HUMAN ABILITY AND PROMPT: PANACEA TO THE USE OF GENERATIVE ARTIFICIAL INTELLIGENCE (AI) FOR TEACHING AND LEARNING

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Abstract
The potential for artificial intelligence (AI) to improve teaching and learning processes has drawn a lot of interest to the incorporation of AI into the Nigerian educational system. Though teachers are already worried that AI will eventually replace them in their roles, it is important to acknowledge the indispensable role of human ability in guaranteeing the successful implementation and utilization of AI in education, even during excitement for technological advancements. Even though artificial intelligence (AI) can provide automated evaluations and individualized learning paths, human interaction is still relatively necessary to develop students' emotional intelligence, critical thinking skills, and ethical principles. The capacity to detect social signs, adjust to unforeseen classroom circumstances, and comprehend contextual intricacies is a special talent that AI systems would find difficult to match. Furthermore, human direction and facilitation are frequently needed for the development of higher-order cognitive skills that results into innovative thinking (entrepreneurial development) and problem-solving. Nigerian educators can bridge the gap between theoretical knowledge and practical application because of their real-life experience and cultural awareness in navigating the complexities of local environments. Ultimately, a balanced strategy that synergizes both technology innovation and human skill is required for the successful integration of AI in Nigerian classrooms. The study concluded that Nigerian education system can pave the way for a revolutionary educational experience that develops well-rounded, critical thinkers and teachers equipped to negotiate the complexity of the twenty-first century by adopting a balanced relationship between AI and teachers.
Key words: artificial intelligence, human ability, prompt and generative

Introduction

The rapid advancement of generative artificial intelligence (AI) has sparked a whirlwind of excitement and trepidation in the realm of education. As these powerful tools become increasingly accessible, educators and learners are grappling with the implications of their integration into teaching and learning processes. While the potential benefits are undeniable, concerns over the misuse of AI assistants and the erosion of human skills have arisen. However, a profound recognition of human ability and the strategic use of prompts may hold the key to harnessing the power of generative AI while preserving the essence of human ingenuity.

Generative AI, such as language models like GPT-3, Claude AI, DALL-E and their successors, has demonstrated an astonishing capacity to generate coherent and contextually relevant text on a

vast array of topics. This capability has the potential to revolutionize educational practices, offering personalized learning experiences, real-time feedback, and the generation of instructional materials tailored to individual needs (Zawacki-Richter et al., 2023). However, the unchecked reliance on these tools raises concerns about the potential for plagiarism, the propagation of misinformation, and the erosion of critical thinking and creativity (Weizenbaum, 1976).

To navigate this complex landscape, it is crucial to acknowledge the inherent limitations of generative AI. While these systems excel at processing and synthesizing vast amounts of data, they lack the depth of human understanding, intuition, and the ability to truly comprehend the nuances of knowledge (Bostrom, 2014). As such, the role of human ability in guiding, contextualizing, and validating the outputs of generative AI becomes paramount.

One promising approach to leveraging generative AI while preserving human agency lies in the strategic use of prompts. Prompts are the textual instructions or queries that guide the behavior and outputs of AI systems (Zhong, Fiedler, Ghorbani, Prentice, Harutyunyan, & Rush, 2022). By carefully crafting prompts that align with learning objectives, educators can harness the power of generative AI while retaining control over the educational narrative. Well-designed prompts can foster critical thinking, encourage creativity, and reinforce conceptual understanding, rather than merely regurgitating information. Furthermore, the process of prompt engineering itself can serve as a valuable learning experience. By engaging learners in the development of prompts, educators can nurture essential skills such as problem formulation, logical reasoning, and communicating effectively with AI systems (Gao, Cai, Müller, Niessl, Chen, Sandberg, Ljunggren & Buggert, 2022). This collaborative effort between human and machine can foster a deeper understanding of the underlying concepts, while also cultivating a healthy skepticism and critical evaluation of AI outputs. Moreover, the integration of generative AI into education should not be viewed as a zero-sum game, where machines replace human expertise. Rather, it presents an opportunity for a symbiotic partnership, where AI augments and enhances human capabilities (Brynjolfsson & McAfee, 2014). By offloading routine tasks to AI systems, educators can dedicate more time and energy to higher-order cognitive activities, such as fostering creativity, nurturing interpersonal skills, and providing personalized mentorship.

Statement of Problem

The incorporation of generative artificial intelligence (AI) within educational contexts presents a multifaceted challenge that demands careful navigation. While these powerful language models possess the ability to generate coherent and contextually relevant content across a vast array of subjects, their unchecked use carries significant risks. The potential erosion of essential human skills such as critical thinking, creativity, and intellectual honesty. The temptation to rely excessively on AI-generated outputs could inadvertently undermine the very foundations of knowledge acquisition and higher-order cognitive development that education aims to cultivate. Moreover, the rapid advancement of generative AI models has outpaced the development of robust frameworks and guidelines for their responsible integration into teaching and learning processes. Educators and learners alike are asking questions surrounding academic integrity, plagiarism, and the potential propagation of misinformation or biased content. The absence of explicit guidelines and precise directives in governing the application of these tools in educational settings heightens the risk of misuse and unintended consequences. Striking the delicate balance between leveraging the benefits of generative AI while safeguarding the integrity of the learning experience remains a pressing challenge that requires a concerted effort from stakeholders across the educational landscape.

Literature Review

The Rise of Generative AI in Education

The emergence of generative artificial intelligence (AI), particularly large language models like GPT-3, has ushered in a new era of possibilities for the field of education. These models are aimed on large volume of data, possess remarkable competence to produce human-like text on virtually any topic (Brown et al., 2020). This capability has sparked a wave of interest and exploration into the potential applications of generative AI in teaching and learning contexts. One of the most promising applications of generative AI in education is the personalization of learning experiences. Traditional educational materials often follow a one-size-fits-all approach, failing to cater to the diverse needs and learning styles of individual students. However, language models can dynamically generate tailored content, explanations, and exercises based on a student's specific

requirements and comprehension level (Yudelson et al., 2022). This personalized approach has the potential to enhance engagement, retention, and overall learning outcomes.

Moreover, generative AI can revolutionize the way feedback is provided to students. Conventional methods of grading and feedback can be time-consuming and subjective, often leading to delays and inconsistencies. Language models, however, can provide instant, detailed, and objective feedback on written assignments, coding projects, and other submissions (Hendrycks et al., 2021). This real-time feedback loop can accelerate the learning process and foster a more collaborative and interactive educational experience. Beyond content generation and feedback, generative AI also holds promise in the realm of intelligent tutoring systems (ITS). These AI-powered systems can engage in natural language dialogues with students, answering questions, providing explanations, and adapting their responses based on the learner's level of understanding (Ruan et al., 2022). This interactive approach can mimic the experience of working with a human tutor, potentially enhancing conceptual understanding and problem-solving abilities.

While the potential applications of generative AI in education are vast, it is crucial to acknowledge the challenges and limitations that accompany this technology. Concerns regarding the potential for plagiarism, the propagation of biases and misinformation, and the erosion of critical thinking skills have been raised (Winder & Uppal, 2023). As such, a balanced and responsible approach to integrating generative AI into educational settings is necessary, one that recognizes the importance of human ability, ethical frameworks, and the strategic use of prompts to guide and contextualize AI outputs.

The Importance of Human Ability

While the capabilities of generative AI in education are undeniably impressive, it is crucial to recognize the inherent limitations of these systems and the irreplaceable value of human ability. Language models, as powerful as they are, are ultimately trained on finite datasets and lack the depth of understanding, intuition, and contextual awareness that humans possess (Bender et al., 2021). Their outputs, while coherent and relevant, may still contain factual errors, logical inconsistencies, or biases that reflect the shortcomings of their training data (Zhao et al., 2021).

Human ability, on the other hand, is characterized by a rich tapestry of cognitive skills that extend far beyond the mere generation of text. Critical thinking, the ability to analyze information from

multiple perspectives, question assumptions, and draw well-reasoned conclusions, is a quintessential human trait that generative AI has yet to fully replicate (Paul & Elder, 2019). Education, at its core, aims to cultivate these higher-order cognitive abilities, which are essential for navigating complex real-world challenges and driving innovation.

Moreover, human ability encompasses the nuanced understanding of context and cultural nuances that are often overlooked or misinterpreted by AI systems. The richness of human experience, shaped by diverse backgrounds, perspectives, and lived realities, imbues individuals with a depth of understanding that transcends the mere processing of data (Srinivasan & Ratan, 2022). This contextual awareness is crucial in educational settings, where the transfer of knowledge extends beyond the mere transmission of information and delves into the realms of empathy, cultural sensitivity, and ethical decision-making. Creativity, the ability to generate novel and original ideas, is another vital human ability that generative AI struggles to fully replicate. While language models can produce innovative combinations of existing concepts, true creativity often stems from the ability to challenge existing paradigms, transcend conventional boundaries, and synthesize disparate ideas in unexpected ways (Boden, 2004). Education plays a crucial role in nurturing and fostering this creative capacity, which is essential for driving progress across various disciplines and addressing complex societal challenges.

Furthermore, human ability encompasses the interpersonal and communication skills that are fundamental to effective teaching and learning. The art of engaging students, adapting to their unique learning styles, fostering a positive and inclusive learning environment, and providing meaningful feedback and mentorship requires a level of emotional intelligence and social awareness that generative AI has yet to master (Mayer & Salovey, 1997). These human qualities are essential for creating an educational experience that transcends the mere transfer of knowledge and fosters personal growth, self-discovery, and a lifelong love for learning. It is important to note that acknowledging the importance of human ability does not negate the potential benefits of generative AI in education. Rather, it calls for a balanced approach that recognizes the complementary strengths of human and machine intelligence. By offloading routine tasks and content generation to AI systems, educators can dedicate more time and energy to cultivating the quintessentially human abilities that are vital for a well-rounded and transformative educational experience (Brynjolfsson & McAfee, 2014). Ultimately, the true power of generative AI in

education lies in its ability to augment and enhance human capabilities, not replace them. By embracing a symbiotic relationship between human ability and AI, educational institutions can pave the way for a future where technology serves as a catalyst for unlocking the full potential of human ingenuity, fostering critical thinking, creativity, and a deep appreciation for the richness of the human experience.

Prompt Engineering as a Pedagogical Tool

As generative AI systems become increasingly prevalent in educational settings, the practice of prompt engineering emerges as a powerful pedagogical tool. Prompts, which serve as the textual instructions or queries that guide the behavior and outputs of language models, and is also essential in molding learning experience (Zhong et al., 2022). By carefully crafting prompts that align with specific learning objectives, educators can leverage on the influence of generative AI while retaining control over the educational narrative. Well-designed prompts can foster critical thinking, encourage creativity, and reinforce conceptual understanding, rather than merely eliciting regurgitated information (Stiennon et al., 2020). Engaging learners in the process of prompt engineering itself can serve as a valuable learning experience. By involving students in the development and refinement of prompts, educators can nurture a range of essential skills, including problem formulation, logical reasoning, and effective communication with AI systems (Gao et al., 2022). This collaborative effort between human and machine can foster a deeper understanding of the underlying concepts, while also cultivating a healthy skepticism and critical evaluation of AI outputs. Moreover, the iterative nature of prompt engineering mirrors the scientific process, reinforcing the importance of hypothesis testing, experimentation, and continuous refinement – skills that are crucial for success across various disciplines (Reynolds & Lewis, 2017).

Furthermore, prompt engineering can be seamlessly integrated into various educational contexts, spanning subjects such as writing, coding, mathematics, and scientific inquiries. For instance, in a writing course, students could craft prompts that encourage the generation of creative narratives or persuasive essays, while simultaneously learning to provide clear and concise instructions to the AI system (Clark et al., 2021). In a computer science class, prompts could be used to generate code snippets, explain programming concepts or provide debugging exercises, fostering computational thinking and problem-solving skills (Hendrycks et al., 2021). The versatility of prompt engineering as a pedagogical tool opens a wealth of opportunities for innovative and

engaging learning experiences across the curriculum. Beyond subject-specific applications, prompt engineering can also serve as a means to cultivate metacognitive skills and self-regulated learning strategies. By reflecting on the effectiveness of their prompts and iteratively refining them, learners can develop profound perception of personal ideas, thoughts, soundness, and areas for improvement (Zimmerman & Schunk, 2011). Metacognitive awareness is crucial for effective self-directed learning, enabling students to monitor their progress, identify knowledge gaps, and adapt their learning strategies accordingly.

Moreover, prompt engineering can facilitate personalized and adaptive learning experiences. By analyzing the responses generated by language models, educators can gain insights into individual students' understanding and tailor prompts accordingly (Ruan et al., 2022). This data-driven approach can help identify areas where students may be struggling or excelling, allowing for targeted interventions and personalized learning paths. Additionally, prompts can be designed to cater to different learning styles and preferences, enhancing engagement and motivation among diverse learners.

It is important to note, however, that effective prompt engineering requires a deep understanding of the capabilities and limitations of generative AI systems. Educators must be skilled in crafting prompts that elicit the desired responses while mitigating the risks of generating biased, inaccurate, or inappropriate content (Weidinger et al., 2022). Ongoing professional development and training in prompt engineering best practices are crucial to ensure the responsible and effective integration of these tools into educational contexts. Ultimately, prompt engineering represents a powerful pedagogical tool that can unlock the maximum capacity of generative AI in education. By actively involving learners in the process of crafting and refining prompts, educators can foster a range of essential skills while simultaneously leveraging the power of AI to enhance learning experiences. However, a nuanced understanding of the capabilities and limitations of these systems, coupled with a commitment to responsible and ethical practices, is paramount to ensure that prompt engineering serves as a catalyst for transformative and enriching educational experiences.

Ethical Frameworks and Responsible AI Use

As the alliance of generative AI and educational contexts gain momentum, it is imperative to establish robust ethical frameworks and guidelines to ensure responsible and judicious use. The

rapid pace of technological advancement has outpaced the growth of comprehensive policies and best practices, leaving educators and learners grappling with a myriad of ethical concerns and potential pitfalls (Reddy et al., 2023). One of the primary ethical considerations surrounding the use of generative AI in education is the potential for academic dishonesty and plagiarism. With the ability to generate coherent and contextually relevant text, there is a risk that students may misuse these tools to produce assignments or projects without proper attribution or understanding (Winder & Uppal, 2023). This threat to academic integrity undermines the very essence of education, which aims to cultivate critical thinking, intellectual honesty, and a genuine thirst for knowledge. Moreover, generative AI systems are not immune to biases and inaccuracies, reflecting the limitations and flaws of the data they are trained on. The propagation of misinformation, stereotypes, or discriminatory content through AI-generated outputs could potentially reinforce harmful biases and undermine inclusivity in educational environments (Mehrabi et al., 2021). Addressing these biases and ensuring the responsible use of AI systems is crucial to creating equitable and inclusive learning experiences.

Privacy and data protection are also significant ethical concerns when integrating generative AI into educational settings. These systems often require access to enormous size of data, including student information and personal details, prompting inquiries about data privacy, consent, and potential misuse of sensitive information (Voigt & Von dem Bussche, 2017). Robust data governance frameworks and transparent policies are essential to safeguard the privacy rights of learners and educators. To navigate these ethical challenges, collaborative efforts between educators, technologists, policymakers, and ethical experts are necessary. Developing comprehensive guidelines and best practices for the prudent utilization of generative AI in education is crucial. These guidelines should address concerns such as academic integrity, confidentiality, fairness, and appropriate use of AI-generated content (Whittaker et al., 2018).

Additionally, promoting the practice of standard AI use within educational institutions is paramount. It can be achieved through ongoing training and professional development programs that equip educators and learners with the knowledge and skills needed to critically evaluate AI outputs, identify potential biases or inaccuracies, and understand the ethical implications of these technologies (Schiff et al., 2020). Encouraging open dialogue and debate around ethical AI use can also promote a more nuanced understanding of the challenges and opportunities presented by

these tools. Ultimately, the responsible integration of generative AI within education requires delicate harmony amidst leveraging the benefits of these powerful tools and upholding the fundamental principles of ethical conduct, academic integrity, and respect for human agency. By embracing a proactive and collaborative approach to developing ethical frameworks and guidelines, educational institutions can pave the way for a future where AI augments and enhances the learning experience while preserving the core values that underpin the pursuit of knowledge and intellectual growth (Floridi & Cowls, 2019).

Human-AI Collaboration in Education

As the integration of generative AI into educational contexts gains momentum, it is imperative to establish robust ethical frameworks and guidelines to ensure responsible and judicious use. The rapid pace of technological advancement has surpassed the development of comprehensive policies and best practices, leaving educators and learners grappling with a myriad of ethical concerns and potential pitfalls (Reddy et al., 2023). One of the primary ethical considerations surrounding the use of generative AI in education is the potential for academic dishonesty and plagiarism. With the ability to generate coherent and contextually relevant text, there is a risk that students may misuse these tools to produce assignments or projects without proper attribution or understanding (Winder & Uppal, 2023). This threat to academic integrity undermines the very essence of education, which aims to cultivate critical thinking, intellectual honesty, and a genuine thirst for knowledge.

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To navigate these ethical challenges, collaborative efforts between educators, technologists, policymakers, and ethical experts are necessary. Developing comprehensive guidelines and best practices for the responsible use of generative AI in education is crucial. These guidelines should address issues such as academic integrity, privacy protection, bias mitigation, and the appropriate use of AI-generated content (Whittaker et al., 2018). Additionally, fostering a culture of ethical AI use within educational institutions is paramount. This can be achieved through ongoing training and professional development programs that equip educators and learners with the knowledge and skills needed to critically evaluate AI outputs, identify potential biases or inaccuracies, and understand the ethical implications of these technologies (Schiff et al., 2020). Encouraging open dialogue and debate around ethical AI use can also promote a more nuanced understanding of the challenges and opportunities presented by these tools. Ultimately, the responsible integration of generative AI into education requires a delicate balance between leveraging the benefits of these powerful tools and upholding the fundamental principles of ethical conduct, academic integrity, and respect for human agency. By embracing a proactive and collaborative approach to developing ethical frameworks and guidelines, educational institutions can pave the way for a future where AI augments and enhances the learning experience while preserving the core values that underpin the pursuit of knowledge and intellectual growth (Floridi & Cowls, 2019).

Conclusion

In conclusion, the emergence of generative AI in education presents both challenges and opportunities. While the potential benefits are undeniable, it is crucial to recognize the limitations of these systems and the irreplaceable value of human ability. By embracing a strategic approach to prompt engineering and fostering a culture of critical thinking, educators and learners can exploit the power of generative AI while preserving essence of human ingenuity, ultimately paving the way for a transformative and enriching educational experience. Educators and learners must cultivate a critical mindset, questioning the outputs of these systems, cross-referencing with authoritative sources, and exercising sound judgment in their application.

Recommendations

To truly channel the potential of generative AI in education while preserving the invaluable role of human ability, a multifaceted approach is necessary. Educational institutions should invest in comprehensive training programs that equip educators with the skills to critically evaluate AI outputs, identify potential biases or inaccuracies, and effectively integrate these tools into their teaching methodologies. Furthermore, curricula should be redesigned to incorporate modules on prompt engineering, encouraging students to develop proficiency in formulating precise and contextually relevant prompts that align with learning objectives. By actively involving learners in this process, it will also enable them to have deepened understanding of core concepts and cultivate essential skills such as logical reasoning, problem-solving, and effective communication with AI systems.

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