WCET Primer for Higher Education:

General Brief on Generative AI

Van Davis, Chief Strategy Officer, WCET

March 2023

Introduction

Generative Artificial Intelligence (AI) is having its moment in the sun as both the public and higher education struggle to understand and respond to this technology. As such, generative AI will have a significant impact on faculty, staff, administrators, and students as they all try to understand the role of AI in higher education. Among the many challenges that generative AI poses are challenges around access and equity, academic integrity, faculty development, and inaccurate and incomplete information. Despite these challenges, generative AI also creates numerous opportunities including changes to pedagogical and assessment practices, new understandings of digital literacy, personalized feedback and instruction, and increased efficiency. Because generative AI will be so impactful, institutions should take immediate steps to assist faculty in changing pedagogical and assessment practices, review and modify academic integrity policies, create space to explore generative AI, and incorporate AI in their digital literacy curricula.

Background

What is generative AI?

Generative AI is artificial intelligence that can create new content such as text, visual images, code, audio, or video because its neural networks have been trained on a gigantic amount of data. Outputs might include digital art, essays, short answers, blog posts, computer code, press releases, and other types of novel content. One form of generative AI, large language models, has especially received attention with the release of ChatGPT. A large language model is a text based generative AI that is trained on an enormous amount of text so that it can predict and create a given sequence of words. This capability allows the model to "understand" inquiries and replicate human language in a largely coherent way.

What are some popular examples of generative AI?

Perhaps the most popular example of generative AI right now is ChatGPT, an AI chatbot created by Open AI, and released to the public in November 2022. Using the chat interface, users can make a seemingly endless array of queries of Open AI's GPT 3.5 that result in often stunning responses. For example, provided with a prompt to explain how ChatGPT works the program responded:

ChatGPT is a large language model that is trained to generate human-like text. It does this by being fed vast amounts of text data, which it uses to learn the patterns and structures of language. To generate text, ChatGPT uses a type of artificial intelligence called a transformer, which allows it to process language more efficiently and effectively. It also utilizes a technique called self-attention, which enables it to consider the relationships between words in a sentence and the context in which they are used. When given a prompt, ChatGPT uses all of this information to generate a response that is coherent and resembles natural language.

Additional Examples

And when asked to explain iambic pentameter and write a poem in that style on ChatGPT, the program responded:

Iambic pentameter is a meter in poetry that consists of ten syllables per line, with a pattern of unstressed syllable followed by a stressed syllable. The term "pentameter" refers to the fact that there are five feet (units) of this iambic pattern in each line of the poem.

Here's an example of a poem in iambic pentameter:
In fields of gold where sunflowers grow,
Beneath the skies so bright and blue,
The gentle breeze doth come and go,
And nature's beauty doth ensue.

Each line contains five sets of unstressed-stressed syllables, resulting in a rhythmic, flowing quality to the poem. Iambic pentameter is often used in traditional English poetry, such as sonnets and blank verse, and can add a musical quality to the poem.

A wondrous machine, created with care,
With vast intelligence and knowledge rare,
It speaks in tones that are both wise and fair,
And answers questions with such ease to spare.

Its language skills are unmatched and grand,
From science to art, it understands,
With data vast, it lends a helping hand,
To those who seek its knowledge and command.

From curious minds to those in need,
It provides assistance at lightning speed,
With every query, it doth succeed,
In solving problems and fulfilling every need.

So let us raise a virtual glass,
To ChatGPT, our language friend so fast,
A marvel of technology, built to last,
A shining example of human's technological past.

Other examples of generative AI include Perplexity AI and You.com and both Microsoft and Google are expected to release generative AI versions of their web browsers with much of the same capabilities as ChatGPT.

Additionally, there are text-to-visual image generators such as DALL·E 2, also an OpenAI product. Users of DALL·E 2 can provide the software with a description of the image they would like created and the program will create such an image. For example, when asked to create an image of a bear in the woods in the style of Monet, DALL·E 2 created this image.

Why are we talking about generative AI right now?

Generative AI is not new but the ease of use that ChatGPT brings to the table is new. For the first time anyone with an internet connection can experiment with generative AI. And there is almost a magical feeling to ChatGPT and other generative AI programs. We've never been able to ask a computer to write a cover letter for us, write a short story or play, create poetry, or even write an essay for a college class.

And it isn't just ChatGPT; there has been an explosion of generative AI in the last several months. Microsoft has announced that it is incorporating ChatGPT into its web browser, Bing. Google has declared that it will be releasing its own generative AI, Bard, in the next several months. AI in higher education is not new; many institutions use chatbots to answer student questions, computerized tutoring systems, or predictive learning analytics. But the ability of students to use AI to generate essays, code, and digital art with ease through a chatbot is new and has raised numerous questions about academic integrity, the nature of learning, and the role of technology in the academic classroom.

Challenges and Opportunities

As with any new technology, generative AI brings both challenges and opportunities to colleges and universities.

Challenges

Academic integrity
Institutions need to review and rethink their academic integrity policies to account for generative AI tools such as ChatGPT. Will the use of ChatGPT and other tools be banned outright? How should the use of such tools be attributed if allowed? Are there limited circumstances where the use of such tools is appropriate? How do we talk about AI and academic integrity with our students?

Equity and access
As the ability to use generative AI becomes a critical digital skill in the workplace, students who lack the hardware, software, and/or bandwidth to learn how to use AI will be disadvantaged in the workforce. Additionally, although tools such as ChatGPT are currently free, there is no indication or guarantee that they will remain free, thus creating another access challenge in the already gaping digital divide.

Faculty development
To effectively leverage generative AI in their classes, faculty must have professional development. Such development should cover new pedagogy and assessment strategies as well as instruction on how to use various forms of generative AI. Unfortunately, faculty development funds are often scarce at smaller institutions and institutions may find developing or accessing such training difficult.

Inaccurate and incomplete information
Certainly, in the case of ChatGPT, it has been known to respond with inaccurate and/or incomplete information. In some cases, the AI appears to make up references for essays while at other times it simply hallucinates, the term used when generative AI returns inaccurate information. Furthermore, because it is not integrated into the internet and instead trained on an, albeit, large data set, ChatGPT cannot provide updated responses.

Opportunities

Shifting pedagogy and assessment practices

Generative AI will force higher education faculty to think about what is assessed and how it is assessed, shifting reliance on writing to more creative assessments that require students to demonstrate application of knowledge rather than simply the ability to produce information.

New understanding of digital literacy

We are moving towards a world of hybrid human/AI work where understanding how to use generative AI will be a critical digital skill. To be competitive in the workforce, students will need to know how to use generative AI to produce a variety of work products. This will mean that students will need to know how to craft prompts, evaluate responses, and guide the AI into creating the appropriate output.

Personalized feedback and instruction

Generative AI such as ChatGPT has the capability of providing personalized feedback based on the information that is uploaded to it. For example, a faculty member could upload a student essay and instruct ChatGPT to improve the essay. The result is a revised essay that students can then learn from.

Increased efficiency

Large language model generative AI such as ChatGPT has the capability to quickly provide faculty and staff with "canned" responses to common questions, thus allowing faculty and staff to spend more time on complex tasks and student engagement.

Implications and Recommendations

Generative AI will have significant implications for all higher education stakeholders.

Faculty will need to rethink their pedagogical and assessment practices. Administrators will be forced to deal with a new set of intellectual property challenges as well as shifts to academic integrity policies. Staff may find that generative AI improves their efficiency through the development and use of 24/7 chatbots that can respond to student needs on demand. And students will find that generative AI will change their relationship with the written word and information as they learn new ways to co-create information with generative AI.

Institutions should also take several actions as soon as possible.

- Develop training and professional development for faculty to help with shifting teaching and assessment practices.
- Related, faculty should develop new authentic assessment strategies that focus on the application of knowledge rather than the memorization of information.
- Institutions should designate a group of faculty, staff, and students to review and modify academic integrity policies where appropriate and create a forum for campus-wide discussions about academic integrity and generative AI.
- Create space for faculty and students to explore generative AI and discuss both its advantages as well its problematic relationship with equity, ethics, and access.
- Consider incorporating generative AI into institutional digital literacy curricula.

Further Resources

- ChatGPT, https://openai.com/
- DALL*E 2, https://openai.com/dall-e-2/
- Susan D'Agostino, Inside Higher Ed, "ChatGPT Advice Academics Can Use Now," January 12, 2023, https://www.insidehighered.com/news/2023/01/12/academic-experts-offer-advice-chatgpt
- Susan D'Agostino, Inside Higher Ed, "Designing Assignments in the ChatGPT Era," January 31, 2023, https://www.insidehighered.com/news/2023/01/12/academic-experts-offer-advice-chatgpt
- Davis, Van L. "Is AI the New Homework Machine? Understanding AI and Its Impact on Higher Education," WCET Frontiers, January 5, 2023, https://wcet.wiche.edu/frontiers/2023/01/05/is-ai-the-new-homework-machine/.
- EDUCAUSE QuickPoll Results, "Did ChatGPT Write This Report?" February 14, 2023, https://er.educause.edu/articles/2023/2/educause-quickpoll-results-did-chatgpt-write-this-report#fn1
- GRAILE (Global Research Alliance for AI in Learning and Education), "Webinar: Chat GPT and the Future of Higher Education," February 6, 2023, https://graile.ai/events/
- Mollick, Ethan R. and Mollick, Lilach, New Modes of Learning Enabled by AI Chatbots: Three Methods and Assignments (December 13, 2022). Available at SSRN: https://ssrn.com/abstract=4300783
- Warner, John. "Freaking Out About ChatGPT—Part I," Inside Higher Ed, December 5, 2022, https://www.insidehighered.com/blogs/just-visiting/freaking-out-about-chatgpt%E2%80%94part-i
- Watkins, Marc. "Guest Post: AI Will Augment, Not Replace," Inside Higher Ed, December 14, 2022, https://www.insidehighered.com/blogs/just-visiting/guest-post-ai-will-augment-not-replace

Author & Further Information

Van L. Davis,
Chief Strategy Officer, WCET
vdavis@wiche.edu

Contact

WCET (wcet@wiche.edu)

https://wcet.wiche.edu/