the heart of R&D collaboration. Cloud makes access possible, and AI makes it easy to find information

In response to the COVID-19 pandemic, the Allen Institute for Al partnered with leading research groups to prepare and distribute the COVID-19 Open Research Dataset (CORD-19). This dataset is a free resource of over 47,000 scholarly articles, including over 36,000 with full text, about COVID-19 and the coronavirus family of viruses for use by the global research community.<sup>12</sup>

## **Data Security and Resiliency**

Protecting data from attack will always be the priority. Data resiliency, the ability to be able to bounce back rapidly after a breach, is becoming top of mind for IT teams in education.

Being "cyber-ready," to borrow a term from PwC,<sup>13</sup> is knowing what you are going to do before, during and after an attack. The strategy needs to be specific to your infrastructure and consider the impact on your digital ecosystem. Ideally, you build greater resilience by what you learn if you are breeched.



ß

# **Connectivity Initiatives vs. the Digital Divide**

Access to knowledge and, with the help of educators, unlocking the value in what is known are prime objectives. However, unavailability or low-quality access in poorly connected geographies as well as low-income families and other marginalized communities creates digital inequity. About 12 million students (including one-third of K-12 students) were adversely affected by the digital divide in the United States in 2021, according to EdSurge.<sup>14</sup>

The issue isn't lost on governments or school systems. The Broadband Equity, Access and Deployment (BEAD) Program provides \$42.45 billion to expand high-speed internet access by funding planning, infrastructure deployment and adoption programs in all 50 states, Washington D.C. and U.S. territories.<sup>16</sup> Municipal-level initiatives have been executed as well. For example, initiatives in Oakland, California's public school system substantially reduced the digital divide. In 2020, 12% of low-income students and 25% of all students in the city's public schools had devices at home and a strong internet connection. By providing nearly 36,000 laptops and more than 11,500 hot spots to low-income public school students, the city was able to connect 98% of the students in the district.<sup>17</sup>



Electricity, gas steam, air conditioning **3%** 

Accomodations and food service **3%** 

Fintech **3%** 

Information and communications 3.4%

Manufacturing 4.1%

Wholesale and retail 4.1%

Finance and insurance 7.1%

Professional, scientific and technical 7.1%

Public admin and defense. social strategy **9.4%** 

Individual 9.4%

FIGURE 2: Cyberattacks on universities accounted for 11.6% of all such attacks in January 2023. There were 31 attacks. Image courtesy of Hackmaggedon.<sup>15</sup>

#### **#befuturereadv**





Multiple Industries 21.6%

Education **11.6%** 

Human health and social work 10.1%

8

We are seeing multiple opportunities for EdTech to support learning, including these somewhat unique use cases:



Intelligent tutors Al programs serving as teachers and mentors, not only guiding lessons but also motivating learners.<sup>18</sup>



**Online proctors** Using timed assessment via an online platform in which the candidates' desktop activity, webcam video and audio are monitored.<sup>19</sup>



#### **Immersive experiences**

The metaverse creates the possibility of virtually transporting students back in history, sending them into outer space or taking them to any location in the world.

Researchers and educators in higher education can augment their internet access by tapping into leading education and research networks, including Internet2<sup>®</sup>. A memberowned, advanced technology community private network, Internet2 enables cloud solutions, research support and services tailored for research and education.

# **Learn How We Facilitate Outcomes**

In some respect the cloud is a classroom or study hall, and networks are the proverbial "walk to school." What will make the journey to and from school enjoyable is continued commitment to connectivity and data security and further development of tools educators can use to be more effective in every aspect of their profession. The long game includes wireless and wireline network convergence, which promises to allow low-latency access to information and platforms from the edge to interconnected data centers.

CoreSite is uniquely positioned to support the technologies driving EdTech and to help increase the value realized for stakeholders leveraging those technologies. CoreSite data centers are built for high-density network interconnection and meeting the power and environmental demands of AI and other high-performance computing services. Flexibility is also a key differentiator. We develop tailored solutions for any sized organization and collaborate with our clients to build resilient, future-ready IT infrastructure. The carriers, IT service providers, clouds and digital platform providers that form our digital ecosystem offer everything EdTech organizations need to fulfill their mission.

#### **SPEAK WITH AN EXPERT**

## About CoreSite, An American Tower Company

CoreSite, an American Tower company, provides hybrid IT solutions that empower enterprises, cloud, network, and IT service providers to monetize and future-proof their digital business. Our highly interconnected data center campuses offer a native digital supply chain featuring direct cloud onramps to enable our customers to build customized hybrid IT infrastructure and accelerate digital transformation. For more than 20 years, CoreSite's team of technical experts have partnered with customers to optimize operations, elevate customer experience, dynamically scale, and leverage data to gain competitive edge.

- 1. Global market to reach \$404B by 2025-16.3% CAGR, Holon IQ, 2020
- 2. Al and the Future of Teaching and Learning: Defining Artificial Intelligence, Office of
- 3. ChatGPT is going to change education, not destroy it, MIT Technology Review
- 4. The Good and the Bad of Chat GPT in Schools, Wired, 2023
- 5. South Park Deep Learning Episode Written By ChatGPT AI, Beyondgames.biz
- 6. How to Level Up Your Teaching with ChatGPT and AI, The House of Podcasts, 2023
- 7. FETC 2023: Expert Strategies on Combatting Burnout and Improving Teacher Retention, EdTech Magazine, 2023
- 8. How artificial intelligence will impact K-12 teachers, McKinsey & Company, 2020
- 9. How universities are using AI to power operational efficiency, Trigent, 2021
- 10. 4 Ways Universities Can Use AI to Streamline Operations, Fierce Education, 2022
- 11. Ibid
- 12. COVID-19 Open Research Dataset, Microsoft, 2022
- 13. Cyber-ready, today and for tomorrow, PwC, 2021
- 14. The Digital Divide Has Narrowed, But 12 Million Students Are Still Disconnected, EdSurge, 2012
- 15. January 2023 Cyber Attacks Statistics, Hackmageddon, February 2023
- 16. Broadband USA, 2022
- 17. How one city closed the digital divide for nearly all its students, The Hechinger Report, 2022
- 18. How K-12 Schools Can Use Artificial Intelligence in Education, 2021
- 19. What is an Online Proctored Exam?, Questionmark, 2022

#### **Technology Trends in Education**