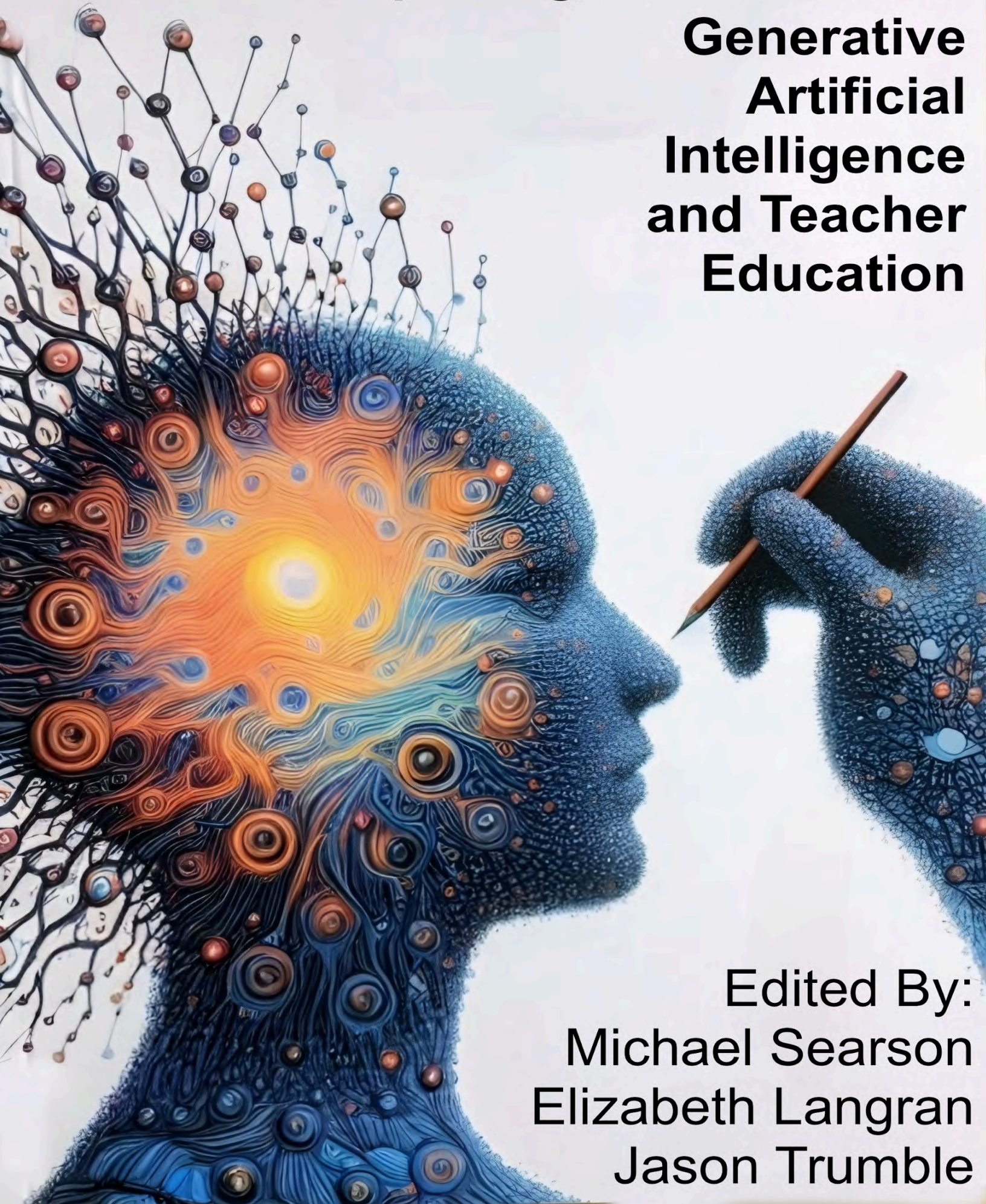


Exploring New Horizons: Generative Artificial Intelligence and Teacher Education



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The (Neil) Postman Always Rings Twice: 5 Questions on AI and Education

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In 2014, The Atlantic ran a story with the title *Why tech hasn't solved education's problems*, which focused on the failed promise of Massive Open Online Courses, aka MOOCs (Meyer, 2014). Specifically, it raised the question, “Why has the promised boom in educational technology failed to appear—and why was the technology that *did* appear not very good?”

Stories such as these and similar questions have been raised about many different technologies. The history of educational technology is littered with examples of technological hype, hope, and disappointment. For instance, a new technology, like the chalkboard, television, or computer (and its potential for learning), leads to a significant level of hype about how it would transform education (Cuban, 1986, 2001, 2013). When these extravagant promises are not met, educators often conclude the uselessness of technology in education.

Often, the argument for including technology in teaching is grounded in language that equates technological advancement to progress and presumes a world of technological immersion is the default world children will inherit (Heath et al., 2022). This insistence on responding tends towards reaction instead of agency and underscores the manner in which the world has been changed by technology, as well as the need for educational systems to respond to these changes. For instance, consider the following quote:

The modern school is forced to meet the demands of a rapidly changing civilization. Today, the world of the learner is almost unbounded. He must acquire facts relating to a bewildering variety of places and things; he must acquire appreciations of far-reaching interrelationships. The curriculum and methods of teaching must undergo a continuous appraisal. New subject matter and new devices for instruction are being scrutinized for their potential contributions to the learning process.

What is surprising is that this quote is not about generative AI or the Internet of MOOCs, but rather about educational film and was written over 90 years ago (Devereux, 1933). Not only that, it was claimed that

The introduction of the use of the talking picture into education may prove to be an event as epochal as the application of the principle of the wheel to transportation or the application of steam power to the industrial age. No development in education since the coming of the text book has held such tremendous possibilities for increasing the effectiveness of teaching as the educational talking picture (Devereux, 1933).

It can be argued that this prophecy did not come true. While educational films have been and still are used in education, there is little evidence to suggest that they have transformed teaching and learning. Yet, similar stories are heard about every new technology. For instance, Gilder (2000) breathlessly declared that networking technologies, such as the Internet, would make us “into bandwidth angels” that would allow us to fly “beyond the fuzzy electrons and frozen pathways of the microcosm to boundless realm.” Similar rhetoric could be seen when describing MOOCs, social media, and now Generative AI.

Though technologies have changed almost all aspects of our lives, critics argue they have not had much discernable impact on education and educational systems. The reason typically given for this seeming inertia is usually to pejoratively characterize educational systems as being fossilized, inertial systems, unable to change to meet the needs of a changing world and to take advantage of the powers of new technologies (Cuban, 2013).

We take a somewhat more nuanced view in that we see the role of technology in education as being complicated by broader factors such as the nature of the technology and larger social, economic, and institutional constraints. Rather than solely emphasizing teaching *with* technologies in order to prepare children for lives in the 21st century, we contend that schools should also be teaching *about* technologies and their impacts on students' individual and collective lives (Krutka et al., 2022). For a range of reasons, from the attributes of the technology itself to the purposes of schooling, not all technologies are necessarily amenable to integration within classroom practice. Moreover, as Cuban (2001) has argued, technology, even when used, is rarely transformative since teachers “domesticate” innovative technologies by fitting them into their existing teacher-driven pedagogical practices. For instance, consider television. It has had limited impact on the classroom—and one would argue rightly so, given the one-directional, passive nature of the medium. But, television has had an impact on the classroom and the curriculum by transforming the world within which education operates.

In this chapter, we suggest that while particular technologies may not directly enter the classroom, their broader impacts on society often necessitate changes in educational approaches and priorities. As McLuhan (1964) argued, “we become what we behold” (p. 29). In a world of pervasive television, we become television-people, humans who develop a preference for an image-heavy experience, clever sound bites, and education as entertainment. In a world of pervasive social media, we become social-media-people, humans whose attention changes to prefer short and intimate bursts of content. In a world of generative AI, we will become artificial-intelligence-people.

Consider the moving picture, the subject of the quotes above from Devereux (1933). While the moving picture itself did not dramatically alter classroom activities, the rise of cinema fundamentally reshaped society in ways that necessitated changes in educational thinking. As film rapidly expanded into a dominant form of entertainment and communication, it became a force of socialization and a tool of propaganda, deeply influencing how people understood themselves and the world. Schools could not ignore cinema's profound impacts; curricula responded by incorporating film literacy and critical viewing skills.

A similar pattern can be seen with digital and networking technologies such as the Internet and social media. Though these technologies did not enter educational spaces to the extent predicted, they have had an influence on schools, schooling, and society. These platforms, designed to maximize engagement and advertising revenue, have affected the mental health of youth worldwide (Wells et al., 2021). Issues like anxiety, depression, and body image struggles have become endemic among students, profoundly shaped by endless social comparison and the commodification of identity online. Thus, even if social media itself has not entered the classroom in a significant manner, it has forced education systems to respond to its broader societal impacts. Schools now grapple with social-emotional learning, digital citizenship, and fostering self-worth in the age of the influencer.

It is in this context that we probe the advent of new Artificial Intelligence (AI) technologies. The rapid development of AI and machine learning tools will transform industries and the world of work in profound ways. Further, AI has already caused harm to those pushed to the margins of society, leading to false arrests of Black people (Kentayya, 2020); over-policing of poor, Black, and Latinx communities (O'Neil, 2017); unequal opportunities in lending for women and People of Color (Bartlett et al., 2022); unjust body searches and surveillance of trans people (Costanza-Chock, 2020); and poor healthcare interventions for Black women as algorithms improperly compute their physical pain (Benjamin, 2019). This requires educators researching and teaching with AI to look beyond classroom interventions and consider new curricula that prepare students to live and prosper in an AI-saturated world.

It has been extensively argued, particularly with the advent of generative AI tools, that this new technology has the potential to transform various aspects of human life, including the way we work, communicate, and express ourselves creatively (e.g., Harwell & Tiku, 2023; Roose, 2023). As more aspects of human labor can be performed by AI tools, it will reduce the value of human labor and expertise in certain domains. As jobs become automated, there will be job losses for some and increased profits for others. The demand for certain professions will rise, while the need for other professions may decline. Moreover, the power of these tools to customize messages through multiple media has significant implications for human communication and decision-making. Trust and transparency are critical for human flourishing, and these new AI-based creations can significantly undermine that through algorithms that are biased or systems that do not understand the nuances of human interaction. As AI permeates society, ethical concerns like privacy, surveillance, and algorithmic bias will require continuous evaluation, regulation, and guidelines. Finally, these tools can undermine originality, creativity, and other critical human abilities and raise questions about authenticity, truth, and what it means to be human. Clearly, these topics go beyond the hand-wringing that we have seen recently about how these new tools (particularly large language models such as ChatGPT and Bard) can allow students to cheat on their examinations or other assessments. This is a narrow, short-sighted, and limited view of how we should think of these technologies and their impact on education.

That said, it is difficult to predict just what shape these changes will take. Cultural change happens in complex, non-linear ways, favoring some while disadvantaging others. Technology weaves itself into the fabric of society, and without collective human work spinning threads toward justice, technology can strengthen the tapestries of inequality. However, individual and collective human intention can direct and re-braid technological uptake. It becomes important, in this context, for educators to explore and interrogate these broader forces with students. This is one way to help young people grow their capacity for agency and action. Educators can support students' questions and critiques of technologies in order to make informed and ethical choices toward more just technological futures (Krutka et al., 2022).

It is here that philosophers and historians of technology can provide guidance, given their ability to look beyond the immediate to broader narratives and societal implications. Grounding their work in theories of media, communications, histories, and sociologies, they consider the potential of new technologies: which aspects of technological potential are emphasized and which get ignored; how certain views get essentialized and normalized and which do not; who gets to control the discourse and who does not, and most importantly, on whom does the burden of new technologies fall.

THE POSTMAN ALWAYS RINGS TWICE

Neil Postman was a prominent American media theorist, cultural critic, and educator who made significant contributions to the study of media, technology, and culture throughout the latter half of the 20th century. He wrote extensively about how technologies and media have transformed society and culture. He is best known for his critique of the transformative impacts of television on society, which he discussed extensively in his foundational book, *Amusing Ourselves to Death* (1985). In this work, Postman posits that the medium of television, with its emphasis on entertainment and its non-linear structure, has fundamentally altered the nature of public discourse, diminishing the value of rational argument and serious conversation.

Postman's arguments align (and differ in nuance and focus) from other media theorists such as Marshall McLuhan (1964), Walter Ong (1982), Jacques Ellul (1964), and others. Postman was aligned with scholars such as McLuhan and Ong and their arguments on how the medium shapes the nature of the content it carries (hence McLuhan's famous dictum, *The Medium is the Message*). Postman, however, was more concerned with the societal implications of media's influence, focusing on the consequences for public discourse and politics. Similarly, even while agreeing with Ellul's concerns about technological determinism, the idea that technology shapes society's values and goals, Postman placed a heavier emphasis on cultural and media critiques.

In this chapter, we focus on the ideas Postman raised in his 1998 talk, "Five Things We Need to Know About Technological Change." We chose this work because it offers accessible insights into Postman's extensive research on the relationship between technology and society. Further, we have found these ideas particularly helpful in our own work in analyzing educational technologies. In his talk, Postman observes:

1. We always pay a price for technology.
2. When it comes to technology, there are always winners and losers.
3. Embedded in every technology, there are one or more powerful ideas—and biases.
4. Technological change is not additive, it is ecological.
5. Technologies are fictions.

In the rest of this essay, we take each of these ideas and explore what they mean for educators and educator preparation in a world changed by Generative AI.

1. We Always Pay a Price for Technology

Postman argued that technological change always involves a trade-off, a Faustian bargain in which technology both gives and takes away. As Postman articulates, the inquiry "What will a new technology do?" holds equal importance to the question, "What will a new technology undo?" In fact, the latter question is arguably more significant because it is so rarely asked. As he wrote:

The question, "What will a new technology do?" is no more important than the question, "What will a new technology undo?" Indeed, the latter question is more important, precisely because it is asked so infrequently... I would forbid anyone from talking about the new information technologies unless the person can demonstrate that he or she knows something about the social and psychic effects of the alphabet,

the mechanical clock, the printing press, and telegraphy. In other words, knows something about the costs of great technologies.

Postman suggests that discussing new information technologies should be reserved for those who can demonstrate an understanding of the social and psychological impacts of historical advancements such as the alphabet, mechanical clock, printing press, and telegraph. For instance, when humans embraced the technology of an alphabet, we gained the ability and opportunity to share ideas more easily and rapidly. We could take ideas out of our heads and store them in a reservoir of letters. However, as Plato worried, literate humans traded our memory as a repository for knowing. Further, as humans shifted from an oral-based culture to a literacy-based culture, we traded the truth and authority of the spoken word for the truth and authority of a written contract. The alphabet did more than make knowledge more accessible. It changed the way humans think and what humans value.

Of course, it is not lost on the two of us that we repeat Plato's argument here through the technology of writing, and the chances are high that you are reading this not printed on paper but rather on some digital device. We note that Postman framed this notion of technological undoing as "technology giveth, and technology taketh away" (p. 1). While Plato concentrated on what the alphabet took, we (Punya and Marie) continue to use, value, and often take great delight in the written word. However, returning to Postman's initial argument, society and individuals often concentrate our imaginations on what technology gives and rarely on what it takes away.

Another key trade-off may be that of balancing between the personalization offered by AI and the human connection that teachers bring into the learning equation. While AI tools can offer personalized learning experiences tailored to individual student's needs, they offer a simulacrum of connection, which may actually cause more harm than good for student emotional and social development. Striking a balance between these two competing yet important goals is a critical trade-off that educators must navigate. Moreover, as AI becomes more integrated within educational contexts, we must be careful not to rely too heavily on technology, and educators will need to carefully evaluate when and how to deploy AI tools. Finally, educators need to find a balance between the data-driven decision-making powers of AI and the personal and professional knowledge they have of individual learners. An overreliance on AI may undermine individual expertise and understanding of their students.

Another price we may pay for AI technology is what and how we consider learning and intelligence. McLuhan (1964) argued we become more like our machines, and so we wonder, is the price we pay that we become artificial-intelligence-humans? Similar to Plato's critique of the alphabet as "a recipe not for memory, but for reminder," we may end up shifting what and how we come, collectively, to know.

Struggle with the unknown is vital to human learning. Vygotsky termed that liminal space between confusion and understanding the zone of proximal development (Rowe & Wertsch, 2002). Generative AI appears to know no such struggle. As far as we can tell, in our attempts to peer into its black box of code, there is no space for wrestling with discomfort as it computes to produce. For AI, the next word emerges from a probabilistic calculation based on what has come before. A soupçon of noise added to the code helps AI produce language that feels authentic and "generative" to the human reader; as Emily Bender and colleagues noted, "...the tendency of human interlocutors to impute meaning where there is none can mislead both NLP researchers and the general public into taking synthetic text as meaningful" (Bender, et al., 2021, p. 611). We don't have an answer to the question, what does it mean for learners to trade off the zone of proximal development for ease of access to the creation of knowledge? But we think that it is a worthy question for educators and scholars -- those of us who are particularly concerned with the question of learning -- to pause and consider.

2. When it Comes to Technology, There are Winners and Losers

The second point that Postman argues is that the pros and cons of emerging technologies are not equally distributed among the population. There are always those who benefit and those who lose out, as well as individuals who remain unaffected by the technology. As he noted:

The questions, then, that are never far from the mind of a person who is knowledgeable about technological change are these: Who specifically benefits from the development of a new technology? Which groups, what type of person, what kind of industry will be favored? And, of course, which groups of people will thereby be harmed?

It is important to acknowledge that beneficiaries of a technology are often unaware of those who are not reaping the benefits or attempt to persuade others that they, too, are reaping the rewards. Most importantly, the distinction between winners and losers is frequently drawn along the lines of existing disparities within the current

system. Therefore, as Postman suggests, we must consistently question who specifically gains from the advent of new technologies, which groups, types of individuals, or industries are favored, and, of course, which segments of the population may be adversely affected.

Access to technologies is not equitably distributed, and that will be true of AI tools as well. Moreover, this also impacts teachers' access to these tools and capabilities, which may lead to two tiers of educators, further emphasizing these disparities. Thus, the implementation of AI tools in education has the potential to exacerbate existing inequalities among students, teachers, schools, and communities, resulting in widening the digital divide and gaps in educational outcomes based on socioeconomic status, geographical location, and other factors.

Further, there may be a shift in emphasis on what is taught and learned in schools where AI-based educational tools may be a better fit for certain subjects or approaches over others. Unlike machine learning and other AI that have been used for at least a decade in STEM fields, for example, in computer science, to help write code, generative AI is particularly compelling in the ways it aligns with creative disciplines. Generative AI's stories, poems, art, songs, and AI-generated architecture and design can be surprisingly delightful and moving. However, we wonder who the winners and losers in this artificial intelligence introduction to humanities and arts may be. If we do become what we behold, what does it mean to develop disciplines of artificial-intelligence-humanities (a term which feels particularly oxymoronic) or artificial-intelligence-arts. This could further widen previously existing gaps or even remove certain key disciplines from the curriculum.

As educators prepare children for life in a world with generative AI, we should consider that the possibility exists for greater injustice and stratification within society. Bender and colleagues note, "Combined with the ability of LMs to pick up on both subtle biases and overtly abusive language patterns in training data, this leads to risks of harms, including encountering derogatory language and experiencing discrimination at the hands of others who reproduce racist, sexist, ableist, extremist or other harmful ideologies reinforced through interactions with synthetic language" (Bender, et. al. 2021, p. 611). Generative AI has already begun to colonize the work of indigenous creators, scraping their art and culture, repackaging it, and selling it back to a wider, whiter, audience for consumption and profit (Marx, 2023; Hendrix, 2023). In what ways might algorithmic injustice and capitalism intersect with generative AI to widen representation and gaps in the discipline of the arts and humanities? As public educators working toward educating citizens for a more robust and multi-racial democracy, what should we be teaching about generative AI to work toward more just technological futures?

3. The Medium is the Message

The third point Postman emphasizes is that every technology embeds concealed, influential ideas and biases which, despite their abstract nature, impact the way people think, behave, and interpret their surroundings. These concealed factors shape our experiences and interactions with technologies, even though we may not be consciously aware of them. Technologies are NOT neutral with regard to their effects on individual and social cognition. Different technologies (or media) engender different mind-sets or ways of thinking, and these characteristics are inherent in the nature of the media itself and, thus, often invisible to the users of these media (McLuhan, 1964).

It is essential to consider what forms of understanding and knowledge are supported or suppressed by particular media. Different media shape cognition by preconfiguring how we process and develop cognitive structures. We borrow the idea of prefiguring from Hayden White's concept of "prefigurative scheme," where he argued that these are precognitive and precritical biases that guide how we perceive concepts within it and their interrelationships (Mishra, Spiro & Feltovich, 1996; White, 2014). As Postman wrote:

Every technology has a prejudice. Like language itself, it predisposes us to favor and value certain perspectives and accomplishments. In a culture without writing, human memory is of the greatest importance, as are the proverbs, sayings and songs which contain the accumulated oral wisdom of centuries. But in a culture with writing, such feats of memory are considered a waste of time, and proverbs are merely irrelevant fancies. The writing person favors logical organization and systematic analysis, not proverbs. The telegraphic person values speed, not introspection. The television person values immediacy, not history.

In other words, the key question for us to consider is that if oral cultures prioritize memory and print cultures emphasize systematic organization, what types of knowledge will AI systems foster?

The idea of media having a “prejudice,” as Postman puts it, plays out at two levels when it comes to generative AI. First, is that the tools themselves are prejudiced, trained as they are on human data, with all its imperfections. There is increasing evidence that these AI tools have built-in biases, reflecting broader social biases that already exist (Benjamin, 2020). Thus, these tools may inadvertently perpetuate existing biases or introduce new ones into educational content and resources, leading to the exclusion or underrepresentation of certain cultural, social, or historical perspectives, limiting students' exposure to a diverse range of ideas and knowledge (Warr, Oster, & Issac, 2023). Furthermore, these biases may lead to unfair treatment of students, perpetuating stereotypes, or unfairly disadvantaging certain groups.

There is also a deeper sense of prejudice that may be important for educators to consider. These are the concealed, almost below the level of conscious introspection, ideas that influence how we think, shape our experiences and interactions, and the kinds of meanings we make and value. This requires us to better understand how these systems work and interact with us.

Generative AI systems, at least in the form they currently exist, have certain unique characteristics, different from any technology that has come before it. Specifically, these generative AI technologies possess the unique capability to communicate with humans using language, a trait previously exclusive to humans. Moreover, these technologies can create and communicate not just with text but also through voice and image. They can read, see, and hear. Secondly, they can participate in extended dialogues, recalling past exchanges, taking turns in conversation, and more. Thirdly, they can adeptly simulate various interaction styles, personalities, and genres of interaction. Lastly, LLMs are equipped with vast knowledge spanning countless domains, though they can sometimes provide inaccurate or fabricated information (Mishra et al., 2023). The initial three capabilities endow these software entities with a semblance of personality and independent thought, making them appear psychologically tangible to us (Mishra et al., 2001). As a result, we often attribute to them cognitive emotions and intentions, such as beliefs and desires. In essence, these advanced, interactive technologies have become genuine social participants in our lives, interacting in a manner unparalleled by any preceding technology. Their expansive knowledge, coupled with their propensity to occasionally fabricate information, positions them as powerful influencers with the potential to reshape various societal systems, including the educational sector (Mishra, Warr & Islam, 2023).

Mishra et al. (2023) list a series of questions that we may be forced to consider going forward. Speaking specifically of teachers, they ask:

What does it mean to teach in an era where GenAI becomes part of our everyday life? In a time when it will be increasingly difficult to distinguish between AI-generated and human-generated content? As the boundary between AI- and human-generated content fades, how will it impact trust in information sources, institutions, and widely held social beliefs? Will GenAI technologies strengthen or erode these beliefs? Will they fuel confusion, skepticism, and anxiety, further exacerbating societal divisions, similar—or perhaps beyond—what we see happening with social media? ... How will our tendency to anthropomorphize, or attribute human traits to non-human entities, complicate matters further? Will these generative technologies, with their creativity, language-using, and seemingly social characteristics, heighten this confusion, creating a deceptive illusion of real, human-like interaction? What will this mean for children and youth who are still developing their sense of self and identity? How will the ripple effects of these developments affect educational systems that are already over-burdened and over-extended? ... Is there a risk of these institutions being perceived as ineffective or complicit in spreading misleading content? Moreover, how will they cope with the mental health consequences that may emerge, and how will they provide support to students navigating a world where truth is elusive and social and emotional confusion prevails? (p. 246).

Just as television emphasized the image over thought, generative AI will, we believe, over-emphasize the social nature of interaction. In an era where GenAI permeates daily life, discerning synthetic AI-generated content from human-created content will be almost impossible. As they write, this blurring boundary raises critical questions about our trust in information sources and societal institutions. Could generative AI, with its convincing, agentic language capabilities, amplify the mistrust, confusion, and divisions we've witnessed with social media? Could existing institutions be seen as perpetuating falsehoods or be deemed redundant? The ability to create new, plausible, realistic media about any topic whatsoever has significant implications for how we think about news, information, and politics. The kinds of critical knowledge skills required to recognize false information require educators and learners alike to understand the kinds of cognitive biases that bad actors will seek to exploit.

Furthermore, our inclination to anthropomorphize these technologies complicates matters further, intensifying the illusion of genuine human interaction. The availability of para-social agents, almost indistinguishable from real humans, requires that our students have the tools (cognitive, interpersonal) to navigate these interactions that will feel extremely real. Consider, for instance, the implications for youth, still shaping their identities, and what these “interactions” will mean for them and their development. There are significant developmental and mental health implications of living in a world where truth is elusive and societal confusion is rampant that may most surely fall on educators to address. With the ongoing GenAI race, as corporations prioritize competitive edge over societal implications, educators might once again bear the brunt of unforeseen consequences.

4. Technological Change is not Additive. It is Ecological.

Technological change is not a mere addition; it is ecological, meaning that the introduction of a new technology alters the entire landscape. As Postman wrote:

A new medium does not add something; it changes everything. In the year 1500, after the printing press was invented, you did not have old Europe plus the printing press. You had a different Europe. After television, America was not America plus television. Television gave a new coloration to every political campaign, to every home, to every school, to every church, to every industry, and so on.

Once a novel technology emerges, there is no turning back. A new medium doesn't just supplement existing elements; it transforms everything. For instance, the advent of print or television reshaped every aspect of society, from political campaigns and homes to schools, churches, and industries (Postman, 1985). Social media didn't just connect us to each other; its use transformed politics through the creation of information bubbles that blinkered our access to alternative perspectives and viewpoints (Vaidhyanathan, 2018). This process of hearing from and speaking just to those who agree with us changed our politics (for the worse) and facilitated the spread of misinformation. The emphasis of social media platforms to prioritize engagement and time spent on the platform over any other goal had a negative impact on the social-emotional well-being of teenagers across the world. These are often unforeseen consequences, but it is important to recognize that they exist, though they are hard to predict (Tenner, 1997). Moreover, the ramifications of such change are vast, unpredictable, and irreversible, making decision-making in this space too crucial to be left solely in the hands of any individual or group.

Though the impacts of AI on society at large are difficult to predict, there are some things that we do know. First, these large multinational companies at the forefront of the AI race are more committed to increasing shareholder profit than to the broader social good. This is apparent from the almost cavalier manner in which these AI tools were unleashed on the world, with little or no discussion or engagement with broader society. We now have an arms race between a small number of large multinational companies that are, for the most part, led by middle-aged men with a relatively narrow range of experience outside of Silicon Valley. Further, recent history (and lawsuits) with social media tools demonstrate that when advertising is the foundational economic model, companies will scrape our most intimate data to profile us for targeted advertising and suggest mis- and dis-information which keeps us engaged on the app (Zuboff, 2019). The danger of these new AI tools is that, given their social nature, they can be trained to be tools of persuasion—whether the goal is to buy particular products or to vote a certain way. Their deep knowledge of us makes us particularly vulnerable. If lies and misinformation on social media created epistemic tensions in society, imagine the shift in what we believe to be truth and reality when bad actors can harness the twin powers of microtargeting and generative AI.

This new technology of AI won't just add a feature to our existing societal framework but, as technologies that came before it, will reshape it entirely, altering how we perceive and interact with information. AI systems are not just gigantic information reservoirs; they have begun to shape our trust and faith in digital entities. This elevated trust in machines comes with the risk of manipulation, given AI's potential to navigate and exploit human cognitive biases seamlessly and imperceptibly. This potent capacity to persuade will most definitely be exploited by companies and political actors seeking to achieve their narrow goals. Thus, AI doesn't just supplement our decision-making processes but also introduces a new variable into our cognitive and ethical equations, inevitably affecting our perceptions of truth, authenticity, and morality.

This transformative dynamic between humans and AI could bleed into various aspects of society, influencing human interaction, psychological well-being, institutional trust, and broad societal norms. As AI systems become embedded in our social and institutional frameworks, they can inadvertently shape human interactions and societal values, sometimes enhancing connectivity and efficiency while, at other times, eroding interpersonal trust and emotional authenticity. We already see our culture often overly venerates technological rationality over human

intuition and emotion. The domino effect of this transition could impact our psychological and social landscapes, where our affiliations, alliances, and even dissent are potentially mediated by algorithmic influence, thereby reshaping societal structures, norms, and, ultimately, our collective human experience.

Of course, all this is extremely speculative, and it is difficult, if not impossible, to figure out what kinds of changes these new AI technologies will bring to society at large. That said, our students must be prepared for a world that may look very different than what it looks like today.

5. Technologies are Fictions

Technologies are frequently seen as an inherent component of the natural order, making them appear exempt from scrutiny (Postman, 1998). However, Postman highlights that technologies are human-made constructs developed within specific political and historical contexts. When a technology becomes mythic, however, it runs the risk of being accepted unquestioningly and is, therefore, not amenable to alteration or control. We need to recognize that, at the end of the day, these technologies are created for humans by humans and to understand that their potential for good or ill depends entirely on human awareness of their effects on us and our actions. As he wrote:

Media tend to become mythic — we think of our technological creations as if they were God-given, as if they were a part of the natural order of things. Cars, planes, TV, movies, newspapers—they have achieved mythic status because they are perceived as gifts of nature, not as artifacts produced in a specific political and historical context. When a technology become mythic, it is always dangerous because it is then accepted as it is and is therefore not easily susceptible to modification or control. The best way to view technology is as a strange intruder, to remember that technology is not part of God’s plan but a product of human creativity and hubris, and that its capacity for good or evil rests entirely on human awareness of what it does for us and to us.

This idea of technology becoming mythic is also applicable beyond technology as well. In fact, it is important to recognize that most of what constitutes our everyday world is artificial, or designed by humans. This includes physical objects like food and pets, which we often perceive as “natural” but have, in fact, been shaped over time through intentional human processes like artificial selection. Also, the scope of ‘artificial’ extends beyond physical artifacts to encompass intangible elements like race, gender, technologies, processes, systems, and culture. For instance, the educational system, with its schools, classes, credits, and degrees, has been designed (either intentionally or by historically contingent factors) and can be redesigned. Speaking in a different context, Yuval Harari speaks to this issue of the “designed” or “created” nature of our world. As he wrote:

Human rights aren’t inscribed in our DNA. Rather, they are cultural artifacts we created by telling stories and writing laws. Money, too, is a cultural artifact... What gives money value is the stories that bankers, finance ministers and cryptocurrency gurus tell us about it (Harari, 2023).

Recognizing the artificiality of things opens them up for questioning, reimagining, and redesigning. This “design” lens provides agency to enact change, as it counters claims that aspects of our world are inherently natural or essential. This is particularly relevant to education, which has often been treated as a natural phenomenon rather than a human creation.

These issues become even more salient in an age of generative AI. Speaking of these capabilities, particularly its language generation and dialogic capabilities, Yuval Harari argued that “AI has hacked the operating system of human civilization.” He goes on to write that “Language is the stuff almost all human culture is made of.” He goes on to ask:

What would happen once a non-human intelligence becomes better than the average human at telling stories, composing melodies, drawing images, and writing laws and scriptures? (Harari, 2023).

Though it is difficult to predict what that would mean in the long run, it is important to recognize that these “designs” are not necessarily intentionally created. In fact, it could be argued that some of the seemingly designed aspects of technology are often unintentional byproducts of broader systemic choices and decisions. For instance, there was no necessity for the economic underpinning of much of the Internet and social media to be based on

advertising. But once that choice was made, it was relatively inevitable that these platforms would move towards finding ways to collect data on people to predict their purchasing choices, keeping them on the platforms for longer durations of time by offering more extreme content and more. Thus, as we think of AI, we need to think beyond the propensities (or, as Postman says, “prejudices”) to the broader socioeconomic structure within which it functions. Ted Chiang, in a recent interview, said,

I tend to think that most fears about A.I. are best understood as fears about capitalism. And I think that this is actually true of most fears of technology, too. Most of our fears or anxieties about technology are best understood as fears or anxiety about how capitalism will use technology against us. And technology and capitalism have been so closely intertwined that it's hard to distinguish the two... (Chiang, 2021).

But distinguishing between the two is a must. And this is emergent from the idea that recognizing that technologies, media, educational systems, and most aspects of our environment are "fictions" in the sense that they have been designed by humans empowers us to redesign and reimagine them (Close et al., 2023). It also encourages a focus on ethical and responsible use in education and finding ways of ensuring these are embedded in how these tools are designed for the future.

CONCLUSION

In his essay, on which this piece is based, Postman described the ideas as “the sort of things everyone who is concerned with cultural stability and balance should know and I offer them to you in the hope that you will find them useful in thinking about the effects of technology.” We believe that his insights stand true even today in an extremely different cultural, social, economic, and technological context. We believe that a deeper introspection into these ideas and what they mean for our world offers deep insights for educators as we seek to navigate this complex landscape.

We close with the same question that we opened the essay with, “Why has the promised boom in educational technology failed to appear—and why was the technology that *did* appear not very good?” but raise it in the context of Generative AI. Will AI go the same way as did MOOCs, or is there something fundamentally different about this technology? We have aimed for a nuanced approach as we speculated on this answer. It suggests that seeing the presence of a particular technology in classrooms or other formal educational spaces may *not* be the only question worth asking. We must recognize that the classroom does not sit in isolation; it responds to how emerging innovations shape culture and the lived experiences of students outside school walls. While a new device may not change classroom activities overnight, its broader disruption of society frequently necessitates educational systems to respond. Thus, we argue, we must look beyond direct applications and consider how emerging innovations alter the cultural fabric, knowledge ecosystems, and human relationships that comprise the milieu in which learning occurs. Even when specific technologies are not directly employed in classrooms, they still affect education by altering the “ecology” within which education functions. This means that the impact of generative AI may not be immediately apparent within the classroom but is experienced more broadly throughout society. Thus, educators need to factor this into their practices to better prepare their students for an indeterminate yet transformed future.

The impact of technologies on the world at large is outside of the direct control of individual educators. Broader economic and social structures influence and determine the ways in which these technologies are taken up in society. Nonetheless, these are educational issues insofar as they change the context within which education functions and change the way we teach about the role of these technologies in our lives.

What is clear is that these technologies are here to stay. They will be a part of our children’s future. However, it is as important to acknowledge that the future is not written, and *how* and *when* and *to what extent* citizens decide to engage with generative AI is still emerging (Warr, Close, & Mishra, 2023). We, as educators, must be engaged in creating educational experiences that will help our learners embrace their individual and collective agency to flourish in this new world. The point is, regardless of whether these technologies enter the world of school, they *will* change the broader ecological social matrix that our students will live in, which needs to be factored into our practice.

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