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Generative Artificial Intelligence in Education, Part Two: International Perspectives

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Generative Artificial Intelligence in Education, Part Two: International Perspectives

Abstract

Generative artificial intelligence (GenAI) has continued to advance at a stunning pace since our last publication on GenAI in education in spring 2023. In that first article of a two-part series, we discussed the overall dynamic frontier of GenAI, its potential uses and benefits in education, the essential abilities required in the age of GenAI, and the associated issues and concerns surrounding this emerging technology. In this second article, we delve deeper to examine the new developments, stances, policies, and initiatives pertaining to GenAI's roles in education in international contexts.

Keywords: ChatGPT, GenAI in Education, Generative Artificial Intelligence, OpenAI, Bard, International Perspectives

Generative Artificial Intelligence in Education, Part Two: International Perspectives

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Introduction

Generative artificial intelligence (GenAI) has experienced accelerated development and advancement since the publication of our last article in the two-part series (i.e., Hsu & Ching, 2023). Nevertheless, the journey towards progress and expanding user base is fraught with challenges on various fronts. Taking ChatGPT for example, the popularity of the service has been on decline as revealed by the data of mobile and desktop traffic to ChatGPT's website (Tong, 2023). ChatGPT's iPhone app downloads have dwindled since peaking in June 2023 (De Vynck, 2023). Also, some long-term ChatGPT users have reported a noticeable reduction in its responsiveness and an increase in errors within its responses (Southern, 2023). On the other hand, while GenAI has accumulated user base at an impressive pace overall, a recent survey conducted among adults in the U.S. from July 17th to July 23rd by Pew Research Center shows that only 18% of adults have used ChatGPT (Park & Gelles-Watnick, 2023). However, several findings from this report can provide context and a reference point for our discussion on GenAI in education worldwide. Notably, younger adults (age between 18-29) and those with higher education degrees are more likely to utilize ChatGPT. Usage of ChatGPT for work and learning has grown faster than for entertainment, compared to the findings in a previous survey conducted in mid-March (Vogels, 2023). Professions like software engineers, graphic designers, and journalists are expected to be the most affected by the chatbot (56%, 54%, and 52% respectively)

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among the surveyed participants. IT and education employees lead in terms of anticipating the impact of ChatGPT on their jobs (75% and 60%). Adults with higher education degrees, especially postgraduates, also foresee the chatbot's impact on their jobs (71%). Since the U.S. is at the forefront of GenAI development, service deployment, accessibility, and the associated challenges and benefits, the experiences and circumstances faced by stakeholders in the U.S. can offer valuable insights into the paths traveled.

This article is the second installment in the two-part series on GenAI in Education. In the first article, we discussed the overall dynamic frontier of GenAI, its potential uses and benefits in education, the essential abilities required in the age of GenAI, and the associated issues and concerns of this emerging technology. In this second article, we expand upon the discussion of GenAI to examine the new developments, as well as the stances, policies, and initiatives related to GenAI in education in international contexts.

GenAI Advancement: An Update on the Leading Technologies

The top two text-generating GenAI technologies, in the form of chatbots, are ChatGPT and Bard, with the former developed by OpenAI (backed by Microsoft) and the latter by Google. ChatGPT has been the leading GenAI chatbot since its launch, in terms of active users, number of languages supported, and the capability to analyze natural language input and produce natural language responses. ChatGPT's advantages as a chatbot stem from its early launch and extensive user base, and the substantial user-input data that fuel its large language model (LLM). However, ChatGPT initially lacked real-time Internet access upon its launch in November 2022, preventing it from handling queries pertaining to information beyond 2021 (OpenAI, 2023). It was only in late September 2023 that OpenAI revealed ChatGPT's new capability to access the Internet, enabling it to provide current information along with direct source links, through an integration

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with the Bing search engine (Franzen, 2023). This feature is now available to paid subscribers and enterprise users. Before ChatGPT has real-time Internet access, users need to use web browser extensions such as WebChatGPT, which would search the Internet for information on a given topic and display web search results related to users' query (Abdelrahman, 2023). To maintain its leading position, OpenAI also announced in late September 2023 other significant ChatGPT updates that are scheduled for release to paid subscribers and enterprise users in early October 2023. These updates include voice conversation (i.e., the ability to "listen" to users' voice input and respond with synthetic voice) on iOS and Android apps, and advanced image query (e.g., allowing users to focus on a specific part of an image) on all platforms (Field & Goswami, 2023).

On the other hand, Google has aggressively pursued innovation, consistently releasing new features and updates for Bard while leveraging integration with distinctive Google products. These advancements include functionalities such as exporting Bard-generated tables to Google Sheets (Wolber, 2023) and incorporating images into conversations with the chatbot through Google Lens starting in July 2023. Since its initial launch, Bard has been made available in more countries, supported more languages, and become more capable of analyzing computational codes and help address mathematical tasks, coding questions, and string manipulation (Elias, 2023). With Google's wide range of services and product lines, Bard is positioned favorably for seamless integration with powerful and popular applications such as Google Workspace, Maps, Email, Calendar, and Meet.

In addition to technology advancements, there have been growing creative uses of GenAI along with the fast development of such technologies. For example, users have started using ChatGPT's natural language processing and generation abilities to create longer text for business

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purposes and academic assignments. To support responsible use and maintain integrity, tools such as AI-text detectors are readily available online, either for free or through paid-subscription (Anderson et al., 2023). In response, individuals have developed workarounds targeted at bypassing AI-text detectors. For example, individuals have created tutorials to teach people various “tricks” (e.g., writing with certain authors’ styles or using anti-detector text-generator) to pass AI-detectors’ examinations of the extent to which a certain text is generated by chatbots instead of human beings (Ivanov, 2023).

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Stances, Policies, and Initiatives

Depending on access, development, and infrastructure, the international perspectives regarding GenAI vary to a great extent. While many countries embrace the powerful technology and its arguably endless uses, they are also cautious about related issues. Considering the various levels of acceptance and approaches regarding GenAI, we will discuss the status and development regarding stances, policies, and initiatives by regions or notable countries.

Europe

The European Union (EU) recognizes the potential benefits of GenAI but also exercises caution regarding the associated risks (e.g., information accuracy, data privacy, bias, and discrimination) (Ortiz, 2023). The EU aims to establish itself as a global hub for AI while striving to ensure the technology is human-centric and trustworthy (European Commission, 2023). The EU takes a risk-based approach to regulate AI systems, prioritizing transparency and accountability. For example, the EU proposed the Artificial Intelligence Act (AI Act) on April 21, 2021, which outlines plans for classifying AI systems by risk levels to mandate corresponding development and use requirements. The goal of the AI Act is to strike a balance

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between fostering innovation and protecting the public (European Parliament, 2023). In mid-June 2023, the members of the European Parliament proposed rules to ban intrusive and discriminatory AI practices, including biometric identification systems in publicly accessible areas, predictive policing systems based on profiling, and emotion recognition systems in law enforcement, workplace, and educational institutions (European Parliamentary Research Service, 2023). While there are no specific policies directly related to using GenAI in teaching and learning, the restriction on using GenAI for emotional recognition in educational settings is an important step to safeguard privacy and personal data to prevent potential misuses. This stance is also echoed by UNESCO (The United Nations Educational, Scientific and Cultural Organization), suggesting that governments must act swiftly to enact appropriate regulations and teacher training to ensure human-centered GenAI practices in education (O'Hagan, 2023; UNESCO, 2023a).

Asia

Asian countries also try to balance the benefits and risks of the powerful GenAI technologies. Taiwan is renowned for its technological innovations and highly skilled workforce in computing and engineering. In addition, Taiwan is home of Taiwan Semiconductor Manufacturing Company (TSMC), the world's largest and most advanced semiconductor producer that also supplies Nvidia's cutting-edge chips designed for running AI and machine learning applications and training GenAI models (Yu, 2023). Recognizing GenAI's capability in enhancing productivity (e.g., content creation) and supporting decision-making processes, the Taiwanese government has taken a proactive stance toward the use of this technology (Ocampo, 2023). For instance, the Cabinet has tasked the National Science and Technology Council (NSTC) with formulating guidelines for the use of GenAI within the Executive Yuan (branch)

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and its affiliated entities, such as ministries and agencies, to establish a shared understanding. The NSTC has also been charged with closely monitoring global trends in AI development. The approaches help ensure the nation and its citizens can maximize the benefits of AI while minimizing risks, all while navigating the complexities of technological progress with a clear sense of purpose and integrity (Executive Yuan, 2023).

Japan has long been a leader in integrating artificial intelligence and robotics, addressing various issues such as labor force shortage (Sneider et al., 2023). This leadership extends to the adoption of GenAI technologies such as ChatGPT in education and scientific research. In early July 2023, Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT) released guidelines allowing for the limited use of GenAI in elementary, junior high, and senior high schools. MEXT plans to select certain junior high and senior high schools by the fall of 2023 to pilot AI programs and intends to revise the guidelines based on participants' experiences (Kyodo News, 2023). In late July 2023, MEXT announced its intentions to develop a homegrown GenAI program to support and facilitate medical and scientific research. This program aims to generate hypotheses by learning from research papers and experimental images. Led by the Riken research institute, the project will expand its applications beyond medical and scientific domains. Starting in 2024, the 8-year project aims to make this technology available in the nation by 2031 (Matsuo, 2023).

Since the onset of COVID-19, China has taken interest in AI-driven technologies in general among other educational technologies to support the growing demand of online teaching and learning. For example, one of the tech giants, NetEase, has made their cloud service and AI platform available to primary and middle schools for free (Khan, 2020). In late July 2023, as part of their GenAI development efforts, NetEase's Educational Technology unit also released

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China's first educational LLM that integrated subject matter knowledge and provided learners with personalized learning guidance (Lu, 2023). Like the EU, China is taking cautiously optimistic measures regarding GenAI usage. At the same time as the development of homegrown GenAI such as Baidu's Ernie bot (Porter, 2023), the Cyberspace Administration of China drafted the Measures for the Management of Generative Artificial Intelligence Services. These measures aim to ensure that the new technologies and the companies providing corresponding services align with the core values of their socialism. Released in early July 2023, the updated guidelines took effect in mid-August 2023 to require GenAI providers to go through security reviews and register their algorithms with the government to ensure their services do not influence public opinions (He, 2023).

In terms of using GenAI in education, Asian universities took various initial stances on this topic. For example, in February 2023, the University of Hong Kong (HKU) implemented an interim ban of ChatGPT for any credit-bearing activities, recognizing its significant implications once used in activities such as coursework and assessments. Unless with instructors' written permission, using ChatGPT can be considered using others' work and treated as plagiarism. In early August 2023, HKU lifted the ban and released a new policy to embrace GenAI technology. Starting September 2023, instructors and students will have free access to tools such as ChatGPT and image generator Dall-E offered through the university (HKU, 2023).

The use of GenAI is gaining traction fast in South Korea. Some universities allow students to use GenAI as a reference tool but prohibit the use of such tools for writing reports/assignments. Education authorities also debated on issuing specific directives to either prevent students from using this service or provide guidance on digital ethics and the appropriate use of GenAI (Kang, 2023; Leung & Niazi, 2023). The Singapore education ministry, on other

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hand, has taken a proactive approach to develop guidance and resources for schools and higher education institutions to support the use of GenAI tools. Teachers are tasked with helping students understand fundamental concepts and against overreliance on technological tools (Leung & Niazi, 2023; Singapore Ministry of Education, 2023).

India prohibits the use of GenAI or other electronic tools during examinations per the guidelines of the Central Board of Secondary Education. Also, educational institutions are cautious about their students using GenAI tools, particularly in the field of computer programming. For example, RV University in Bengaluru prohibited students from using tools such as GitHub Co-Pilot, ChatGPT, and Blackbox to assist them in coding (Thadhagath, 2023). Among these tools, GitHub Co-Pilot is especially powerful yet concerning as it can quickly generate usable codes based on natural language prompts, faster than human programmers. Computer science educators cautioned beginners in coding against relying on GitHub Co-Pilot as it can hinder their learning (Leung & Niazi, 2023).

Africa and Latin America

While there are no regulations or policies specifically directed at the use of GenAI, several African countries including Egypt, Rwanda, and Mauritius have developed national AI policies that encompass various aspects, including adoption, contributions from the private sector, data strategies, and ethical guidelines (Adams, 2022). Moreover, emerging frameworks such as the *Blueprint on Artificial Intelligence for Africa*, have been developed and published in 2021 by SMARTAfrica (i.e., a multi-country alliance) and the South African government (Elimian, 2023). Although such frameworks may not explicitly address the educational use of GenAI, their development and progress hold the potential to tackle related issues, such as data

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storage and protection. This includes safeguarding students' data privacy when integrating GenAI into learning systems.

At the time of writing, Latin America does not have specific policies or initiatives targeted at GenAI. However, with the support of UNESCO, countries such as Chile, have initiated a series of workshops as precursors of updating policies aimed at harnessing the power of AI in general (UNESCO, 2023b). Similarly, while Mexico has not specifically addressed GenAI at the national level, the government has undertaken efforts to create the Mexican National AI Agenda (2018-2030). This agenda is designed to promote the responsible development and use of AI across various domains, including 1) governance, government, and public services; 2) research and development; 3) capacity, skills, and education; 4) data infrastructure; 5) ethics and regulation (OECD AI Policy Observatory, 2022; The George Washington University, 2018).

Canada

While Canada has taken interest in the benefit and potential of GenAI, the Government takes measures to ensure the technology benefits Canadian citizens and risks are mitigated. For example, in April 2023, the Office of the Privacy Commissioner of Canada launched an investigation into OpenAI, the developer of ChatGPT. The investigation aimed to determine if the company was collecting, using, and disclosing personal information without proper consent (The Office of the Privacy Commissioner of Canada, 2023). As previously discussed, concerns about data privacy have been raised in the context of GenAI, particularly regarding the transparency of the data used in training these models and whether companies track users' personal information and activity patterns (Vermes, 2023). More recently in July 2023, leading universities such as University of Toronto have begun offering guidance, resources, and support

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for the use of GenAI for teaching practice (University of Toronto, 2023). Additionally, in September 2023, the Government of Canada (2023) released the “Guide on the use of Generative AI”. This guide acknowledges the potential benefits of GenAI, encourages federal institutions to deploy it responsibly in their operations, and offers suggestions on policy considerations and best practices.

USA

The U.S. stands as one of the world leaders in the development of GenAI technologies. With the early deployment and public access to these cutting-edge technologies, educators and administrators are facing unprecedented decision-making situations when it comes to guiding learners at all levels. In response, some of the country’s largest school districts initially opted to ban the use of ChatGPT. For example, as of early September 2023, the Los Angeles Unified School District, the second largest school district in the U.S., continued to uphold its ban on ChatGPT, a restriction in place since December 2022. This ban applies to the use of ChatGPT on school devices and networks, while students using unfiltered network and home devices remain unaffected (Gogo, 2023; Singer, 2023). A similar concern was echoed by New York City public schools, the largest school district in the U.S., which imposed a ban on ChatGPT as early as January 2023, citing concerns about potential misuses for essay writing and cheating. However, with greater familiarity and a more thorough examination of GenAI, the ban was lifted a few months later. Officials began to consider the potential benefits provided by GenAI in terms of improving administrative tasks, communication, and teaching (NBC News, 2023). Meanwhile, more educational institutions across levels are adopting a cautious yet proactive approach. They are organizing resources, information, webinar, workshops to support educators and employees by providing guidelines to promote responsible uses of GenAI tools (Sheehan, 2023). While not

explicitly addressing GenAI's use in education, the National Science Foundation (2023) announced investments totaling \$140 million to establish seven new AI Institutes in collaboration with federal agencies and higher education institutions. In late May 2023, the Department of Education released a new report to offer insights and recommendations regarding the opportunities and risks associated with AI in education, research, and assessment (U.S. Department of Education Press Office, 2023).

Conclusion

In this paper, we examined the new developments in leading GenAI technologies. We also discussed stances, policies, and initiatives related to GenAI in education across international contexts, including Europe, Asia, Africa, Latin America, Canada, and USA. While the rate of GenAI adoption and deployment varies by regions, the experiences and paths traversed by earlier adopters can provide valuable insights for those considering the adoption of this powerful technology. In addition, with a broader scope, it is also critical to continue monitoring and examining the interplay between GenAI and its potentially far-reaching impact on human resource development, career fields, educational and industrial policies, as well as infrastructure planning and development. These aspects will in turn influence educational policies and practices in international contexts.

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