National Center on Accessible Educational Materials

AI & Accessibility: Supporting All Learners

By AEM Center at CAST

Published: June 1, 2024

The contents of this website were developed under a cooperative agreement with the US Department of Education, #H327Z190004. However, those contents do not necessarily represent the policy of the US Department of Education and you should not assume endorsement by the Federal Government. Project Officer, Rebecca Sheffield, Ph.D.

National Center on Accessible Educational Materials (2024). AI & Accessibility: Supporting All Learners. Wakefield, MA: National Center on Accessible Educational Materials.

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Part 1: Introduction and Getting Started

Accessibility Concerns:

People with disabilities are frequently marginalized members of our society. Those with physical disabilities often have less ability to travel and engage with other people because of mobility issues. Many have to rely on specialized transportation that is more limited than what is available to the general public. Those with difficulty speaking have to rely on devices that, on average, may take over a minute to assemble a few words. This can be a barrier to them when participating in active conversations with others. Or, they have to "pre-record" things they want to say, which will only fit limited circumstances.

People with intellectual disabilities have more difficulty than the general public with attending medical appointments, reading product safety information, and accessing necessary public services. In learning settings, very little of the typical education curriculum is accessible to them, especially as the content gets more challenging in middle and high school.

For the first time in history, a general-purpose technology tool is available that can help address many of the accessibility limitations mentioned above. Some of the solutions are available right now. Others will be available in the immediate future. That tool is artificial intelligence (AI).

What is AI

AI refers to the development of computer systems capable of performing tasks that typically require human intelligence. These tasks include learning, decision-making, problem-solving, understanding natural language, and visual perception. AI systems can process large amounts of data, learn from patterns and experiences, and make predictions or decisions based on that learning. For accessibility, AI is particularly significant as it offers innovative solutions to overcome various barriers faced by individuals with disabilities, enhancing their ability to interact with the world around them more effectively and independently. Many uses of AI have already improved access for people with disabilities.

- Using facial recognition to unlock a personal device, such as a phone or computer, eliminates the need to type passwords.
- Word prediction and voice dictation allow people with limited dexterity to use personal devices more easily.

- Electronic speech-to-text can create closed captions in real time for people who are deaf or hard of hearing.
- Inexpensive consumer technology can allow someone with physical limitations, such as a spinal cord injury, to control their environment, including unlocking doors, operating computers and TVs, and turning lights on or off using their voice or an Augmentative and Alternative Communication (AAC) system.

These technologies rely on AI and have greatly benefited from advances in this field over the last three or four years.

Current and Future Use of AI for Accessibility

Some AI technologies, such as self-driving cars, will improve the mobility of people with physical disabilities. As they become more present in the public transportation system, many will be wheelchair accessible. Rather than relying on spotty transportation options, people with physical disabilities may have more access to travel within a city. In time, people who are blind, have vision impairment, or have limited mobility will be able to use self-driving cars independently. Self-driving wheelchairs are already in the works. This advancement will allow someone who requires a power wheelchair for mobility, but cannot control it skillfully, to achieve greater mobility within buildings and shorter community distances.

The current generation of augmentative and alternative communication — AAC systems — although significantly improved over past devices, still limits the user's communication abilities. There are two products already available that utilize artificial intelligence to improve communication. Voiceitt's solution will translate difficult-to-understand speech, such as that caused by a stroke or cerebral palsy, into understandable spoken language using a portable device with an internet connection. OTTAA Project: AI Algorithms for Assistive Communications is designed to utilize the person's location and commonly used phrases to make it easier for them to communicate using a symbol-based approach. Both of these current products point to a future where people needing AAC can participate in conversation more wholly and efficiently.

Generative AI:

Due to advances in machine learning and large language models, (LLM), such as ChatGPT, AI tools have become available to the general public. These tools have only grown in power and usefulness in the last year. What was previously a dream, or only available to researchers, is now widely open to the general public in both paid and free versions.

ChatGPT is one of the more powerful generative AI systems available outside a lab. The GPT stands for generative pre-trained transformer. ChatGPT was trained using immense amounts of information from every online source. It takes that information and applies statistics to determine the likelihood of a given word occurring based on previously used words. This means that it does not understand information the same way we do. Still, the amount of data it has been trained on, and the effectiveness of current machine learning algorithms, gives a very human response to the "prompt" you give it. However, this does not mean that the information provided is accurate. You should exercise the same caution as you would with any information you find on the internet.

Homework

If you have not used ChatGPT 3.5, please set up an account. The best way to become familiar with its capability is to engage with it. Start with a topic you know and would like to learn more about. Remember that the free version has a cut-off year of 2023 for its knowledge base. The free version of Microsoft CoPilot, which is based on OpenAI's ChatGPT 4, will let you search the web for more current information. Using either, please give it a topic and ask it questions. As long as you are in the same chat, it knows what you asked previously. You can start a new chat by clicking the pencil icon when switching topics. You can also ask ChatGPT or Copilot the best way to learn how to use generative AI. As you explore, think about applications for people with disabilities. For example, ask either how the principles of Universal Design for Learning (UDL) can be applied in a given situation or topic.

Part 2: Supporting Students with Disabilities through AI

Not long ago, our schools used computer labs and educational software for doing repetitive drills. This software and hardware lacked the power to differentiate the material level according to the learner. As more schools moved to a one-to-one device model, students could access educational materials and generate content electronically. This opened the door to improved access at school for some students. But, because the curriculum could not adapt to the learner, many students still found themselves locked out from the education they required.

Generative AI can knock down the remaining barriers to educational access for our students with physical, intellectual, or communication disabilities. Generative or Gen AI refers to artificial intelligence that can generate new content, such as text, images, or music, by learning from a large dataset of existing material. It is now widely available and integrated into many educational products and operating systems.

AI in Education

Generative AI has only been available to the public since November 2022. Across the country, districts need help with how to utilize this technology. Unfortunately, very little attention has been given to how students with disabilities can benefit from its use.

Many of our students require modified instructional materials and content to access it. These accommodations were handcrafted, or students were provided with alternative curricula. Students who used augmented communication devices could not fully participate in classroom conversations and discussions because of the limitations of the device technology.

Generative AI can create personalized educational materials for a student's understanding level. It can adjust and provide feedback as the student uses them. It can rewrite text so students can learn the concepts their classmates are learning. It will allow students to produce written work that is at a much higher standard than without this support. If incorporated into augmentative communication devices, it will enable much more fluid exchanges with their teachers and classmates.

For personalized education, greater access to curriculum, and improved communication to become a reality, schools require foundational policies for using artificial intelligence in general education. Until this takes place, students with disabilities will find themselves blocked from using these tools. As of January 2024, only four states have published guidance for AI in education, and many districts are banning its use by students.

Getting Started

Several additional hurdles must be surmounted before generative AI can become part of accepted educational technology. One of the first is student data privacy. Very few Gen AI services are willing to sign data privacy agreements (DPAs) with school districts. Some services will sign agreements but require subscriptions and have fewer AI services than the larger providers. This limits the ability of the district to recommend the use of Gen AI by their students while at school. Even if this gets worked out, most major AI providers require an account and set an age limit for students to use it.

Rather than waiting until privacy issues are taken care of, teachers need to start educating themselves now on how to use generative AI so they can model its use with students. Then, assuming your district allows the use of generative AI by its staff, a workaround would be that teachers enter the prompts the students generate. This avoids the student data privacy issues, because the teacher is authorized to use it, and can ensure the prompt doesn’t use personalized information. If the teacher wants

additional privacy precautions, some services have a setting to prevent the LLMs from using the chats as part of their training data.

Incorporating generative AI into classroom lessons or smallgroup discussions in this way will encourage students to learn the appropriate use of this technology. An excellent place for examples of well-written prompts to help get your students started is the AI for Education prompt library.

Part 3: Conclusion

Generative AI will provide many students with disabilities an improved opportunity for meaningful participation in the general education curriculum. It is essential that school districts develop policies on appropriate use, and the Gen AI providers work with the districts on privacy concerns.

The districts that surmount these hurdles will see a golden age of accessibility for all their students. Artificial intelligence is already impacting our society. Schools need to help their teachers understand and use generative AI. Otherwise, our students, especially those with disabilities, will be left behind.

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