Paradoxes of Generative AI:
Both Promise and Threat to Academic Freedom

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Abstract

Integrating generative artificial intelligence (AI) into education offers promising opportunities for dynamic learning experiences yet raises ethical concerns regarding data privacy, algorithmic bias, and threats to academic freedom. This article explores the paradoxical tensions arising from AI's impact on academic institutions, examining the challenges educators and the industry face. By extending paradox theory into education, the study identifies and classifies these tensions, including concerns about AI's displacement of human roles and discrimination. It focuses a novel lens on complex issues within the industry, providing educators with a structured approach to navigate these challenges and equipping them to harness technological advancements responsibly in their classrooms.

Generative artificial intelligence (AI), with its capacity to produce content resembling human-generated material, is increasingly finding its way into the classroom (Williams et al. 2023). In STEM subjects, generative AI platforms facilitate problem-solving exercises and simulations, offering students dynamic learning experiences (Alasadi and Baiz 2023). Educators are integrating generative AI into creative disciplines like art and literature, where students can co-create new artworks or narratives (Epstein, Hertzmann, and Investigators of Human Creativity 2023). Some school systems even incorporate generative AI into student assessment practices (Smolansky et al. 2023). While these varied applications offer promising opportunities to enhance learning outcomes, they also raise ethical considerations regarding data privacy, algorithmic bias, and the continued role of humans as educators (Luckett 2023). The issue of generative AI's impact on academic freedom is particularly urgent, as reflective bias and misinformation may unintentionally shape the discourse. Therefore, as generative AI permeates our educational institutions, academics and policy makers must navigate these tensions thoughtfully and ethically to ensure responsible integration of generative AI into practice.

AI algorithms, often trained on input data that reflect existing societal norms and biases, risk perpetuating discriminatory tendencies (Dautov et al. 2023). This poses a significant challenge to academic freedom, as AI-driven systems may inadvertently reflect and reinforce biased societal constraints (Singh 2023). Such biases can manifest in various forms, including but not limited to

gender, race, sexual orientation, socioeconomic status, and cultural background. Biased algorithms have led to documented examples of wrongful arrest (Hill 2022) in the criminal justice system. Consequently, the use of AI in academic contexts demands scrutiny and proactive measures to mitigate any perpetuation of discriminatory biases, safeguarding the principles of academic freedom and fostering an inclusive scholarly environment.

Academic institutions' challenge in navigating the use of generative AI embodies a paradoxical tension. Paradox theory highlights conflicting objectives within organizations and underscores the need for effective management to ensure organizational success. Paradoxes consist of "contradictory yet interconnected elements that coexist simultaneously and endure over time" (Smith and Lewis 2011, 386). Despite increasing attention paid to generative AI's role in education, minimal extant research explicitly applies paradox theory to contextualize the technology's risks to academic freedom. Our study aims to fill this gap by identifying and categorizing tensions surrounding AI's impact on human roles, data privacy, security concerns, and the potential for discrimination due to systemic bias. By extending paradox theory into education, our research offers a fresh perspective on complex issues within the industry and contributes to the growing literature on AI and technological bias.

Literature Review

Bias and Misinformation through Generative AI

Misinformation, often originating from bias, hampers consensus-building around factual information (West and Bergstrom 2021). Misinformation is "information considered incorrect based on the best available evidence from relevant experts at the time" (Vraga and Bode 2020, 138). Generative AI exacerbates the presence of misinformation by synthesizing misleading content across media platforms, with impacts on various domains, including pandemic responses, agriculture, and democracy (Kreps and Kriner 2023; Baines and Elliott 2020; Stroud 2019; Nisbet, Mortenson, and Li 2021; Watts, Rothschild, and Mobius 2021). The hallucination effect in generative AI refers to the phenomenon where AI models generate false or misleading information, a problem exacerbated by misinformation as it contaminates the training data, leading AI systems to replicate and amplify inaccuracies (Shin, Koerber, and Lim 2024).

Biases in AI, caused by poor testing practices or algorithmic bias from limited training data and design, can perpetuate societal disparities, compromising fairness and reliability (Dautov et al. 2023; Wylie-Kellermann 2020). Addressing these flaws involves algorithm development transparency, quality audits, and external regulation (Daneshjou et al. 2021; Landers and Behrend 2023; Rego de Almeida, dos Santos, and Farias 2021). Generative AI's role in spreading misinformation is significant, with researchers noting the technology's malicious uses and its contributions to misinformation (Ferrara 2023; Xu, Fan, and Kankanhalli 2023). Challenges in detecting misinformation are compounded by inadequate filtering mechanisms and flawed

training data, calling for improved detection methods and policy-driven initiatives (Monteith et al. 2024; Shoaib et al. 2023).

Conversely, there is potential for using generative AI to combat misinformation. Techniques such as combining text analytics with user behavior and source indexing have shown promise in reducing misinformation spread (Patil et al. 2023). Studies on fake-news detection frameworks further underscore this potential (Hiriyannaiah et al. 2020). Additionally, generative AI is poised to enhance social science research through improved literature reviews and research methodologies (Bail 2023). While concerns about generative AI's misuse persist, its potential benefits for academia and society are significant.

Academic Industry Transformation

To date, a significant amount of literature has been authored on the overall impacts of generative AI and the transformation of our educational system. It is arguably one of the hottest research topics today across multiple domains. See Figure 1 for a trend line of published literature in the Scopus database related to the intersection of AI and education systems. Several comprehensive literature reviews from 2023 (see Bahroun et al. 2023; Baytak 2023; Bozkurt 2023; Ismail et al. 2023) highlight vital themes such as transformative effects on education, ethical considerations, technology adoption, and the absence of emotional intelligence in AI systems. These studies underscore the intensity and diversity of focus on emerging scholarship and the need to understand better the fast-moving impacts of AI's influence on teaching and learning.

Figure 1. Scopus Database Trend for Relevant Publications

Count of Scopus Publications by Year for Variants of AI and Education System
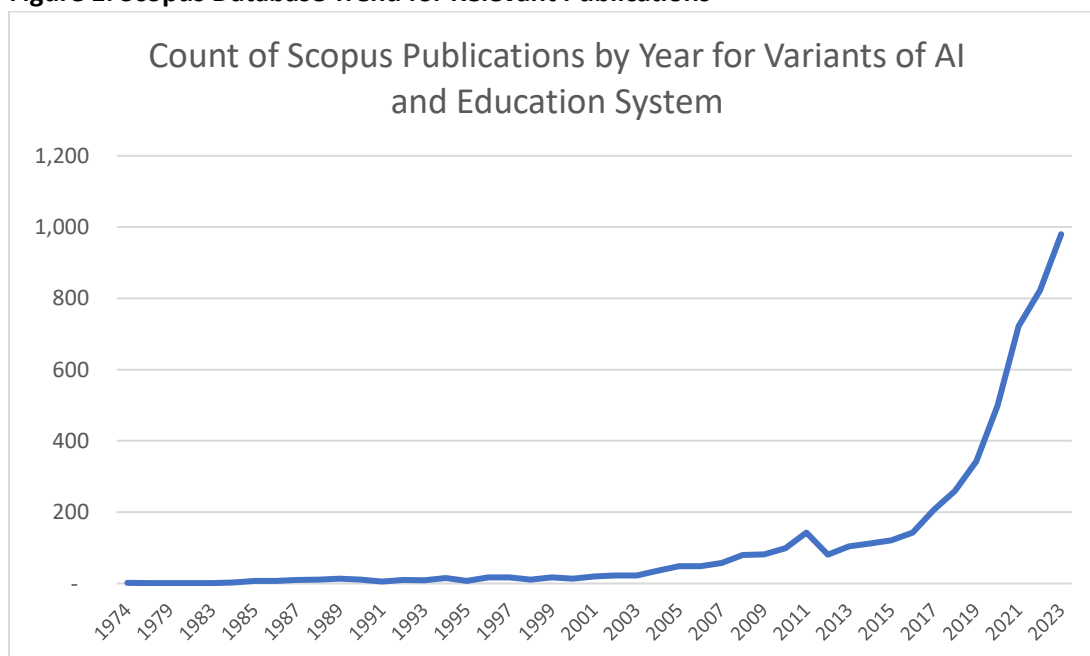
Extant research acknowledges that it is no longer a question of whether AI will affect the lives of students and educators but more a matter of when and how (Alasadi and Baiz 2023; Chiu 2024). In his book *Understanding Academic Freedom*, Henry Reichman (2021, 2) notes that the concept should be framed as a means to "investigate truth; critically to verify fact; to conclude using the best methods at command, untrammeled by external fear or favor, to communicate this truth to the student; to interpret to him its bearing on the questions he will have to face in life—this is precisely the aim and object of the university."

Adopting this frame to view the concept of academic freedom, we can better see how generative AI emerges as a risk to educators. Generative AI restricts the boundaries of knowledge through algorithmic bias and enables the success of lesser researchers by "supercharging their research" (Maslach 2023). Therefore, risks of misuse of generative AI quickly lead to plagiarism, inequity, loss of privacy, and challenges with our overall inability to detect the use of AI (Chesterman 2024; Dien 2023; Quay-de la Vallee 2023). Jacques Bughin (2023) explores the pervasive fear that generative AI tools will lead to massive job losses. Collectively, there is little incentive to stop the misuse of generative AI, which opens doors for bad actors within the educational system and continued efforts to prevent researchers using traditional, rigorous methods from succeeding.

Theoretical Grounding

Paradox theory proves adept in capturing the emergent tensions facing academics with risks to freedom, offering a forward-looking approach that advocates embracing tensions and adopting a "both/and mindset" (Smith and Lewis 2022). Wendy Smith and Marianne Lewis (2011) highlight the four primary categories of paradoxical tensions that can affect organizations. The *learning* paradox involves the tension between innovation and tradition, where there is a constant push to break away from the past to pursue new achievements. *Belonging* paradoxes arise from conflicts between individual and organizational values, often due to hierarchical structures. The *performing* category encompasses tensions stemming from competing goals that demand attention from stakeholders, adding a layer of complexity to decision-making. Finally, the *organizing* paradox reflects the challenges within organizational structures, where leadership roles can intensify the dynamics between collaboration and competition. It is argued that paradoxes persist due to the interdependence of their contradictory elements, and while managing these tensions through "either/or" solutions often leads to stagnation or defensiveness, advocating for a "both/and" approach that embraces the coexistence of tensions fosters adaptability and innovation (Schad et al., 2016).
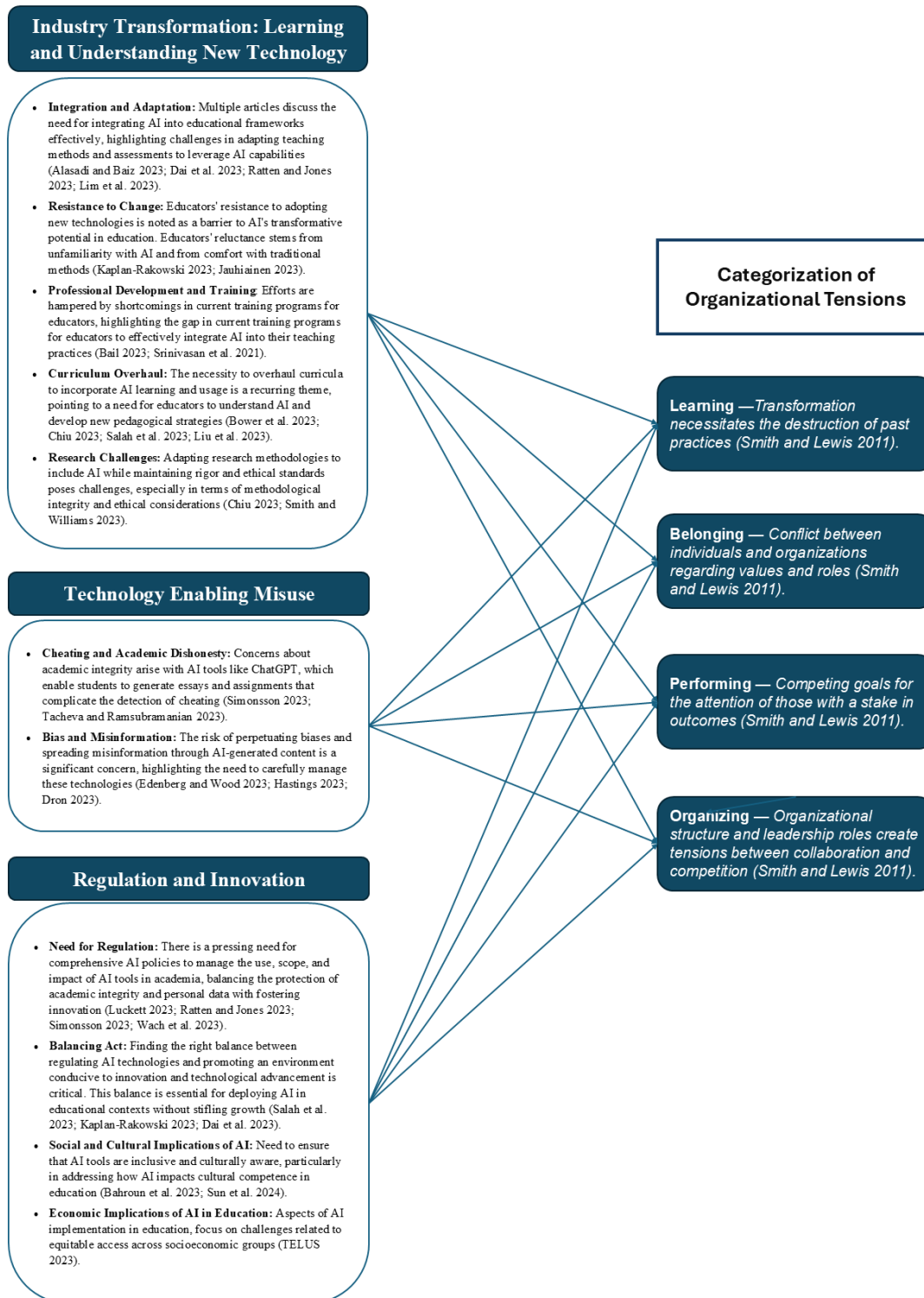
Methodology

Leveraging the emerging themes from my background review, my approach required that I review the literature on two primary streams: "academic transformation due to AI" and

"generative AI and bias." My goal was not a comprehensive review of all works; one can see the previously discussed systematic literature reviews. Instead, I reviewed research until theoretical saturation was reached on paradoxical tensions.[1] I reviewed relevant papers through full-text reviews to identify critical tensions inherent in the literature. Figure 2 presents an organized overview of this literature, categorizing the critical tensions into *learning*, *organizing*, *performing*, or *belonging*, categories delineated by Smith and Lewis (2011). The diversity and range of coded entries in figure 2 underscore the paradoxical tensions' intricate and interconnected nature.

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[1] Databases used for this analysis include EBSCO, JSTOR, and Google Scholar. *Academic Transformation Due to AI* used combinations of keywords: "Academy," "Education System," "School System," "Digital Transformation," "Generative AI," and "Artificial Intelligence." *Generative AI and Bias* used combinations of keywords "Bias," "Algorithmic Bias," "Artificial Intelligence," "Generative AI," and "Misinformation."

Figure 2. Generative AI and Education: Paradoxical Tensions Across Literature

Industry Transformation: Learning and Understanding New Technology

- **Integration and Adaptation:** Multiple articles discuss the need for integrating AI into educational frameworks effectively, highlighting challenges in adapting teaching methods and assessments to leverage AI capabilities (Alasadi and Baiz 2023; Dai et al. 2023; Ratten and Jones 2023; Lim et al. 2023).
- **Resistance to Change:** Educators' resistance to adopting new technologies is noted as a barrier to AI's transformative potential in education. Educators' reluctance stems from unfamiliarity with AI and from comfort with traditional methods (Kaplan-Rakowski 2023; Jauhiainen 2023).
- **Professional Development and Training:** Efforts are hampered by shortcomings in current training programs for educators, highlighting the gap in current training programs for educators to effectively integrate AI into their teaching practices (Bail 2023; Srinivasan et al. 2021).
- **Curriculum Overhaul:** The necessity to overhaul curricula to incorporate AI learning and usage is a recurring theme, pointing to a need for educators to understand AI and develop new pedagogical strategies (Bower et al. 2023; Chiu 2023; Salah et al. 2023; Liu et al. 2023).
- **Research Challenges:** Adapting research methodologies to include AI while maintaining rigor and ethical standards poses challenges, especially in terms of methodological integrity and ethical considerations (Chiu 2023; Smith and Williams 2023).

Technology Enabling Misuse

- **Cheating and Academic Dishonesty:** Concerns about academic integrity arise with AI tools like ChatGPT, which enable students to generate essays and assignments that complicate the detection of cheating (Simonsson 2023; Tacheva and Ramsubramanian 2023).
- **Bias and Misinformation:** The risk of perpetuating biases and spreading misinformation through AI-generated content is a significant concern, highlighting the need to carefully manage these technologies (Edenberg and Wood 2023; Hastings 2023; Dron 2023).

Regulation and Innovation

- **Need for Regulation:** There is a pressing need for comprehensive AI policies to manage the use, scope, and impact of AI tools in academia, balancing the protection of academic integrity and personal data with fostering innovation (Luckett 2023; Ratten and Jones 2023; Simonsson 2023; Wach et al. 2023).
- **Balancing Act:** Finding the right balance between regulating AI technologies and promoting an environment conducive to innovation and technological advancement is critical. This balance is essential for deploying AI in educational contexts without stifling growth (Salah et al. 2023; Kaplan-Rakowski 2023; Dai et al. 2023).
- **Social and Cultural Implications of AI:** Need to ensure that AI tools are inclusive and culturally aware, particularly in addressing how AI impacts cultural competence in education (Bahroun et al. 2023; Sun et al. 2024).
- **Economic Implications of AI in Education:** Aspects of AI implementation in education, focus on challenges related to equitable access across socioeconomic groups (TELUS 2023).

Categorization of Organizational Tensions

Learning —*Transformation necessitates the destruction of past practices (Smith and Lewis 2011).*

Belonging — *Conflict between individuals and organizations regarding values and roles (Smith and Lewis 2011).*

Performing — *Competing goals for the attention of those with a stake in outcomes (Smith and Lewis 2011).*

Organizing — *Organizational structure and leadership roles create tensions between collaboration and competition (Smith and Lewis 2011).*

Results

Surfacing the Paradoxes

According to the literature, the contemporary educational system is actively navigating a dramatic transformation tied to the increasing reliance and need for training on generative AI, threats of censorship, and the increasing polarization of the polity, the root of all of which can arguably be traced back to bias and misinformation. Much of the surveyed research connects directly to this notion that the field must grapple with the requirements of adopting new technology that will fundamentally change how academic pursuits are executed (Alasadi and Baiz 2023; Chiu 2024; Dai, Liu, and Lim 2023, and so on). This includes tensions such as those related to integration and adaptation, resistance to change, the need for professional development and training, the need for curriculum overhauls, and overarching research challenges. Kaplan-Rakowski et al. (2023) confirmed that the more educators interacted with generative AI models, the more positive their sentiments on the technology became. Similarly, Jussi S. Jauhiainen and Agustin G. Guerra (2023) suggest that the latest iteration of one such popular model (ChatGPT) was flexible enough to support various students with different learning methods, increasing enjoyment. Another study surveyed teachers and found that curriculums need to shift to "teach students how AI works, how to use AI, as well as the critical thinking skills and the ethical values needed for working in an AI-saturated world" (Bower et al. 2023, 18). Jon Dron (2023) argues that the more humans interact with generative AI, the more the system will reflect humanity's collective intelligence. However, as organizational challenges persist, competing interests risk organizational paralysis (Srinivasan and Parikh 2021).

While some researchers frame the promise in a positive light, as reshaping education and empowering students (for example, Bahroun et al. 2023; Dai, Liu, and Lim 2023), many argue that misuse of the models risks harming academic integrity and that AI's use is nearly untraceable, thereby promoting cheating among both students and professors (Simonsson 2023; Tacheva and Ramasubramian 2023). Eric Simonsson (2023) does argue that even in the face of threats to academic integrity and freedom, the educational system will be better off embracing the technology than attempting to contain its spread. Also included in this category is literature tied to the role of bias and misinformation within the technology (for example, Edenberg and Wood 2023; Hastings 2024). Some research frames the antipathy as simply a lack of experience.

Many authors calling for improved regulation and governance argue that this should be done in a way that does not inhibit innovation. Such tensions are expected as technology changes create a threshold across which individuals move from the known to the unknown, inspiring fear and risking vicious cycles. Some articles strike at the heart of the matter by positioning the evolution of generative AI within the broader debate about how regulators can and should target policies and initiatives to address algorithmic and training biases inherent in these systems (Luckett 2023; Ratten and Jones 2023). Other researchers highlight sociocultural impacts such as threats of discriminatory hiring practices (Luckett 2023), specific racial and gender biases (Smith and

Williams 2021; Sun et al. 2024), and the eventual risk of a total dehumanization of society (Tacheva and Ramasubramanian 2023). This sentiment resonates across calls for algorithm auditing and regulation (TELUS 2023; Wach et al. 2023).

My analysis suggests a representation of all four paradoxical categories. This underscores the need for more complete organizational routines to foster stability while adapting to technological change, which challenges educational practices and raises concerns about academic freedom and the evolving roles of educators (God 2023).

Dynamic Equilibrium

Exploring paradoxes at the intersection of academic freedom and generative AI is an initial step toward better understanding and addressing them. Drawing on insights from the dynamic equilibrium model (DEM) by Smith and Lewis (2011), it becomes evident that failing to embrace paradoxes may lead to a vicious cycle. Proactive strategies can yield creative "both/and" solutions known as virtuous cycles, as illustrated in the model. Haridimos Tsoukas and Miguel Pina E. Cunha (2017) propose two approaches to managing these tensions: the receptive and the defensive. The receptive approach, requiring cognitive complexity and dynamic capabilities, fosters virtuous cycles by acknowledging and addressing paradoxes. The defensive approach, driven by weaker cognitive and emotional intelligence, tends to fuel vicious cycles, hindering organizational growth and creativity (Smith and Lewis 2011).

Much of the literature undergirding the *learning* paradox underscores the role of action learning as a powerful approach to hurdling the inherent tensions arising from transformational change. However, as Limerick, Passfield, and Cunnington (1994) note, visionary leadership is often necessary to navigate this dynamic. Who plays the role of the visionary leader when the impetus for change is rattling the entire educational institution? While the DEM framework underscores the traditional dynamic of leader and organization, this same cycle should be adapted for the broader industry, such as academics facing risks to academic freedom. This will require all affected individuals to develop a much deeper understanding of the risks and benefits of this technology and organize behind calls to action for algorithmic transparency, quality auditing, and proper regulation to mitigate risks.

Paradoxical tensions exist everywhere one looks. Our findings highlight several paradoxes emerging from the intersection of academic and generative AI that ultimately prove a harbinger of threats to academic freedom. To argue these points, it has been critical to surface the tensions by identifying them across the literature, categorizing them within the established frames of paradox theory, and then considering how a dynamic equilibrium model can aid academics in mitigating the perceived risks to academic freedom. The issue has been succinctly assessed by Noam Chomsky, Ian Roberts, and Jeffrey Watumull (2023), in a recent *New York Times* editorial, where they write, "The human mind [unlike ChatGPT] is a surprisingly efficient and elegant

system that operates with small amounts of information; [the human mind] seeks not to infer brute correlations among data points but to create explanations." The authors highlight a key difference between human intelligence and AI: while AI relies on vast data to find patterns, the human mind efficiently creates causal explanations from minimal information, engaging in deeper reasoning and error correction.

There remains a great need to discuss the role generative AI should continue to play in educational institutions and our society in general. At this stage, stuffing the genie back in the bottle is impossible. The technology will not disappear, and the perceived costs must be weighed against this new technology's enormous potential benefits. As we observe growing calls for more careful regulation, there is reason to believe that more stringent requirements for the safety and security of our institutions are possible. Thus, how we decide to evaluate and discuss these social and technological developments as experts, policy makers, or even as a society will determine whether we can build a better functioning partnership that will improve the overall education system.

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