Transdisciplinary Dialogues on AI in Education: Earth, Air, Water, Fire as Metaphors for Change

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Abstract

The authors integrate the classical elements – earth, air, water, and fire – within post-human perspectives to explore the multifaceted integration of Artificial Intelligence (AI) in educational contexts. A transdisciplinary approach invited a fertile dialogue among three academic experts from distinct fields of study, who then examined the transformative impact of AI in education: transcending traditional anthropocentric perspectives. In the 'Earth' metaphor, the narrative likens AI's role to Earth's stabilizing properties. It critically analyzes AI simulations in various disciplines, emphasizing AI's support in fundamental learning and cognitive development, yet maintaining skepticism about its effects on embodied cognition and experiential learning. Addressing 'Water', the authors underscore the need for fluid, adaptable educational governance in response to AI integration. This element resonates with post-human ideas of fluidity and hybridity, urging educational systems to be responsive while expressing concerns about rapid technological changes and their wider implications, calling for thoughtful policy revisions. The focus in 'Fire' shifts to AI's transformative effects on educational governance, intertwining ethical and data privacy issues. The authors critique the potential centralization of power of educational technology companies and the importance of preventing educational inequities and biases. Transitioning to 'Air', the focus is upon AI's exponential impact on pedagogy, just as air facilitates communication. The authors examine AI's potential for personalizing learning and enhancing interactive dynamics. Examining this element also highlights the importance of algorithmic transparency and the risks of diminishing human roles in education. Finally, the authors examine and interpret the United Nations' *Agenda 2030* through a post-human perspective, advocating for an educational governance model and framework that acknowledges the interplay between human, non-human, and technological entities, thereby emphasizing the need for transdisciplinary perspectives on AI in education to capture the Zeitgeist of the Fourth Industrial Revolution.

Keywords: Generative Artificial Intelligence; AI; data privacy issues; educational governance; embodied cognition; experiential learning; Fourth Industrial Revolution; posthuman perspectives; transformative impact

Epigraph 1: *"Here we're made of water, earth, fire, and air."* (Emre, 1989)

Introduction

Generative Artificial Intelligence (AI) is at the forefront of educational transformation, symbolizing an era where learning transcends traditional methods and incorporates elements as fundamental as earth, air, water, and fire. According to Capra and Luisi (2014), understanding complex systems through a unifying vision helps in deciphering the multifaceted impact of AI on education, aligning with systems thinking principles that are crucial in integrating AI effectively. The necessity of transdisciplinary dialogues is highlighted by Goertzel (2019), who articulates that *"Metrics for assessing the achievement of human-level AGI are argued to be fairly straightforward, including e.g., the classic Turing test, and the test of operating a robot that can graduate from elementary school or university"* (p. 4). Human-level artificial general intelligence (AGI) refers to AI systems that can match or exceed human cognitive abilities across a wide range of tasks and domains. Such systems would be capable of general learning, reasoning, and problem-solving at a level comparable to humans, rather than being specialized for narrow applications. Siemens (2005, p. 3) states, "*A central tenet of most learning theories is that learning occurs inside a person.*" Incorporating AI in education through a multidisciplinary and transdisciplinary discourse enriches comprehension and ensures holistic integration of AI in educational practices, challenging anthropocentric views and embracing a broader ecological perspective (Capra & Luisi, 2014).

The authors explored AI in education through the allegorical lens of the classical Greek elements: earth, air, water, and fire. Earth, as discussed by Aristotle (350 BCE), symbolizes the foundational and stabilizing aspects of AI that support and challenge educational systems, reflecting its role in providing structure and resistance. In *The Presocratic Philosophers,* Kirk, Raven, and Schofield (1983) state that air, associated with the life-giving and communicative properties in Hippocratic texts (Hippocrates, 400 BCE), represents AI's potential to enhance pedagogical communication and interactive dynamics, embodying breath and life in education. Thales of Miletus (585 BCE) thought of the earth as floating atop water, encapsulating water as the principle of all things, and this is emblematic of adaptability, which mirrors the need for educational systems to remain fluid and responsive in the age of AI. Finally, fire, often discussed by Heraclitus (500 BCE) as a force of constant change and transformation, represents AI's transformative impact on educational governance, ethics as well as the dynamic and ever-changing nature of technology. From historical consciousness derives adaptability to change, an acute realization that life has not always been as it is today, and that it will not forever remain as it is at present. Thus, one can arrive at a proper perspective on contemporary events, an ability to relate each to its appropriate antecedents and to project, at least to some extent, its possible consequences. History, properly comprehended, enriches and deepens the understanding of contemporary society (Shera, 1953).

Each metaphor – earth, air, water, and fire– is conceived to reflect AI's role and potential impact on education. The discourse among academic experts from various fields, facilitated by a transdisciplinary approach, ensures a practical yet visionary exploration of AI's capabilities. This aligns with the United Nations *Agenda Transforming our World: the 2030 Agenda for Sustainable*

Development goals, advocating for an educational framework that acknowledges the interplay between human, non-human, and technological agents, fostering a robust, inclusive, and forward-thinking educational system (United Nations, 2015).

This study is vital because it positions AI as a transformative force that redefines educational paradigms through both metaphorical and practical lenses. By analyzing AI's educational role through the framework of classical elements - earth, air, water, and fire - this examination connects classical philosophy with modern educational challenges. The study emphasizes cross-disciplinary collaboration, bringing together insights from technology, educational philosophy, and posthumanism. This holistic approach resonates with global initiatives, such as the United Nations' Agenda 2030, underscoring the need for an educational framework that reflects a balanced interplay of human, non-human, and technological interactions. Thus, this research not only challenges the anthropocentric focus of traditional education but also advocates for an ecological perspective that can adapt to the continuous changes AI introduces. By framing AI's influence on education within this broader historical and philosophical context, the study contributes to a more integrated, sustainable vision for the future of learning.

The authors' insights rise out of a trifecta of perspectives born from diverse experiences intertwined to create a new lens as a clarion call towards a deeper understanding of the forces within us, those surrounding us, and how they interact, thus shaping the posthuman world. Like the gales of the north wind, which symbolize challenges or significant changes, these paradigm shifts can push us out of our comfort zones, deepen our understanding, strengthen our character, and act as a catalyst for personal growth and resilience. "Rather than remain fixed in familiar practices, we will need to harness an agile, growth-oriented mindset. Now is the time for courage, vision, and perseverance" (Cowin, 2023).

Thus, we can gain skills to confidently navigate Volatility, Uncertainty, Complexity, and Ambiguity (VUCA). VUCA describes environments with rapid, unpredictable changes, originating from the U.S. Army War College in the late 1980s. The acronym was initially used to describe the post-Cold War world but has since been widely adopted in business and leadership contexts.

Literature Review

Epigraph 2: *"We're headed for a world where you're either going to be able to write algorithms ... or be replaced by algorithms."* (Bridgewater hedge-fund billionaire Ray Dalio, 2018)

In the days of Aristotle, human interaction grounded most things, including politics; then later in the Middle Ages and during the Renaissance, the humanities emerged as a form of study. Fast forward to the nineteenth century, when ultimately humanism became a field of study, and similar to the emergence of the study of liberal arts that built upon the Greeks' creation of the concept of humanity, all of these major developments shared the same theme: man rested at the center, as the narcissistic measure of everything. This anthropocentrism reigned supremely until the late twentieth century. It was at this time that a few key post-human and materialist thinkers began to disrupt this narrative. Remarkably, few other major developments have left their mark in the way posthumanism has in education. For example, as Snaza and colleagues (2014) pointed out, Haraway's A Cyborg Manifesto (1985/1991) contended that we live in a world where the boundaries separating humans from animals and machines are weak at best. Haraway advocated for studying phenomena in relation to the complex social relationships they exist within and challenged others to use material ways of thinking rather than scientific approaches. Her approach was to instead emphasize what knowledge *is* as well as how it *comes to be*.

This generative, transdisciplinary approach emphasizes connectivity, critical examination, and global awareness that promotes sustainability and renewable practices that refuse to center all primary focus on the human but rather all living and nonliving matter in the environment through both language and materiality. In terms of effect on methodology in education, the origin of the paradigm shift was a call to arms: to think differently in post-qualitative research was the imperative for a new generation of those engaged in systematic inquiry (Lather & St. Pierre, 2013; St. Pierre, 2011). Paul Crutzen (2002) summarized the radical changes specifically with regard to how educators should envision educational practices and institutions through a posthuman lens that merges the relationships between humans and machines as well as animal/human relationships: "For the past three centuries, the effects of humans on the global environment have escalated. Because of these anthropogenic emissions of carbon dioxide, the global climate may depart significantly from natural behavior for many millennia to come. It seems appropriate to assign the term 'Anthropocene' to the present, in many ways human-dominated, geological epoch … (p. 23).

A vital component of posthuman thought emerged from Carly Wolfe's (2010) work in cybernetics research and hybridized communication systems, a central hallmark of which was the notion that it did not matter whether those engaged in communication were human, animal, or machine: data could be problematized amongst all these simultaneously. Snaza and colleagues (2014) point out multiple related examples of ways in which humans are increasingly intertwined with machines in the case of a wounded war veteran losing a limb and obtaining a prosthetic to function differently. Less physically and more metaphorically, yet another instance can be seen as school age students learning to stand in line, speaking quietly in the hallway in the first years in school or else they learn to face discipline, symbolically another representation of how all actors in the system are forced to become part of the anthropological machine that focuses on conformity and young children must learn to acquiesce; sacrificing the experience the what it means to be free as they begin their cultural induction into the institution of school (Agamben, 2004; Lewis & Kahn, 2010). More recently, a plethora of connections between humans and machines have multiplied exponentially as humans seamlessly coexist with devices such as phones, tablets or high-tech gaming systems. The most recent generation struggles to remember a time without this connection to technology, and time spent away from these devices and applications has become anxiety-producing to many young people.

While posthuman theorists often focus primarily on the ways in which human and machines often enhance human capabilities thinking with and through technology (Weaver, 2010; Pettman, 2011) other posthuman thinkers have followed Deleuze (1988) philosophical work in an attempt to conceptualize a vision of the Earth independent from the ideals of Anthropocentrism; essentially proposing that animals as well as other non-animal assemblages matter unto themselves, separate and untied to human value systems (Thacker, 2011; Harman, 2012). Some of these pivotal concepts came from philosophy: Deleuze and Guattari (1987, 1994, 2009) introduced concepts like assemblages, folds, rhizomes, and lines of flight, while other hallmark ideas came from physics: Barad (2003) suggested quite simply that all kinds of *matter matters*; and directly impacting research methodology was feminist philosopher Braidotti (2013) who summarized the importance of thinking differently about a host of issues given that:

> "posthuman theory is a generative tool to help us rethink the basic unit of reference for the human in the bio-genetic age known as 'anthropocene', the historical moment when the Human has become a geological force capable of affecting all life on this planet. By extension, it can also help us rethink the basic

tenets of our interaction with both human and non-human agents on a planetary scale" (pp. 5–6).

Within this posthuman era, it is salient that the integration of AI into education reveals a range of attitudes, reflecting both optimism and concern. Optimistic views emphasize the potential of AI to improve educational outcomes. Wang, Sun, and Chen (2022), for example, argue that the AI capability of higher education institutions (HEIs)—comprising resources, skills, and innovation consciousness—significantly impacts student self-efficacy and creativity. Similarly, Marengo et al. (2023), in their study, *The Educational Value of Artificial Intelligence in Higher Education: A Ten-Year Systematic Literature Review,* state that after reviewing 44 studies, the integration of AI in higher education has been markedly increasing, especially in the last decade, leading to significant transformations in teaching and learning processes. Their review highlights that most studies suggest AI can enhance personalized learning experiences, improve administrative efficiency, and even predict student performance outcomes. Their review highlights that AI can enhance personalized learning, improve administrative efficiency, and predict student performance. However, they caution that while AI holds great promise, more empirical research is needed to guide its effective implementation, urging further evidence-based studies to validate and optimize its use.

Holmes et al., (2019) goes further expressing concern that over-reliance on AI could reduce the depth of human interactions in the classroom, potentially diminishing the relational aspect of teaching that is critical for student development. This observation is consistent with the results of a recent survey by Best Colleges, which reveals growing concerns among college students about the impact of AI on higher education and future careers. According to the survey, 59% of students believe that regular use of AI tools for completing coursework could devalue a college degree, reflecting a significant level of unease about integrating AI in academic settings (Bryant, 2023). The study also notes that students anticipate the most negative impact of AI on educational majors, with about one-third expressing concern over the next 4-5 years. Despite these apprehensions, there is a recognition of AI's positive effects on computer and information sciences, with 26% foreseeing benefits. Furthermore, the survey highlights a gender disparity in attitudes toward learning AI skills, with men more likely than women to consider them crucial for career competitiveness. This discrepancy underscores a broader issue of gender representation in tech-related fields.

The above findings underscore a complex landscape where AI's role in education is both promising and challenging, necessitating careful consideration of its implementation in curricula and career preparation. Therefore, while AI can be a valuable tool, it should complement rather than replace human engagement. Popenici & Kerr concur by stating that "Firstly, it's critical to remember that education is fundamentally a human endeavor and not a technological problem." (Popenici & Kerr, 2017, p. 4).

In the evolving landscape of education shaped by AI, the classical elements - earth, water, fire, and air - serve as metaphors for the multifaceted roles that AI plays in reshaping our approaches to learning and knowledge. Earth reflects the grounding stability and structure that underpins educational systems, anchoring growth and development within a reliable framework. Water embodies adaptability, representing the fluidity necessary in governance and policy to meet the demands of a rapidly advancing technological era. Fire, with its transformative energy, symbolizes the disruptive potential of AI to ignite change, reimagining ethics and governance. Air, vital and connective, illustrates the expanded channels of communication and interaction AI

brings, enhancing the relational aspects of learning. Together, these elements offer a fertile perspective, inviting us to consider AI's impact not merely as a tool but as a dynamic force that challenges traditional paradigms and compels us toward a more exponential future. AI's presence in education invokes forces as ancient as nature itself, bringing both opportunity and tension to the learning landscape. These elemental forces compel us to approach AI in education critically, acknowledging both its potential and its capacity to unsettle the established equilibrium of learning.

Earth

Epigraph 3: ***"Why do we not perceive the senses themselves as well as the external objects of sense, or why without the stimulation of external objects do they not produce sensation, seeing that they contain in themselves fire, earth, and all the other elements, which are the direct or indirect objects is so of sense?"*** **(Aristotle, De anima, Book II, Ch. 5, p. 21)**

3.1.1 AI's fundamental learning and cognitive development

AI is a non-carbon-based intelligence, neither aware of nor able to understand the physicality of our embodied cognition. Its processes are purely computational, lacking the embodied experiences that ground human cognition in sensory, emotional, and cultural contexts. Despite the increasing integration of AI in educational settings, there is a growing concern that these technologies may undermine the principles of embodied cognition emphasized by developmental psychologists like Piaget. AI often promotes disembodied learning experiences, potentially distancing learners from the physical interactions that are crucial for cognitive development. This raises important questions about how we can reconcile the humanistic emphasis on personal growth and physical engagement with the abstract nature of AI-driven education.

Addressing this tension requires an exploration of the embodied cognition framework, which emphasizes the inseparable link between mind, body, and environment in learning. This perspective, championed by scholars such as Piaget and Wilson, offers critical insights into how AI technologies might disrupt traditional pathways of cognitive development rooted in physical engagement. Developmental psychologists, such as Piaget, have long recognized the extraordinary influence of action on learning (see Piaget,1952). Embodied cognition is a theoretical framework that emphasizes the role of the body and its interactions with the environment in shaping cognitive processes such as mental representation and extended cognition (Shapiro, 2019). This approach challenged traditional views of cognition as purely mental processes, instead arguing that our thoughts, perceptions, and understanding of the world are deeply intertwined with our physical experiences. Wilson stated, "Cognition is situated. Cognitive activity takes place in the context of a real-world environment, and it inherently involves perception and action" (Wilson, 2002, p. 626). Embodied cognition suggests that the way we move, perceive, and interact with our surroundings plays a crucial role in how we learn, remember, and solve problems.

Research in embodied cognition demonstrates the importance of sensorimotor experiences in important aspects of cognitive development. For example, studies have shown that gestures and body movements can facilitate learning and problem-solving. Goldin-Meadow (2011), for example, observes that gestures can facilitate learning in two ways: indirectly, by shaping the learning environment, and directly, by influencing the learners themselves. Additionally, the concept of "grounded cognition" suggests that our understanding of abstract concepts is rooted in our physical experiences (Barsalou, 2008). This idea is supported by evidence showing that metaphors and analogies often draw from bodily experiences to convey complex ideas (Lakoff &

Johnson, 1999). An example of complex learning that illustrates these principles is mastering musical instruments. Learning to play an instrument involves not only the cognitive understanding of music theory but also the physical coordination and emotional expression inherent in performance. This multifaceted process engages the learner's motor skills, sensory experiences, and emotional responses, embodying the interconnectedness of mind and body in learning.

Another critical issue is the phenomenon of 'digital overshadowing', a term the authors propose to describe how the essential human elements of education, such as empathy, creativity, and critical thinking, are increasingly marginalized by an over-reliance on technological solutions. AI-driven educational tools often emphasize efficiency and standardized outcomes, which may neglect the importance of social interaction and physical engagement in learning. For example, adaptive learning platforms might tailor content to individual performance but fail to account for the benefits of collaborative learning and the development of social skills. This overemphasis on technology can overshadow the nuanced and complex nature of human learning processes, leading to an educational experience that is efficient but lacks depth and personalization. In systems dominated by educational technology companies, there is a palpable risk that education may shift its focus from fostering holistic development to prioritizing data and metrics. Such a shift can lead to a dehumanized learning environment, where students are perceived merely as data points, obscuring their unique needs and potential.

Significant negative implications of AI's potential are a hollowing out of the embodied cognition concept and subsequent cognitive development of learners. Research and classroom experience suggest that learning must be an active, engaging process that involves the whole body, rather than a passive absorption of information. Educational approaches that incorporate physical movement, hands-on activities, and real-world experiences may be more effective in promoting deep understanding and long-term retention of knowledge (Kontra, Goldin-Meadow, & Beilock, 2015). For example, one method is the Total Physical Response (TPR) in language learning. This language teaching method was developed by James Asher and connects physical movement with language learning. Students learn through actions - they listen to commands in the target language and respond by performing the corresponding movements. As AI becomes increasingly integrated into educational contexts, it is essential to consider how such technologies can support embodied learning experiences, rather than replace them. Therefore, embodied cognition remains an indispensable domain for the development of human intelligence, underscoring the need to preserve and enhance these human-centric learning processes.

Experiential learning is a form of embodied cognition, as students are active participants in the learning process. Students in higher education, in particular, show a positive reaction to experiential teaching methods, such as the use of simulations, and an increase in perceived learning (Villarroel et al., 2020). Active learning that involves building relationships is central to effective instruction (Bergmann & Sams, 2012). Educational researchers worldwide agree that many of the problems in education could be solved by using methodologies where active learning and relationships are central and emphasize physical, pedagogical, and psychosocial dimensions. Hoover (2019) suggests that schools known for their commitment to improving school climate are typically distinguished by robust relationships among school staff. And when instructor-student relationships are fostered, the classroom environment is more positive and aids in student well-being (Hoover, 2019). Engagement and active learning are critical components in the learning process. Classroom simulations utilizing AI are one way to deliver experiential learning that fosters this type of relationship between the student and instructor, as well as between the student and the coursework. A recent study analyzed the positive impact of a business simulation on

student engagement, learning, and higher-order thinking (Yueh-Min, Silitonga & Wu, 2022). Students regularly immerse themselves in games for personal enjoyment and satisfaction; thus, learning through simulations incorporates real-life problems that increase the students' interest in learning. Simulation games are a practical approach to acquiring knowledge that provides both the learner and instructor with a toolbox to facilitate active learning.

While AI increases perceived learning and student engagement, it cannot replace the importance of the instructor in the learning process. AI simulations lack the emotional processing of human intelligence (Korsakova-Kreyn & Gumilev, 2021). The disconnection between the emotional cognition and intellectual involvement of AI cannot be discounted with active guidance through instructors as a vital component in student learning.

Epigraph 4: ***"He lived in this dream world more than in the real one. The real world: classroom, courtyard, library, dormitory, and chapel were only the surface, a quivering film over the dream-filled super-real world of images."*** **(Hermann Hesse, Narcissus and Goldmund)**

3.1.2. AI simulations

AI simulations improve education and curriculum development, particularly in business education. Student engagement is one aspect of improved learning, but student workforce readiness is another imperative aspect of learning. A curriculum entrenched in experiential learning and self-reflection prepares students for the workforce in a tangible manner (Edmondson & Matthews, 2021). In business disciplines, such as marketing, technology advancements, and the demand for data-driven marketing decisions, AI simulations can provide students with practical experience in the learning process. A study suggests that live project-based simulation learning supports the development of the technical and meta-skills needed to be workforce-ready in marketing disciplines (Rohm, Stef & Ward, 2021). Rohm et al. (2021) note that marketing simulations provide students with the chance to learn adaptation to uncertainty, analyze real business decisions and outcomes, and prepare for future challenges. Marketing educators who want to integrate AI marketing simulations into teaching pedagogy need to first understand the simulation, scaffold the pre-work mastery, and then act as a business consultant to the student decision-making process.

While grounding students' theoretical knowledge with practical, workforce-ready applications provides a fertile, grounded, nourishing space for their professional life to grow and reap a bountiful harvest, we must guard against pervasive commercialization.

Water

Epigraph 5: ***"With them the Seed of Wisdom did I sow, And with my own hand labour'd it to grow: And this was all the harvest that I reap'ed. I came like water, and like Wind I go."*** **(Rubáiyát of Omar Khayyám, p.30)**

3.1.3 Water: Adaptability and Fluidity in Educational Governance

Navigating Rapid Technological Changes

As AI continues to steadily move into the foreground of the teaching and learning processes, it will continue to infiltrate educational systems, structures, policies, procedures, market demands, and delivery models. First, there is little doubt that AI can help streamline administrative

functions, reduce costs, and eliminate inefficiencies that have led to college tuition costs tripling over the last 58 years. According to data from the National Center for Education Statistics (NCES), tuition costs rose from $4,648 in 1963 to $14,307 in 2021. When wielded strategically, AI can fundamentally reshape student services – delivering tutoring that adapts to each learner's needs, creating clear pathways for underprepared students to succeed, building dynamic networks between current students and alumni, and intelligently matching students with mental health resources that fit their individual circumstances (Aud et al., 2011). Second, when harnessed effectively, AI holds the promise to improve student services through personalized learning pathways. In addition, AI can greatly reduce the time spent identifying academic integrity violations in real-time, implement early alert systems, and identify failing students. Yet, despite these affordances, there are many challenges yet to be addressed. For instance, currently, there are no ethical safeguards to combat the bias and discrimination inherent in many AI algorithms that have been essentially programmed to match human decision-makers screening students for admission or employees for hire (Silberg & Manyika, 2019; Koch et al, 2025). As Silberg and Manyika (2019) explained, "to the extent AI is used for decision making, prediction, and allocative efficiency, it will always be subject to challenges of bias and fairness...AI can help reduce bias, but it can also bake in and scale bias" (p. 2). While the goal is to complement humanity and not replace it, there are complex inherent hurdles to minimizing bias. Considering gender stereotypes and the currently limited percentage of women university presidents, how would an algorithm set a percentage that is fair based on the population at large if the real world is not there yet?" (Silberg & Manyika, 2019, p.3).

3.2. Resonance with Posthuman Ideas

AI technology has already and will continue to produce future knowledge, pedagogies, and practices that will be used in classrooms in all the forms they take in the future. At their core, posthuman perspectives (Haraway, 1982; Barad, 2007; Braidotti, 2013) widen the lens to see beyond the anthropocentrism and narcissistic human individual to better incorporate the multiple forces constantly intermingling, including nature, technology, animals, and humans. These thinkers offer a vision of a very complex, but flexible and dynamic political model, in which we are all actors within larger networks at play. The most vivid of metaphors comes from Ceder's (2016) dissertation, in which he presents a posthuman theory of educational relationality. He uses the phrase "cutting through water," referring to a Korean proverb that equates love in a family to water; it stays together even after an argument. Boats and divers both cut through water. He then explains that there are scientific reports on hydrophobic knives that can cut a single drop of water in two. Finally, a Buddhist use of the metaphor involves explaining that an offense cannot harm you if you think of it as a cut through water instead of a cut through sand or stone.

AI's evolving use in education can be conceptualized similarly. The advantages of using AI can be found in its rapid evolution, constantly shifting, ebbing and flowing like a river, finding its course. The inherent fluid nature is consistent with the concept of what Yuval Harari (2017) coined 'Dataism." Harari, an Israeli historian and author, introduced the concept of 'Dataism' in his (2017) book *Homo Deus: A Brief History of Tomorrow*. Dataism is a philosophical concept that views the universe as a flow of data and sees value in anything that contributes to data processing. It is based on the idea that with enough data and computing power, everything can be understood, predicted, and optimized. According to Harari, Dataism treats data as the most valuable resource, even more so than physical resources or human knowledge, and suggests that the best way to understand and improve systems, including humans and societies, is through the

collection and analysis of vast amounts of data. It posits that algorithms and data processing will eventually surpass human decision-making and problem-solving capabilities and implies that the free flow of information is the highest good, and that any barrier to this flow should be minimized or eliminated. Harari suggests that as technology advances and our ability to process data increases exponentially, Dataism could potentially reshape our understanding of humanity, society, and even reality itself. However, he also warns of the potential risks, such as the loss of privacy, the concentration of power in the hands of those who control the data, and the possibility of humans becoming irrelevant in a data-driven world. It is important to note that Dataism is a theoretical concept and not a widely accepted ideology at present, and that Harari uses it as a thought experiment to explore potential future developments and their implications for humanity.

AI technology will continue to produce future knowledge, pedagogies, and practices that will be used in classrooms in all the forms they take in the future. At their core, posthuman perspectives (Haraway, 1982; Barad, 2007; Braidotti, 2013) widen the lens to see beyond the anthropocentrism and the narcissistic focus on the human individual to widen the lens to incorporate the multiple forces constantly intermingling between nature, technology, animals and humans. Posthumanism offers a vision of a complex but flexible and dynamic political model, in which humans are actors within larger networks at play. The most vivid of metaphors comes from Ceder's (2016) dissertation in which he presents a posthuman theory of educational relationality. He uses the phrase "cutting through water" referring to a Korean proverb that equates the love in a family to water given the family unit can withstand an argument; similarly, both boats and divers effortlessly cut through water. By contrast, Ceder references scientific reports on hydrophobic knives that can cut a single drop of water in two. AI's evolving use in education can be conceptualized similarly. The affordances of using AI can be found in its rapid evolution constantly shifting, ebbing and flowing like a river, finding its course naturally amongst a host of landscapes and terrains. The inherent fluid nature is consistent with the concept of what Harari (2017) coined dataism, the view of the entire universe as essentially a system of data flows whereby everything from weather systems to humans, to animals to forests to cities, everything is made up of data points. This perspective aligns with the posthumanism notion of interconnectedness and the blurring of boundaries between human and non-human.

The integration of AI in education is not a static process but a dynamic one that will continue to require improvisation, adaptation, and flexibility. Just as water finds its way efficiently through any landscape, AI must navigate the complex terrain of educational systems, policies, and practices. This fluidity is essential for AI to effectively support and enhance learning experiences while also addressing the unique needs of diverse learners. Moreover, the concept of dataism highlights the importance of data in shaping our understanding of the world and our place within it. In the context of education, data generated by AI systems can provide valuable insights into student learning, enabling personalized approaches and adaptive interventions. However, it is crucial to approach this data with a critical lens, recognizing the potential for bias and the need for ethical considerations in its collection, analysis, and use.

Fire

Epigraph 6: *"Thereupon Surt flings fire over the earth and burns up all the world."* (Prose Edda)

3.3 On the Transformative or Destructive Power of AI

Preventing educational inequities and biases is crucial in educational governance for Higher Education Institutions (HEIs). AI systems are only as unbiased as the data they are trained on, and historical biases can be perpetuated and amplified by AI algorithms. Algorithmic transparency in AI-enhanced pedagogy is critical to maintaining trust and ethical standards in education. Transparency ensures that the processes by which AI systems make decisions are understandable and can be scrutinized. This clarity is essential for addressing concerns related to data privacy, bias, and fairness. Pasquale's (2015) The Black Box Society: *The Secret Algorithms that Control Money and Information* underscores the importance of transparent algorithms as essential for fostering trust and ensuring accountability in AI systems. AI in education governance can either innovate or lead to the centralization of power for a few large HEIs and EdTech vendors, creating educational inequities. Thus, ethical oversight is crucial to harness AI's benefits while mitigating its risks.

Picture a future where educational content in educational institutions is sponsored by corporations. Student G, interested in environmental science, finds her lessons heavily biased towards the interests of a major oil company, which funds the AI system of her institution. Her curriculum subtly downplays the impact of fossil fuels and promotes alternative narratives that serve the company's interests. Student H, passionate about nutrition, is bombarded with content promoting processed foods because a leading snack brand sponsors his program. These students receive an education tailored not to their intellectual growth but to corporate agendas, leading to a skewed understanding of their fields and an erosion of educational integrity. Like the prophesied flames of Surt that will consume the world in Norse mythology, unchecked corporate influence through AI in education threatens to burn away academic and institutional integrity, leaving behind only the ashes of compromised knowledge and distorted truth.

Air

Epigraph 7: "*Education is the most powerful weapon which you can use to change the world.*" (Nelson Mandela, 1990)

3.4 Embracing the Winds of Change

Educational governance stands at a pivotal crossroads, where the trade winds of tradition meet the gusty hurricanes of technological advancement and shifting societal needs. Today, governance models, like sturdy oak trees, are primarily hierarchical and centralized, their roots deeply entrenched in the soil of the past. These traditional models, with their focus on top-down decision-making, struggle to bend and sway with the dynamic landscape of education in the 21st century, like trees in a storm, evoking Deleuze and Guattari's (1987) more organic rhizomatic approach that values both human and nonhuman elements, relational approaches, complexity, and celebrates the diversity and inclusion of differences.

As we look towards the horizon, we see the need for more flexible, decentralized, and inclusive governance structures, like a forest of diverse species adapting to changing conditions. Tomorrow's educational governance models must embrace the fresh air of collaboration, integrating insights from various stakeholders, including educators, students, parents, and technologists. This participatory model, like a vibrant ecosystem, will be essential in creating policies and practices that are responsive to the evolving educational environment. Many have pointed out that educational processes have increasingly been influenced by market logic, driven by competition and productivity (Davies & Bansel, 2007; Davies, 2020; Mills et al., 2020). Neoliberal systems are often devoid of leadership, favoring managerial approaches and

undervaluing pedagogical quality in favor of quick, high-volume transactional approaches to education. The characteristics of such systems are often patriarchal and hierarchical, emphasizing simplistic and reductive degree programs, lauding efficiency and cost-effectiveness over the more uncomfortable concepts such as complexity, diversity, and equity, and any examination of the nature of power or the analysis of how power flows could potentially disrupt neoliberal systems (Mills et al., 2020). An effective educational governance model must recognize the interplay between human, non-human, and technological elements, like a symphony where each instrument plays a crucial role in creating a symphonic experience for the audience. This holistic approach ensures that policies and practices reflect the complex dynamics of contemporary education environments, like the intricate web of life in a thriving ecosystem.

Epigraph 8: ***JidduKrishnamurti*****:** ***What we are trying in all these discussions and talks here, is to see if we cannot radically bring about a transformation of the mind. *Not accept things as they are* - but to understand it, to go into it, examine it, give your heart and your mind with everything that you have to find out.*** **(Zeitgeist: The Movie, 2007)**

3.5 Fourth Industrial Revolution's Zeitgeist: Breaking Down the Walls

The Fourth Industrial Revolution (4IR), like a powerful gust of wind, represents a fusion of technologies blurring the lines between the physical, digital, and biological spheres. Capturing its essence, or Zeitgeist, requires a transdisciplinary approach that transcends traditional academic boundaries. The term 'Zeitgeist' is a German word meaning "spirit of the age" or "spirit of the times." It encapsulates the dominant set of ideas, beliefs, and cultural norms that define a particular era. Shaped by technological advancements, social movements, political climates, and economic conditions, the Zeitgeist provides a comprehensive understanding of an era's broader context. For example, the 1960s are characterized by a countercultural movement and civil rights activism, while the current era, influenced by the Fourth Industrial Revolution (4IR), is marked by AI, robotics, and digital communication. Understanding the Zeitgeist is crucial for contextual analysis, offering insights into why events unfold as they do and how they are perceived. It also provides predictive insights, suggesting future trends and societal shifts based on prevailing attitudes and innovations. Additionally, Zeitgeist serves as a cultural reflection, influencing art, literature, and media, and offering a mirror to society's collective mindset.

The 4IR is characterized by unprecedented advancements in AI, robotics, the Internet of Things (IoT), and biotechnology, which collectively reshape industries, economies, and societies. A transdisciplinary perspective integrates knowledge from diverse fields, fostering innovative solutions and holistic understanding. In education, this means breaking down silos between science, technology, engineering, arts, and mathematics (STEAM) and incorporating insights from the humanities and social sciences. Such an approach equips students with the critical thinking and adaptability needed to navigate and contribute to the rapidly evolving 4IR landscape.

As we embrace the winds of change, we must ensure that education systems are equipped to prepare students for the multifaceted challenges and opportunities that lie ahead, like a kite soaring high on the breeze of knowledge. By breathing life into AI-enhanced pedagogy through communication and interaction, we can create a vibrant and dynamic educational landscape that nurtures the growth of every learner, like a garden where every seed has the potential to become a mighty tree.

Epigraph 9: ***"Everything is interwoven, and the web is holy; none of its parts are unconnected. They are composed harmoniously, and together - they compose the world.***" (**Marcus Aurelius, Meditations)**

3.6 Transdisciplinary Dialogues on AI in Education: Earth, Air, Water, Fire as Metaphors for Change

The ongoing discussion amongst philosophers and those with posthuman vantage points continues to clarify both the distinctions as well as the relationships between human beings and the machines they program that may soon be human companions. The ethics of AI span a wide trajectory of this exploration, including what Susan Leigh Anderson and Michael Anderson optimistically pose: "Ideally, we would like to be able to trust autonomous machines to make correct ethical decisions on their own, and this requires that we create an ethic for machines" (Nath & Manna, 2023, p. 191). How does one program an ethical code for robots exactly? If robots are logical, and some ethical decisions made by humans are based on compassion, or what is referred to as Gilligan's (1982) "ethics of care." As we grapple with these larger philosophical questions, one practical dilemma emerges in daily life. What moral principles and or practical guidelines need to be in place to safely collect, store, and analyze data? From social media information to genetic composition, there is inherently such a broad range of issues that must be considered and codified, including key principles such as privacy, consent, transparency, fairness, and accountability. Are these universal across the global landscape? Will these only pertain to human rights, or one day also include the rights of cyborgs and other machines? AI has the power to be a catalyst for a great deal of positive change, particularly in human services such as education and healthcare. Earlier this year, at Touro University, the newly created position of Associate Provost for Artificial Intelligence was charged with leading the development of university-wide policies and programs to integrate AI throughout all of the education and professional programs. HEI leaders believe it's critical to be proactive in approaches with AI, based in some measure on the belief that technology can not only improve learning, our quality of life, and efficiency but it even holds the power to save us as a species (Dacey et al, 2017). If AI can handle the many mundane tasks that educators are consumed by that subtract time away from students and colleagues in meaningful exchanges, building quality relationships, perhaps AI will be the answer to eliminate administrivia and allow educators and administrators alike to be focused on the more human tasks inherent in the mission of education if properly conceived, implemented, and supervised.

AI's integration into educational governance holds the transformative potential of fire, clearing the underbrush, but it also raises significant ethical considerations and data privacy concerns. The extensive data collection necessary for AI systems to function optimally poses risks to HEI independence and student privacy. These systems often require access to sensitive information, including academic performance, behavioral data, and personal identifiers. The aggregation and analysis of such data, while beneficial for personalized learning and administrative efficiency, can lead to privacy breaches if not properly managed. Ensuring robust data protection measures and transparent data usage policies is crucial to mitigate these risks.

If there ever was a burning, all-consuming fire, it would be companies such as EMOTIV, a bioinformatics company, that promotes the extraction and use of brain data to enhance happiness and productivity through electroencephalography (EEG) to understand the human brain, focusing on cognitive performance tracking and monitoring emotions. The company translates complex EEG patterns into cognitive state measures through machine learning algorithms, monitoring

various cognitive states such as interest, excitement, frustration, engagement, relaxation, boredom, attention, and cognitive stress.

While educational tech has much positive potential to democratize learning, it also raises significant concerns about the centralization of power. As educational technology companies grow, they risk becoming unaccountable behemoths, exhibiting rigidity and indifference toward the nuanced needs of diverse educational communities. One of the primary concerns with the centralization of power in educational technology companies is the creation of an "accountability sink." This concept refers to a situation where the concentration of control in a few large entities leads to a reduction in transparency and accountability. When a handful of corporations dominate the educational technology landscape, they can set standards, influence policies, and shape educational outcomes with little oversight. This lack of accountability can result in decisions that prioritize profit over the educational well-being of students, potentially exacerbating existing inequities. The growing influence of top educational technology companies such as Emeritus, Memrise, Afya, Knowbox, Vitru Education, Yellowbrick, and Strivr Labs underscores the urgency of addressing these concerns (Time 2024). These companies, while leading innovation, must be held accountable to ensure they contribute positively to the educational landscape.

The proprietary nature of many educational technologies can create barriers to entry, privileging institutions and students with greater financial resources while marginalizing those with fewer means. Proprietary systems often require substantial financial investments for access, subscriptions, or licenses, which can be prohibitively expensive for many educational institutions and individual learners. Financial barriers create a divide where affluent higher education institutions (HEIs) and students can afford the latest educational tools, gaining an advantage in learning and development, while less privileged ones are left behind. Moreover, reliance on proprietary platforms can lock institutions into specific ecosystems, limiting their flexibility and autonomy. Educational institutions can become trapped by the services and platforms provided by a few powerful EdTech companies, which can dictate terms and conditions, often at the expense of the schools' budget and pedagogical freedom. This dependency not only drains financial resources but also restricts the ability of educators to choose and tailor educational tools that best fit their pedagogical needs.

The National Education Policy Center policy brief *Time for a Pause: Without Effective Public Oversight, AI in Schools Will Do More Harm than Good* highlights the potential risks of centralizing educational governance through AI:

> Advocates for AI claim that it will transform teaching and learning for the better. It will not happen if the AI imposes a rigid mechanistic model of instruction, corrupts curriculum with misinformation, and biases consequential decisions about student performance. It will not happen if integrating AI into schools' administrative processes locks schools and districts into an expensive 'stack' of corporate tech systems for many of their everyday operations, with the result that funds available for other uses—including the teachers who can develop deep connections with nation's students—are increasingly shifted to corporate vendors. It will not happen if AI exacerbates violations of student privacy, increases surveillance, and further reduces the transparency and accountability of educational decision-making (Williamson, Molnar, & Boninger, 2024).

AI, in particular, poses a significant threat in this context. The danger is that such companies' AI algorithms will create behemoths of rigidity and indifference. AI systems implemented by large companies can enforce standardized approaches that fail to accommodate the ethical and moral clarion call to education before profit. Closed 'back box' AI systems often rely on algorithms that, while efficient, may inadvertently perpetuate biases present in their training data. For instance, an AI system designed to evaluate student performance may reinforce existing socioeconomic disparities by favoring students who fit a particular profile, thereby marginalizing those from less privileged backgrounds.

Conclusion

Epigraph 10: ***Parados, "See, how our lives like birds take wing, like sparks that fly when a fire soars..."*** **(Oedipus Rex, strophe 2, p. 11)**

The implementation of AI in educational governance must be approached with caution to prevent exacerbating existing educational inequities and biases. AI systems are only as unbiased as the data upon which they are trained. Therefore, if historical biases are present in the data, these will be perpetuated and even amplified by AI algorithms. Nevertheless, the centralization of data and decision-making processes in AI systems raises significant privacy and security concerns. The authors invite Administrators to be intentional in ensuring robust data protection measures are in place to safeguard student information. Algorithmic transparency in AI-enhanced pedagogy is critical to maintaining trust and ethical standards in education. Transparency ensures that the processes by which AI systems make decisions are understandable and can be scrutinized. This clarity is essential for addressing concerns related to data privacy, bias, and fairness. Pasquale's (2015) *The Black Box Society: The Secret Algorithms That Control Money and Information* underscores the importance of transparent algorithms as essential for fostering trust and ensuring accountability in AI systems.

AI in education governance can be either a cleansing fire or the destruction of Higher Education Institutions (HEI) as we know it. So, if intentionality, care, optimism, respect, and trust (ICORT) (Purkey, Novak, & Fretz, 2020; Anderson, 2021) is the mindset driving the people, places, policies, programs, and process (5Ps) of this "Fourth Industrial Revolution's" systems, then AI can truly illuminate and innovate, provide personalized learning and efficient administrative processes. However, by contrast, without ICORT ensuring careful management and ethical oversight, it can lead to centralization of power for a few large HEI and Ted Tech vendors, thereby creating further educational inequities. Therefore, as we navigate the Volatility, Uncertainty, Complexity, and Ambiguity (VUCA) dimension of AI in education and its evolving consequences for learning, we return to the unifying vision emphasized by Capra and Luisi (2014), which advocates for understanding complex systems through the lens of systems thinking. Together with the authors' trifecta lens, this approach enables us to engage in transdisciplinary dialogues that enrich our comprehension of AI's multifaceted impact on education. By challenging anthropocentric views and intentionally inviting a broader ecological perspective, we acknowledge the intricate interplay between human and non-human actors in shaping the future of learning.

Re-engaging with our initial discussions, it becomes evident that a systems thinking approach is essential for a comprehensive understanding of AI's place in education. This perspective aligns with Goertzel's (2019) call for transdisciplinary dialogues, Siemens' (2005) emphasis on the internal nature of learning, and Purkey and Novak's (2016) intentional invitations

to examine the 5Ps that impact effective, systemic reform. Adopting a post-human perspective opens new insights into AI systems. By challenging anthropocentric views and considering a broader ecological perspective, we can more effectively evaluate the implications of AI technologies that may match or exceed human cognitive abilities.

Human endeavors through the ages are a testament to our dreams, creativity, and collective yearning. As we reflect on the arc of our aspirations, let us draw inspiration from Ovid's Metamorphoses (LCL 42: 8-9): "He gave to man an uplifted face and made him stand erect and turn his eyes to heaven." This enduring vision reminds us to continue reaching for the sublime, ever mindful of the boundless possibilities before us.

References

Agamben, G. (2004). *The open: Man, and animal* (K. Attell, Trans). Stanford, CA: Stanford University Press.

Anderson, C. J. (2021). Developing your students' emotional intelligence and philosophical perspective begins with I-CORT. *Journal of Invitational Theory and Practice, 27*, 36-50.

Anderson, R. B. (Trans.). (1880). *The Younger Edda: Also called Snorre's Edda, or the Prose Edda. An English version of the forward; The fooling of Gylfe, the afterword; Brage's talk, the afterword to Brage's talk, and the important passages in the poetical diction (Skaldskaparmal) with an introduction, notes, vocabulary, and index*.

Aristotle. (350 BCE). *Metaphysics* (W. D. Ross, Trans.). Retrieved from https://plato.stanford.edu/entries/aristotle-metaphysics/

Aristotle. (n.d.). *De anima (On the soul)* (E. M. Edghill, Trans.; D. Kolak, Ed.). Retrieved from https://antilogicalism.com/wp-content/uploads/2016/12/aristotle_anima_final.pdf

Aud, S., Hussar, W., Kena, G., Bianco, K., Frohlich, L., Kemp, J., & Tahan, K. (2011). *The Condition of Education 2011*. (NCES 2011-033). National Center for Education Statistics.

Barad, K. (2003). Posthumanist performativity: Toward an understanding of how matter comes to matter. *Signs: Journal of Women in Culture and Society, 28*, 801–831.

Barad, K. (2007). *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning*. Duke University Press.

Barsalou, L. W. (2008). Grounded cognition. *Annual Review of Psychology, 59*, 617–645. https://doi.org/10.1146/annurev.psych.59.103006.093639

Bergmann, J., & Sams, A. (2012). *Flip your classroom: Reach every student in every class every day*. International Society for Technology in Education.

Braidotti, R. (2013). Posthuman humanities. *European Educational Research Journal*, *12*(1), 1–19.

Braidotti, R. (2016). Posthuman critical theory. *Critical posthumanism and planetary futures*, 13–32.

Bryant, J. (2023). 6 in 10 students say use of AI tools in college diminishes value of degree. *BestColleges*. Retrieved from https://www.bestcolleges.com/research/most-students-say-using-ai-tools-in-college-diminishes-degree-value/

Capra, F., & Luisi, P. L. (2014). *The system's view of life: A unifying vision*. Cambridge University Press.

Ceder, S. (2015). *Cutting through water: Towards a post-human theory of educational relationality* (Doctoral dissertation, Lund University).

Cowin, J. (2023, December 3) *Teaching is an Act of Love* [Video Interview by Kevin Brown]. City Tutors. YouTube. https://www.youtube.com/watch?v=kg7gr_doE14

Crutzen, P. J. (2002). Geology of mankind. Nature, 415, 23

Dacey, C., Abrams, L., Strom, K., & Mills, T. (2017). The future of self-study: Through and with technology. In *Being self-study researchers in a digital world: Future-oriented research and pedagogy in teacher education* (pp. 167–173). Springer.

Davies, B. (2020). Life in neoliberal institutions: Australian stories. *Qualitative Inquiry*. https://doi.org/10.1177/1077800419878737

Davies, B., & Bansel, P. (2007). Neoliberalism and education. *International Journal of Qualitative Studies in Education, 20*(3), 247–259. https://doi.org/10.1080/09518390701281751

Deleuze, G. & Guattari, F. (2009). *Anti-Oedipus: Capitalism and schizophrenia* (R. Hurley, M. Seem, & H. R. Lane, Trans). New York, NY: Penguin Books.

Deleuze, G., & Guattari, F. (1987). *A thousand plateaus: Capitalism and schizophrenia* (B. Massumi, Trans.). University of Minnesota Press.

Deleuze, G., & Guattari, F. (1994). *What is philosophy?* (H. Tomlinson & G. Burchell, trans.). London: Verso. (Original work published 1991)

Edmondson, D., & Matthews, L. (2021). Developing marketing curriculum to make students workforce ready. *International Journal of Education Management, 35*(5), 969–983.

Emre, Y. (2000). *The drop that became the sea: Lyric poems of Yunus Emre* (K. Helminski & R. Algan, Trans.). Shambhala.

FitzGerald, E. (Ed.). (2009). *Rubáiyát of Omar Khayyám* (D. Karlin, Ed., 1st ed.). Oxford University Press.

Gilligan, C. (1982). *In a different voice*. Harvard University Press.

Goertzel, B. (2014). Artificial general intelligence: Concept, state of the art, and future prospects. *Journal of Artificial General Intelligence, 5*(1), 1-46. https://doi.org/10.2478/jagi-2014-0001

Goldin-Meadow, S. (2011). Learning through gesture. *Wiley Interdisciplinary Reviews: Cognitive Science, 2*(6), 595–607. https://doi.org/10.1002/wcs.132

Harari, Y. N. (2017). *Homo Deus: A brief history of tomorrow*. HarperCollins.

Harman, G. (2012). *Weird realism: Lovecraft and philosophy.* Laurel House, UK: Zero Books.

Haraway, D. (1985/1991). A cyborg manifesto: Science, technology, and socialist-feminist in the late twentieth century. *Simians, cyborgs, and women: The reinvention of nature* (pp.149–182). New York, NY: Routledge.

Heraclitus. (500 BCE). *On nature* (Fragment 30). Retrieved from https://ia600203.us.archive.org/31/items/thefragmentsofth00herauoft/thefragmentsofth00herauoft.pdf

Hippocrates. (400 BCE). *On the nature of man* (G. E. R. Lloyd, Trans.). Retrieved from https://www.ucl.ac.uk/~ucgajpd/medicina%20antiqua/tr_GNatHom.html

Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.

Hoover, S. (2019). Policy and practice for trauma-informed schools. *National Association of State Boards of Education*.

Kirk, G. S., Raven, J. E., & Schofield, M. (1983). *The Presocratic philosophers: A critical history with a selection of texts* (2nd ed.). Cambridge University Press. https://doi.org/10.1017/CBO9780511813337

Koch, A. J., D'Mello, S. D., & Sackett, P. R. (2015). A meta-analysis of gender stereotypes and bias in experimental simulations of employment decision making. *Journal of Applied Psychology, 100*(1), 128–161. https://doi.org/10.1037/a0036734

Kontra, C., Goldin-Meadow, S., & Beilock, S. L. (2015). Embodied learning across the life span. *Topics in Cognitive Science, 7*(4), 513–532. https://doi.org/10.1111/tops.12162

Korsakova-Kreyn, M., & Gumilev, N. (2021). Emotion, embodied cognition, and artificial intelligence. *Academia Letters, 2*. https://doi.org/10.20935/AL3134

Lakoff, G., & Johnson, M. (1999). *Philosophy in the flesh: The embodied mind and its challenge to Western thought*. Basic Books.

Lather, P., & St. Pierre, E. A. (2013). Post-qualitative research. *International Journal of Qualitative Studies in Education, 26*, 629–633.

Lewis, T., & Kahn, R. (2010). *Education out of bounds: Reimagining cultural studies for the posthuman age.* New York, NY: Palgrave Macmillan.

Marcus Aurelius. (2002). *Meditations: A new translation* (Modern Library Ed.). Modern Library.

Mandela, N. (1990, June 24). Nelson Mandela visits Madison Park HS in Roxbury in 1990. *GBH News*. Retrieved from https://www.wgbh.org/

Marengo, A., Pagano, A., Soomro, K., & Pange, J. (2023). The educational value of artificial intelligence in higher education: A ten-year systematic literature review. *Preprints*. https://doi.org/10.20944/preprints202311.0055.v1

Mills, T., Strom, K., Abrams, L., & Dacey, C. (2020). More-than critical friendship. *International Journal of Qualitative Studies in Education*. https://doi.org/10.1080/09518398.2020.1727331

Nath, R., & Manna, R. (2023). From post-humanism to ethics of artificial intelligence. *AI & Society, 38*(1), 185–196. https://doi.org/10.1007/s00146-021-01189-w

Ovid. (1916). *Metamorphoses* (Book I). In Metamorphoses, Volume I: Books 1-8 (pp. 8–9). Loeb Classical Library 42. Harvard University Press.

Pettman, D. (2011). *Human error: Species-being and media machines.* Minneapolis, MN: University of Minnesota Press

Pasquale, F. (2015). *The black box society: The secret algorithms that control money and information*. Harvard University Press.

Piaget, J. (1952). *The origins of intelligence in children*. International University Press.

Popenici, S. A. D., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. *Research and Practice in Technology Enhanced Learning, 12*(1), 22. https://doi.org/10.1186/s41039-017-0062-8

Purkey, W.W., Novak, J.M., & Fretz, J.R. (2020). *Developing inviting schools: A beneficial framework for teaching and leading*. Teachers College Press.

Purkey, W. W., Novak, J. M., & Schoenlein, A. T. (Ed.). (2016). *Fundamentals of invitational education* (2nd ed.). International Alliance for Invitational Education.

Rohm, A. J., Stefl, M., & Ward, N. (2021). Future proof and real-world ready: The role of live project-based learning in students' skill development. *Journal of Marketing Education, 43*(2), 204–215. https://doi.org/10.1177/02734753211001409

Shapiro, L. (2019). *Embodied cognition* (2nd ed.). Routledge.

Shera, J. H. (1953). *Historians, books and libraries: A survey of historical scholarship in relation to library resources, organization and services*. Press of Western Reserve University.

Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning, 2*(1). Retrieved from http://www.itdl.org/Journal/Jan_05/article01.htm

Silberg, J., & Manyika, J. (2019). Tackling bias in AI (and in humans). *McKinsey Global Institute*.

Sophocles. (1976). Oedipus Rex (D. Fitts & R. Fitzgerald, Trans.). Harvest Books. (Original work published ca. 429 BCE)

Snaza, N., Appelbaum P., Siân, B., Carlson, D., Morris, M., Rotas, N., Sandlin, H. Wallin, J., Weaver, J.A. (2014). Toward a Posthuman Education. *Journal of Curriculum Theorizing, 30*(2): 39–55: PKP Publishing Services Network. https://digitalcommons.georgiasouthern.edu/curriculum-facpubs/47

St. Pierre, E. A. (2011). Post qualitative research: The critique and the coming after. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE handbook of qualitative research* (4th ed.). (pp. 611–626). Thousand Oaks, CA: Sage

Time. (2024). World's top edtech companies of 2024. Retrieved from https://time.com/collection/worlds-top-edtech-companies-2024/

Thacker, E. (2011). I*n the dust of this planet: Horror of philosophy, vol. 1.* Laurel House, UK: Zero Books.

Ulmer, J. B. (2017): Posthumanism as research methodology: inquiry in the Anthropocene, International Journal of Qualitative Studies in Education, DOI: 10.1080/09518398.2017.1336806

United Nations. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development*. Retrieved from https://sdgs.un.org/2030agenda

Villarroel, V., Benavente, M., Chuecas, M., & Bruna, D. (2020). Experiential learning in higher education: A student-centered teaching method that improves perceived learning. *Journal of University Teaching & Learning Practice, 17*(5). https://doi.org/10.53761/1.17.5.8

Wang, S., Sun, Z., & Chen, Y. (2022). Effects of higher education institutes' artificial intelligence capability on students' self-efficacy, creativity and learning performance. *Education and Information Technologies*, 1–21. https://doi.org/10.1007/s10639-022-10995-8

Weaver, J. (2010). Educating the posthuman: *Biosciences, fiction, and curriculum studies.* Rotterdam, NL: Sense Publishers.

Williamson, B., Molnar, A., & Boninger, F. (2024). Time for a pause: Without effective public oversight, AI in schools will do more harm than good. *National Education Policy Center*. Retrieved from https://nepc.colorado.edu/publication/ai

Wilson, M. (2002). Six views of embodied cognition. *Psychonomic Bulletin & Review, 9*(4), 625–636. https://doi.org/10.3758/BF03196322

Wolfe, C. (2010). *What is posthumanism?* Minneapolis, MN: University of Minnesota Press.

Yueh-Min Huang, L., Silitonga, L. M., & Wu, T.-T. (2022). Applying a business simulation game in a flipped classroom to enhance engagement, learning achievement, and higher-order thinking skills. *Computers & Education, 183*, 104494. https://doi.org/10.1016/j.compedu.2022.104494

Zeitgeist: The Movie – Full Documentary | Social Power Structure Misinformation [Film]. (2007). YouTube. https://www.youtube.com/watch?v=p4qKjijP99c

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