DESCRIBING COMMUNICATION TECHNOLOGIES:

THE IMPACT OF ARTIFICIAL INTELLIGENCE ON EDUCATIONAL SPACES

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"Artificial Intelligence (AI) involves replicating human intelligence processes in machines, particularly computer systems. Some key areas include machine learning, natural language processing, and computer vision. AI can process and analyze large datasets, recognize patterns, and make decisions efficiently, revolutionizing industries such as healthcare, finance, and education. This technology's rapid advancement promises significant innovations and challenges existing paradigms, making it a crucial area of study and application." (ChatGPT, 2024)

Artificial intelligence has been around for decades now but has more recently gained popularity with the advent of generative artificial intelligence (GenAI) tools. Some examples of such tools include, but not limited to, ChatGPT, Bard, Bing, Claude, Copilot, and Gemini. GenAI can produce a wide variety of content such as text, images, videos, voiceovers, and music. GenAI. has been utilized heavily in marketing, customer service, web design, healthcare, security, and finance industries, and education. These tools are language models (LM), a term signifying a system that is algorithmically trained to predict the likelihood of characters, word or strings (Bender et al., 2021). LM's were initially introduced in the 1980's (Bender et al., 2021), but the recent advances in technology have garnered massive attention and widespread use, particularly with the introduction of ChatGPT, a large language model (LLM) developed by Open AI. This paper will focus on artificial intelligence in education (AIEd), a rapidly developing area of interest for educators, stakeholders, and policymakers.

In November 2022 ChatGPT was released and it quickly became a popular tool used by students and teachers in all levels of education. According to a February 2024 study, 37% of college students self-reported that they used ChatGPT, with 69% saying they used it for writing assignments, 67% used it for research, 37% for emails and 35% for assessments (Intelligent.com, 2024). A recent poll found that 58% of students ages 12-18 reported using ChatGPT (Common Sense Media, 2023). The rapid spread of GenAI has resulted in a massive wave of media attention and conversations in educational spaces, leading institutions to quickly adjust or create new school policies to address it. A.I. is a disruptive technology in educational spaces, that has challenged educators to re-think and re-design their practices as they grapple with new opportunities and challenges. This paper will discuss the impacts that GenAI has had on literacy, language, and the impacts on educational spaces from the perspective of a variety of stakeholders.

ARITIFICIAL INTELLIGENCE AND LANGUAGES

As AI continues to evolve, a key field of research and interest has been natural language processing (NLP). NLP “explores how computers may be want to understand and manipulate natural language text or speech to try and do useful things (Ali & Shandilya, 2021, p. 135). This capability is the backbone of GenAI models which enable them to function as a communicative space, extending its capabilities far beyond the traditional search models such as Google. One of the benefits is that it can be used as a real-time 24-hour tutor. This feature is helpful in that it can learner autonomy, giving the user the ability to teach oneself a skill and decreasing their reliance on traditional educational structures. A popular use of GenAI is the learning of a new language, where its interactive approach is similar to other language learning apps, yet it is available for free and adaptable for the user. ChatGPT currently supports over 25 languages (ChatGPT, 2024) but has specialized add-ons installed that are designed to support language learning. One such example created by Andrew McGregor affords the user a variety of language learning opportunities such as story mode, lesson mode, picture mode, guided lessons and supporting images, and allows the user to interact through text and voice (ChatGPT, 2024).

Despite these benefits for language learning possibilities, there are limitations encoded within the structures of LMM. Researchers have pointed out that GenAI language technologies do not yet support a wide variety of the world’s languages. Joshi et al., (2020) noted that "language technologies contribute to promoting multilingualism and linguistic diversity around the world. However, only a very small number of the over 7000 languages of the world are represented in the rapidly evolving language technologies and applications". A recent study found that ChatGPT was able to identify 100 languages accurately, yet failed to identify another 382 languages, with languages from the African continent being notably underrepresented (Chen et al., 2023). Despite the fact that there are groups of researchers working to preserve and perpetuate low resource languages there is a long way to go before these language models are equitable and fully representative of linguistic diversity. As GenAI continues to evolve and shape communicative spaces, it is important that attention be given to what sorts of data sets are being used to train these models, as we run the risk of leaving languages behind.

IMPACT ON EDUCATIONAL SPACES

Artificial intelligence has been shaping and influencing various aspects of our lives for decades now. Of particular interest to researchers is the ways in which it has impacted learning environments, as the potentials for transformation are just beginning to be realized. Numerous studies have investigated the uses of AIEd, covering a range of topics from monitoring and evaluating students' attention (Wang et al., 2022) to using chatbots to stimulate interest in subject matter (Fryer et al., 2017), and the use of AI tools to support self regulation in students (Molenaar, 2022). Alam (2023) notes that some "researchers are exploring novel user interfaces, such as natural language processing, speech and gesture recognition, eye-tracking, and other physiological sensors, which could be used to augment both AIEd and non-AIEd software" (p.24). In the field of education, we are just beginning to see and understand the possibilities for GenAI technologies to transform learning.

For educators, GenAI programs afford them the opportunity to decrease the labor costs typically associated with repetitive tasks such as writing lesson plans, creating differentiated reading materials and assessing learner outcomes. Software programs such as Diffit (https://web.diffit.me/) are rapidly emerging and shifting the labor of educational material creation from humans to A.I. Other studies have utilized A.I. (specifically NLP) to investigate how learners engage with course content, create learner profiles and map knowledge structures in MOOC settings (Guoqing & Abisado, 2023). As Alam (2023) notes, AIEd is also a powerful tool to open up what is sometimes called the 'black box of learning,' giving us deeper, and more fine-grained understandings of how learning actually happens (for example, how it is influenced by the learner's socio-economic and physical context, or by technology)" (p.18). These advancements signal a transformation in the educational field where A.I. can increase the efficiency of educators and help deepen their understanding of learner profiles and assessment of learner outcomes.

From a learner centered approach, GenAI affords learners opportunities such as the increased personalization of learning and enhanced learner agency, raising questions about the future and longevity of the existing traditional educational structures and landscapes. There is an extensive body of research on the benefits of using GenAI for language learning, with researchers finding impacts such as the reduction of emotional barriers by allowing for repetitive practice in low-stakes environments (Tai & Chen, 2020) providing timely and appropriate feedback, (Underwood, 2017) and increasing learner engagement and writing outcomes (Rad et al., 2023). However, questions have been raised about the possible overreliance of students on GenAI models for writing. Zhen et al., (2024) noted that "individuals increasingly favor fast and optimal solutions over slow ones constrained by practicality" (p.1). A study by Gao (2022) drew attention to overreliance on GenAI in academic settings and the challenges that both humans and A.I. detection software face in attempting to differentiate between human and A.I. generated writing. A recent study highlighted the consequences of such reliance, finding that AI use led to a loss of decision making, increased laziness, and negative impacts on security and privacy (Ahmad et al., 2023). Further research in this area is needed in order to gain a deeper understanding of the long term impacts of AI use on human cognition, motivation and literacy skills.

ISSUES AND IMPLICATIONS

Out of all the possible impacts of GenAI in education, the most fervently discussed and debated topic is that of cheating and plagiarism. This has pushed educators to question what skillsets learners will need in the future, and how to operate within the parameters of an educational system designed prior to the introduction of a rapidly evolving technological advancement. A recent study found that ChatGPT did not increase the prevalence of cheating, however it did alter the type of cheating, such as a movement away from social cheating towards A.I. related cheating (Lee et al., 2024). This finding is in line with ongoing discourse surrounding A.I. and plagiarism which is that students and teachers alike find the boundaries between plagiarism and the ethical use of a tool to be blurry. Policymakers globally have been quick to react to the rhetoric, outlining policies and procedures to mitigate the use of A.I. in institutions, with some choosing to outright ban it.

The introduction of artificial intelligence technologies into educational spaces has created challenges for educators and other stakeholders resulting in intensive debates. As the technologies have developed more rapidly than policymakers can keep up with, stakeholders are left with more questions and concerns about the future social and ethical implications than answers. Researchers note that “in the educational setting, the importance and need for Explainable AI is further heightened due to the issues related to learner autonomy and agency, support for learner metacognitive processes and reflective processes and broader issues relating to authentic assessment, credentialing and academic integrity.” (Khosravi et al., p.19, 2022). The ongoing discourse and research in the field will reshape language, communication and technologies, while transforming the educational spaces of the future.

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