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Scholarly Essay

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Ten Myths About Artificial Intelligence in Education

Louie Giray, LPT, MC
Colegio de Muntinlupa, Muntinlupa City, Metro Manila, Philippines
https://orcid.org/0000-0002-1940-035X

Contact: *pupgiray@gmail.com*

Abstract

Objectives: I analyze, deconstruct, and debunk prevalent misconceptions about artificial intelligence (AI) in education.

Methods: This study identifies and presents ten common myths about AI in education, followed by concise explanations that counter each myth with the corresponding reality, relying on credible sources and evidence.

Results: AI does not replace educators; it lacks the vital human qualities crucial for effective learning experiences. Thus, it can complement rather than substitute for educators. Physical classrooms remain pivotal for fostering student engagement, an element AI cannot fully replicate, challenging the notion of AI replacing the need for traditional classrooms. Despite excelling in specific tasks, AI lacks human cognitive characteristics such as understanding and creativity, which counters the belief that AI is smarter than people.

Conclusions: Dispelling these myths can help pave the way for a more nuanced, responsible, and beneficial integration of AI in the realm of education. This ensures that its influence aligns with constructive pedagogical goals and contributes to societal advancement. The strengths of AI can be leveraged to empower a more inclusive, equitable, and effective education for all.

Implications for Practice: Educators are advised to be informed about the realities of AI in education to counter misconceptions and make informed decisions about its integration. Policymakers should also allocate resources for educator training in AI use, aiming for proficiency and confidence in incorporating these technologies into educational methodologies.

Keywords: *AI myths, artificial intelligence, artificial intelligence in education, technology*

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Introduction

The pervasive influence of artificial intelligence (AI) is undeniable. Its presence permeates society, stretching into diverse domains, notably education. Gates (2023), in a proclamation marking the commencement of the AI age, underscored its burgeoning influence, a sentiment echoed by numerous scholars and industry leaders.

Giray (2023a) emphasized AI's perceptible impact, particularly in academic pursuits and research, reflecting the evolution of AI's role in shaping educational landscapes.

However, myths about AI in education have thrived and have often become ingrained as truths. These pervasive misconceptions form the crux of a narrative that demands critical examination. Moon (2009) aptly framed myths as prescientific endeavors that offer explanations for unexplored phenomena. Similarly, Natale and Ballatore (2020) elaborated on the construction of the AI myth, highlighting the analogies, rhetorical projections into the future, and the controversies surrounding AI claims.

The discourse around digital technologies, AI chief among them, can create modern myths, often with references to utopian possibilities (Brevini, 2021). However, such idealistic portrayals often mask the inherent dangers of misconceptions about AI. De Saint Laurent (2018) noted the perilous consequences of the presumption that AI can remain neutral and unbiased. These misconceptions can lead to the avoidance of critical debate, the normalization of biases, and the absolution of accountability from both creators and users. Falk (2020) contributed a vital perspective by highlighting the myth of AI's superhuman potential, which often obfuscates the more imminent challenge of artificial stupidity. This form of AI could supplant, subjugate, or deceive human users, posing a substantial threat that requires attention and discussion (Giray et al., 2024).

In spite of the readily available AI tools in education, persistent myths continue to influence pedagogical approaches, policymaking, and perceptions regarding AI's potential within academic environments. Dispelling these misconceptions is crucial to understanding AI's capabilities and adeptly integrating it into education. Addressing prevalent myths about AI in education is essential, necessitating an enlightening discussion to debunk these misconceptions. Hence, in this paper, I discuss these myths, their origins, and the importance of countering them.

Ten Myths

Myth 1: AI Will Replace Teachers and Other Education Workers

Many people think that AI will replace teachers and other people who are working in education. However, this overlooks the intricate human touch essential to education. To be specific, AI lacks the capacity for bodily presence (Felix, 2020), for imparting existential reflections, norms, values, or a comprehensive understanding of self, history, and society—inherently human characteristics.

Highlighting the irreplaceable role of humans in education, AI-enabled teaching–learning processes cannot fully replace the dynamic interactions and immediate feedback inherent in face-to-face education (Malik & Solanki, 2021). While AI systems facilitate skill acquisition and conceptual understanding, they cannot fully replace the multifaceted roles of teachers and education workers (du Boulay, 2016). AI lacks the empathetic and nuanced interactions that human teachers and education workers offer, such as emotional support, mentorship, and adapting teaching methods to idiosyncratic situations.

Karsenti (2019) emphasized the urgency of preparing teachers for AI integration in classrooms, recognizing AI's potential benefits but underscoring its inability to replicate essential human qualities. Alam (2021) warned against the thinking that AI can entirely replace teachers, cautioning that AI's effectiveness in education relies heavily on high-quality data and may exacerbate existing inequalities. Specifically, biased data used to train AI systems may perpetuate and amplify societal biases, leading to discriminatory outcomes, particularly affecting marginalized students. Moreover, access to AI technologies is often limited to privileged communities, widening the digital divide and hindering opportunities for socioeconomic advancement for disadvantaged populations.

Despite its potential to optimize specific aspects of education, AI falls short in replicating the intricate human dimensions essential to education. AI cannot fully encompass the multifaceted expertise and indispensable human qualities integral to the role of educators and other education workers. This affirms the enduring value of human involvement in education, especially in fostering the nuanced understanding, interactions, and empathetic connections vital for effective learning experiences. Education not only fosters academic growth, it also nurtures emotional intelligence and social cohesion, both of which are essential for thriving individuals and societies.

Myth 2: AI Will Replace the Need for Classrooms

The prevailing belief that AI will replace classrooms stems from the transformative promises within Education 4.0 that emphasize AI's potential to revolutionize learning (Sharma, 2019). This vision of a future with more personalized, portable, and globally accessible education inadvertently fuels the misconception that physical classrooms might become obsolete.

The appeal of AI's personalized learning experiences further contributes to the notion that traditional classrooms could be dispensable. However, evidence from Kariippanon et al. (2019) emphasizes the vital role of classrooms in fostering student interaction, collaboration, and behavioral engagement. Bartu (1991) underscored that classrooms are vital social spaces, with their dynamics significantly influencing educational outcomes.

Parambil et al. (2022) recognized AI's capacity to transform classroom practices, especially in monitoring attention and behavior. However, they acknowledge AI's limitations in completely replacing physical learning spaces, advocating a collaborative approach whereby AI complements rather than entirely supplants traditional classroom settings.

Despite remarkable advancements in AI technology, the social, emotional, and interactive dimensions offered by physical classrooms remain indispensable. These spaces continue to play a crucial role in nurturing social interactions and fostering emotional development in ways that AI cannot, thus firmly establishing their significance alongside the potential benefits offered by AI in educational settings.

Myth 3: AI is Smarter Than People

The pervasive belief that AI outstrips human intelligence is perpetuated primarily by media narratives. Although AI excels in specific domains, such as data analysis and pattern recognition, it lacks the nuanced understanding and adaptive intelligence inherent in human cognition (Marcus, 2018). Marcus highlighted AI's limitations, emphasizing its inability to comprehend context, display genuine creativity, or possess consciousness—fundamental aspects of human intelligence. Similarly, Tegmark (2017) noted AI's lack of consciousness and inner experiences, which renders it incapable of authentic agency.

Contrary to the myth, while AI may exhibit traits similar to the human mind, it does not universally surpass human intellect (Wang et al., 2018). In fact, Dell'Acqua et al. (2024) proposed that AI's capabilities give rise to a *jagged technological frontier,* which refers to the scenario in which AI can effectively perform certain tasks, while others—despite appearing to be only equally challenging—are currently beyond AI's capabilities.

However, combining AI with human expertise, especially in deep learning, enhances performance and creates value, harnessing AI's power alongside human domain knowledge (Mahmud et al., 2022). This symbiotic relationship demonstrates that, while AI brings computational advantages, it is the interface with human understanding that maximizes its potential.

Myth 4: AI Can Teach Everything

AI is often overestimated, implying it is all-knowing, but this belief does not hold true. AI lacks common sense knowledge (Levesque, 2017), for example, which is crucial for handling novel situations that diverge from established patterns. In actuality, of course, no single human being has a monopoly on knowledge, so it follows that neither could AI. Nevertheless, many people tend to inflate AI's prowess, treating it as an almost magical tool. As Domingos (2015) underscored, however, AI's proficiency is confined within certain boundaries: it excels in specific tasks but is constrained by its limitations.

Marcus and Davis (2019) emphasized AI's struggle with common-sense comprehension and contextual understanding, essential for a well-rounded education. Boden (2016) further solidified this notion, arguing that AI fails to replicate human creativity, emotional intelligence, and the nuanced interactions vital in fields like art, music, values, and physical education. AI can never fully replicate human emotions, such as empathy, love, or grief, as these are deeply rooted in personal experiences and consciousness (Zimmerman et al., 2023). Additionally, AI may struggle with creativity, in the sense of original thought or artistry that stems from unique human perspectives and emotions (Aris et al., 2023). Lastly, ethical decision-making and moral reasoning can be challenging for AI, as these often require complex value judgments and cultural context that may not be easily quantifiable or replicable by algorithms alone (Alvarado, 2023). In fact, Himmelreich (2023) asserted that democratizing AI may lead to injustices, moral oversights, and impracticality.

While AI excels in domains like data analysis and pattern recognition, it falters when human creativity, emotional depth, and holistic comprehension are imperative. Thus, AI could never replace a comprehensive education encompassing such dimensions of diverse subjects.

Myth 5: AI Can Solve All Educational Problems

The allure of technological solutions contributes to the propagation of the myth of AI as a panacea for all issues within the educational sphere. Currently, education faces various challenges that extend beyond the scope of what AI can widely address. Issues such as unequal access to quality education due to socioeconomic disparities, the need for personalized learning experiences catering to diverse student needs, and the adaptation to rapidly evolving technology in educational settings are prominent concerns (Wang et al., 2024).

Providing mental health support for students, fostering critical thinking skills, and preparing students for a rapidly changing job market are also pressing challenges that require human insight and intervention (Batubara, 2021). Furthermore, teaching ethics, moral values, and social responsibility require nuanced human qualities like subjective interpretation and moral reasoning—attributes beyond AI's capacity. These limitations call attention to AI's inadequacy in imparting vital aspects of education that require human understanding and judgment (Floridi, 2023).

Contrary to the misconception that AI can independently revolutionize education, its true potential lies in integration within a holistic educational framework. To maximize AI's impact, a vision of the intersection of human educators and AI tools as a collaboration is crucial. In such a symbiotic relationship, effective education is multifaceted, benefiting from the fusion of human expertise with AI's capabilities (Russell, 2019).

Myth 6: AI Is Too Complex for Educators

Navigating the realm of AI in education can be a daunting prospect for those new to the field. The pervasive notion that AI is too intricate for educators to harness often stems from misinterpretations, so this belief requires reassessment. Du Boulay (2018) challenged this view by emphasizing the adaptability and user-friendliness of AI tools in educational contexts. Educators might overlook the wide array of accessible AI-driven resources, like ChatGPT or Bing, which allow users to input questions and receive prompt answers. Such examples illustrate the simplicity and potential applicability of AI tools in educational settings.

Zimmerman (2020) offered practical examples of integrating AI seamlessly into lesson plans, hence promoting deeper understanding among educators. Moreover, as AI continues to evolve, advancements in user interfaces and educational AI platforms, such as interactive simulations and personalized learning systems, are making AI integration even more straightforward and beneficial for educators (An et al., 2023).

Furthermore, real-world success stories demonstrate the ease of AI integration into educational practices. Consider the implementation of adaptive learning platforms such as Khan Academy or Duolingo. These platforms employ AI algorithms to personalize learning experiences for students, catering to individual strengths and weaknesses. Educators witness firsthand how AI, without demanding intricate technical knowledge, enhances student engagement and performance. Such instances serve as tangible evidence that AI, when intelligently employed, offers a supportive and adaptable toolset that educators can readily use to amplify their teaching methodologies.

Myth 7: AI is Always Objective

Many hold the misconception that AI possesses inherent objectivity, but AI is not immune to fallibility: it can mirror the biases of its creators embedded in the datasets it learns from. For instance, when AI algorithms are trained on biased data, such as gender-skewed datasets, they tend to perpetuate these biases in their outputs (Wellner, 2020).

In 2018, Amazon discontinued a secretive AI recruiting tool, due to its bias against women. Trained on résumés submitted predominantly by men over a decade, the system exhibited a preference for male candidates. It penalized résumés containing terms such as "women's" or graduates from all-women's colleges, perpetuating gender biases in recruitment (Dastin, 2018). This example highlights potential concerns if AI were used in teacher recruitment.

When asked to generate an image of a scientist, teacher, or criminal, an AI often depicts a White male scientist, a White female teacher, and a Black male criminal, reflecting biases in training data and societal perceptions (Sham et al., 2023). Similarly, language models such as GPT-3 have been criticized for generating biased or inappropriate content based on input prompts, highlighting ongoing challenges in mitigating biases in AI-generated outputs (Landers & Behrend, 2023). If AI-driven educational platforms or tools rely on biased data or algorithms, they may perpetuate stereotypes and reinforce inequities in educational opportunities. Biased content generated by AI language models such as GPT-3 can also impact educational materials and assessments, potentially influencing students' perceptions and learning outcomes based on their backgrounds or identities.

Meanwhile, Liang et al. (2023) reported consistent misclassifications by GPT detectors, revealing inherent biases against non-native English writers. False positives occur when content created by a human is mistakenly classified as being generated by AI, due to similarities in language patterns or other criteria used by the detection system (Dalalah & Dalalah, 2023). This may occur because non-native speakers use common English words, leading AI detectors to give a low perplexity score and incorrectly flag the text as AI-generated. Despite the text being authored by a human, the detectors' reliance on simplistic criteria can result in misleading classifications.

Expanding on this issue, Yapo and Weiss (2018) delved into the ethical implications of biases in machine learning. They emphasize that biases in AI and machine learning algorithms can both benefit and harm individuals, emphasizing the need for inclusivity and stakeholder awareness during the design phase, in order to protect vulnerable groups.

AI's objectivity hinges on the quality and diversity of the data it learns from, making AI susceptible to developer biases that affect its outcomes (Giray, 2023b). These limitations highlight the need for diverse and unbiased datasets and a heightened ethical consciousness in AI development and application.

Myth 8: AI is Expensive

The belief that AI is inherently expensive overlooks the plethora of affordable resources accessible to educators. The initial high costs associated with AI development and integration have fueled this misconception. Today, however, a closer examination reveals numerous free and affordable AI tools beneficial to teachers, enhancing productivity and teaching methodologies. OpenAI's offerings, such as DALL·E 2 for image generation and ChatGPT for conversational interfaces, are just two examples of cost-effective AI resources available to educators. Similarly, Bard and Google AI-infused apps provide a range of free tools encompassing natural language processing, machine learning, and computer vision, empowering educators to improve teaching practices. Additionally, Synthesia and Murf.ai offer video and voice generation capabilities at affordable rates, showcasing the accessibility of advanced AI functionalities for teachers.

Software tools such as SaneBox and Decktopus, powered by AI, streamline email management and aid in creating engaging presentations, benefiting teachers in their daily tasks. Meanwhile, Quizizz, designed for educators, enables them to create personalized quizzes that adapt learning paths based on individual student responses. Its AI capabilities adjust question difficulty, perform grammar checks, and redesign questions to reflect real-world scenarios, and it continues to evolve with additional features. Moreover, Character AI, a neural language model chatbot service, replicates human conversations and generates text responses, which can be used to improve language comprehension and communication skills.

These diverse AI tools, which can be accessed in just one click, not only debunk the notion of AI exclusivity, but also demonstrate how they can significantly enhance teachers' productivity and teaching methodologies. Whether automating administrative tasks or improving content creation, these AI resources are accessible and affordable and can provide valuable support to educators, empowering them to elevate their teaching practices and efficiency.

However, despite the availability of free plans for some AI tools, equity and accessibility issues persist. While these free versions can be helpful, they often lack advanced features or may be outdated compared to their paid counterparts. The most cutting-edge AI models, such as Claude and ChatGPT, typically require paid subscriptions for a modest monthly fee, but other popular tools, such as Quizizz and Synthesia, tend to have higher price points.

Myth 9: AI is Only for Science, Technology, Engineering, and Mathematics (STEM) Subjects

Many believe that AI is relevant only to STEM subjects. Certainly, AI is applicable in STEM—it aids in science education (Cooper, 2023) and learning mathematics (Hwang & Tu, 2021), and it enhances teaching in civil engineering (Manzoor et al., 2021). But AI is versatile: its influence extends into non-STEM domains and its applications cut across diverse fields. For example, AI fosters social-emotional skills among individuals with autism, through virtual companions (Hughes et al., 2022), and it revolutionizes physical education in colleges (Fu, 2020). It is also instrumental in cultivating ethical thinking (Bae et al., 2022), promoting cooperative problem-solving (Lee, 2021) and even transforming political science education (Khalifa, 2022). Additionally, AI plays a significant role in healthcare education (Randhawa & Jackson, 2020) and enhances music education, elevating student performance compared to traditional methods (Hu, 2021). These studies collectively showcase AI's broad spectrum of applications, challenging the notion that it is confined to STEM alone. The myth that AI is exclusively tied to STEM subjects is simply not true, which is ably established by the abundance of research demonstrating its successful use across diverse domains.

Myth 10: AI is a Threat to Schools

The myth that AI threatens schools often stems from apprehensions regarding its unintended consequences or potential for misuse. The fundamental understanding that AI is not inherently malevolent is therefore critical to its use in education; the impact of AI hinges primarily on its ethical implementation and responsible human oversight. Reiss (2021) and Wang (2021) delved into the practical and ethical aspects of AI in education and its potential benefits: enriching student learning, aiding decision-making for educational leaders, and streamlining educational processes. Yet these studies also caution against AI misuse, which could perpetuate biases, compromise data security, or even challenge moral values. AI must be implemented ethically and monitored vigilantly.

Although AI unquestionably enhances efficiency and cost-effectiveness in schools (Humble & Mozelius, 2022), schools must not lose sight of the technology's limits and the indispensable role of teachers. Chiu and Chai (2020) underscored the teacher's pivotal role in shaping student learning experiences, emphasizing the need for a balanced approach whereby AI complements rather than supplants human teaching.

Success lies in striking a balance—acknowledging AI's potential to enhance schools while honoring the fundamental role of educators in shaping the educational landscape. AI can bridge gaps, reinforce learning experiences, and streamline administrative tasks. Nevertheless, schools must maintain a human-centric approach and be vigilant against the dangers of excessive reliance on technology.

Table 1. *Summary of Myths and Realities About AI in Education*

No.	Myth	Reality
1	AI will replace teachers and other education workers.	AI lacks the capacity for human interaction, empathy, and nuanced understanding crucial for fostering effective learning experiences, thus complementing rather than replacing educators.
2	AI will replace the need for classrooms.	Physical classrooms play a vital role in fostering student interaction and emotional engagement, elements that AI cannot fully replicate.
3	AI is smarter than people.	While excelling in specific tasks, AI lacks the comprehensive understanding, creativity, and consciousness inherent in human cognition.
4	AI can teach everything.	AI's proficiency is limited; it cannot replicate human emotional depth or holistic comprehension essential in education.
5	AI can solve all educational problems.	Even with effective AI integration, AI cannot address multifaceted issues, such as socioeconomic disparities or personalized learning needs, without human intervention.
6	AI is too complex for educators.	AI is not inherently complex. Its tools are user-friendly and accessible, and educators need support to learn and utilize them.
7	AI is always objective.	AI systems can reflect biases from their creators and datasets, problematizing their objectivity and emphasizing the need for diverse, unbiased data and ethical considerations.
8	AI is expensive.	Various affordable or free AI resources are accessible to educators, debunking the notion of AI exclusivity due to costs.
9	AI is only for STEM.	AI significantly influences diverse fields beyond STEM, in areas such as social-emotional learning and ethics.
10	AI is a threat to schools.	AI enhances efficiency but requires ethical implementation and oversight. It complements but does not replace the fundamental role of educators in quality education.

Conclusion

Navigating the landscape of AI in education demands understanding and a nuanced perspective. Addressing the prevalent myths surrounding AI's role in academic environments is central to ensuring that its integration aligns with constructive educational goals and societal advancement. The myths outlined above, from AI replacing teachers to its alleged threat to traditional schooling, have been debunked through a critical lens. Educators must recognize that, while AI presents remarkable capabilities, it remains complementary to, not a substitute for, human educators.

Understanding the limitations of AI is as crucial as acknowledging its potential. AI lacks the multifaceted capacities inherent in human cognition, which are fundamentally necessary to effective education. Moreover, it cannot single-handedly resolve all educational challenges, particularly those rooted in social disparities. Nevertheless, this article makes apparent the tremendous benefits of integrating AI, which serves as a powerful tool, enhancing efficiency, supporting educators in various disciplines beyond STEM, and democratizing access to resources previously deemed too expensive.

Moving forward, it is essential to inform policymakers, educational institutions, and educators themselves about the benefits of a responsible and well-informed AI integration strategy. Advocating for diverse, unbiased data and ethical considerations in AI development is critical to ensuring its objectivity and fairness in educational settings. The call to action lies in fostering an informed dialogue. Educators should receive support and training to utilize AI tools effectively. Policymakers must craft frameworks that balance innovation with ethical oversight, ensuring the responsible integration of AI into educational systems.

By dispelling these myths, we can pave the way for a more nuanced, responsible, and beneficial integration of AI in the realm of education, ensuring that its influence aligns with constructive pedagogical goals and contributes to societal advancement. Lastly, by embarking on this journey together, we leverage the combined strengths of educators and AI to empower a more inclusive, equitable, and effective education for all.

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