Rise of the Machines

WHAT COLLEGES AND UNIVERSITIES NEED TO KNOW ABOUT CHATGPT

The game-changing capabilities of generative artificial intelligence (AI), specifically ChatGPT (Generative Pre-trained Transformer), have captivated the world. ChatGPT, a revolutionary large language model recently released by AI research and deployment company OpenAI, is a quantum leap forward in the evolution of artificial intelligence that has prompted leaders across industries to consider its far-reaching implications. (See Figure 1 for a glossary of related terms.)

ChatGPT can write essays, poems, and song lyrics. It can write and debug computer code. It can quickly research and present answers to broad and complex questions on nearly any topic. And it can even address how — despite appearances — it hasn't quite advanced to the state of passing the famous Turing Test and is not a conscious, sentient being.

Like all AI, ChatGPT has limitations, and its responsible use requires us to understand those issues. For example, because it is a model that predicts the next word in a sentence based on

Figure 1. Artificial intelligence terms

Artificial intelligence (AI) is the study and creation of computer systems that can perform operations that typically would require human intelligence. These include understanding and generating natural language, recognizing objects, and making decisions based on inputs.

Generative AI is a subset of AI and machine learning that involves creating new content or data, such as text, images, or speech, based on a set of inputs or examples.

A **large language model** is an AI tool that uses complex algorithms to generate text by analyzing and predicting patterns in large word data sets.

the volumes of data it has been trained on, it will occasionally generate incorrect answers.

Last trained on new data in September 2021, it cannot produce answers based on events or data that have occurred since that point in time, although that restriction is expected to change as the platform continues to evolve and learn.

While this latest generation of AI technology is not perfect, we would be foolish not to acknowledge that it will only improve and that the world has fundamentally changed now that it exists.

Looking Through a New Lens: The Impact on Colleges and Universities

From the printing press to the calculator to the personal computer to spellcheck and the internet itself, nearly every leap forward in media and learning technology has been met initially with some degree of concern and excitement.

The concept of AI can be traced back to ancient Greece when philosopher Aristotle posed the idea of automatons or self-operating machines. For as long as humans have been conceiving and developing intelligent machines, they have harbored fears of what they might portend.

Perhaps most famously, the HAL 9000 intelligent computer system in Arthur C. Clarke's 2001: A Space Odyssey novel and film took over the spaceship and threatened the crew's lives. ("Open the pod bay doors, HAL.")

Today, that same anxiety is affecting the perception and adoption or rejection of AI on college campuses.

Within weeks of its launch, ChatGPT successfully passed all three parts of the U.S. Medical Licensing Examination, a graduate-level exam at the University of Pennsylvania's Wharton School of Business, law exams at the University of Minnesota, and countless others.

In response, some colleges and universities are adapting teaching methods to incorporate the technology, including a Wharton professor who has established what might be the de facto standard for AI policy in the classroom. Others are attempting to ban its use by taking measures such as requiring handwritten exams and papers to be written while proctored.

"I hope to inspire and educate you enough that you will want to learn how to leverage these tools, not just learn to cheat better," one professor wrote in his revised syllabus, The Wall Street Journal reported.

As emerging technology continues to disrupt higher education, it will impact teaching and learning, research, and university operations.

Enhanced Teaching and Learning — or Not?

Headlines about AI in the classroom have trumpeted its intelligence and ability to succeed in educational courses of all types. And much of the initial discussion on college and university campuses has focused on the potential threats of AI to teaching and learning, including ways that it could be misused to produce academic work that is not original and could constitute plagiarism.

However, educators must acknowledge that we are moving into a future where AI is present in everyday life. Colleges and universities must begin to embrace tools such as ChatGPT and the responsibility that comes with them to prepare students for an AI-enabled workforce. They must look beyond an initial sense of threat to the immense opportunities that AI like ChatGPT present for positively transforming the educational experience by teaching appropriate use through modeling in the classroom and laboratory.

Opportunities and Benefits

· **Curriculum development:** Because it de-emphasizes memorization, AI has the potential to accelerate specific curricula by freeing instruction time and energy for higher-level functions. For example, students may learn how to use AI-generated information to create new applications, analyze the implications of the information generated, or even learn new ways to validate AI outputs themselves. The process of making AI produce an output and then exploring the validity of that output will become an increasingly important part of curricula.

· **Assessment and exams:** Provided there are measures to ensure transparency and prevent bias, AI can improve university assessments and exams through grading, personalization, and proctoring.

· **Course delivery:** AI has the potential to revolutionize the way academic content is created and distributed by automating the production of lectures, assignments, and other course materials. This acceleration could lead to more efficient and effective teaching and learning.

· **Creativity:** Creativity has always emerged as distinct from the thinking of the past — either by building upon prior ideas in new ways or by rejecting prior understanding. New technology is no different as it serves as a starting point for a fresh approach to the creative process.

· **Personalized learning:** AI can be used to create customized learning experiences based on a student's needs and learning styles. Institutions like Georgia State University are already using AI to power adaptive learning programs; this will expand and accelerate.

Challenges and Drawbacks

· **Plagiarism and academic misconduct:** Increased plagiarism reported by some institutions during the pandemic has further stoked fears about the obvious ways that ChatGPT and other AI tools could accelerate this problem.

However, there are multiple tools in development, including GPTZero (ironically created by a college student), to address these concerns. To avoid students claiming the platform's material as their work, colleges and universities must reexamine the definition of plagiarism, academic misconduct rules, and classroom expectations and procedures.

· **Critical thinking:** Students may not be challenged to develop their own ideas and solutions if AI produces them, requiring faculty to rethink how to teach these critical skills.

· **Quality control:** Depending on the complexity of specific tasks, ChatGPT may not be able to understand context, making quality control and oversight necessary to ensure its accuracy and appropriateness for teaching and learning.

Research and Research Integrity: Increased Investment Expected

The COVID-19 pandemic saw a remarkable acceleration in vaccine production, which left the world in awe at the state of modern science and technology. With the help of AI technologies such as ChatGPT, the pace of scientific research and problem-solving will increase even further. However, it is crucial for the research enterprise to weigh potential benefits and drawbacks.

· **Research opportunities:** Increased interest in AI applications — and potential harms — could lead to increased public and private research investments in the field. Large research universities will be best positioned to capitalize on new investments, particularly those with existing AI and computer science programs.

· **Automating literature review:** The new platform can be used to quickly search through large amounts of literature and extract relevant information, saving time and resources for researchers.

- **Improving data analysis:** AI can be used to analyze large data sets and generate insights, aiding in discovering new patterns and relationships.

- **Enhancing collaboration:** AI can facilitate communication and collaboration among researchers, making it easier for them to share information and work together on projects.

- **Bias:** If the training data used to generate results or make decisions is biased, it could perpetuate these biases further, leading to inaccurate or unfair results.

- **Fabricating or falsifying data or manipulating images:** Because AI tools can be used to alter images, and analyze and synthesize data, using AI to synthesize data to figures or images may lead to an intentional, knowing, or reckless use, resulting in inaccurate results.

- **Plagiarism:** Since ChatGPT can generate text like existing sources, it can make it easier for researchers to plagiarize, perhaps even inadvertently.

- **A check on science:** There are scientists who actively work to identify research misconduct and may use AI to increase the volume and accuracy of their work. Similarly, journals and publishers may also use AI to detect manipulated images or data using tools already in place.

Unleashing the Power — and Managing the Risks — of AI: Streamlining Operations Across Campus

Modern AI has already affected various university operations, from recruitment and marketing to customer service and research. For example, traditional AI has improved efficiency and saved costs by automating certain rules-based administrative functions. These include payroll, evaluations, data entry, and document management. As AI progresses, it will be necessary to manage risk across campus strategically.

- **Increased automation:** Natural language processing of AI like ChatGPT can handle cognitive tasks, enhancing existing applications and expanding automation by solving non-rules-based problems like humans. Examples include responding to student inquiries, creating funding proposals, and processing student applications and enrollment forms.

- **Recruitment and enrollment management:** AI is already used in enrollment management, including predictive modeling; chatbots and virtual assistants; personalized communication; and assisting admissions decision making. ChatGPT heralds a new era where it is expected that generative AI will be used even more extensively in enrollment management, in an increasingly personalized and context-aware form, potentially leading to:

  – More efficient and effective recruitment and enrollment processes.

  – Increased virtual and augmented reality use in campus tours and other recruitment efforts.

  – More personalized and targeted marketing.

  – Greater automation of administrative tasks such as processing applications and managing financial aid.

  – A better understanding of student needs and preferences used to improve student retention and success.

- **Talent reconfiguration:** Automating specific tasks will inevitably lead to reconfiguration for some staff in areas such as data entry and research assistance; library cataloging and reference desk services; grading and assessment; IT help desk functions and troubleshooting; and basic data analysis and reporting tasks. Leaders have the opportunity to retrain staff for other roles or add positions to manage new processes.

· **Technology dependence:** Relying too heavily on AI could lead to a lack of human interaction and decision making, harming university operations.

· **Potential for bias:** As previously mentioned, AI relies on training data from previous sources. If the training data reflects societal biases, these biases will be reflected in AI outputs, potentially leading to discriminatory decision making in areas such as student admissions, disciplinary proceedings, or funding decisions. Examining the training data and ensuring that it represents a diverse and inclusive range of perspectives is crucial.

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Utopia or Dystopia?

Leading colleges and universities are responding to the AI revolution foretold by the arrival of ChatGPT not out of fear but out of creative, strategic, and deliberate optimism. University leaders are working with faculty and students to proactively adapt to the new world ChatGPT is helping to shape. They are investing in research and development, determining governance, collaborating with innovative technology companies, and rethinking their teaching approaches to prepare their students for careers in the AI-powered future. They are working on technology integration, process optimization, training and support, and data analysis.

By retaining their position of creative intellectual leadership, colleges and universities can position themselves as key players in the rapidly evolving landscape of technology and innovation. With proper planning, strategy, and execution, the possibilities for ChatGPT to positively transform the modern university are potentially boundless.