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Critical Posthumanist Literacy: Building Theory for Reading, Writing, and Living Ethically with Everyday Artificial Intelligence

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ABSTRACT

Literacy has become inextricably bound with machine processes, especially in the age of ubiquitous, consequential artificial intelligence (AI). Despite a relatively long history of AI involvement in our everyday reading and writing practices, the public availability of generative AI tools has set off a wave of heated debate—and concern—about AI's role in our lives. We argue that critical literacy theory and tools can serve as a foundation, when combined with posthumanist ideas and some technical knowledge, for understanding, teaching, and participating in our AI-infused world. In this paper, we outline our theory of critical posthumanist literacy, which draws on posthumanist scholarship to re-imagine critical literacy with respect to concepts of ontology, agency, ethics and justice, and pedagogy. For each concept, we build on humanist, critical perspectives to show how posthumanist scholarship can help theorize for literacy in the age of AI, especially as AI presents both lingering and new challenges to conceptions of human text production and consumption. Posthumanism provides us with alternative modes of thinking about the nature of "things" (and ourselves); with an understanding of agency as not a human possession but an accomplishment among/within many human and non-human actors; with an expanded ethics that accounts more deeply for non-humans; and with pedagogy that embraces ambiguity, movement, and speculation. Using these ideas to expand critical literacy practices, we offer concepts and questions for guiding literacy practice and research, with the understanding that these are no longer separable from complex computational systems.

Although the generative, widely available, and explicit use of AI in ChatGPT feels like it heralds a sea change in our literacy practices, AI has been a part of our reading, writing, and living for quite some time. For example, AI algorithms have been shaping what people read and watch in our social media feeds, suggesting words or phrases for our searches, and guiding our routes home via navigation apps for many years. This longer view of AI, and AI's shifting capabilities, is important for two reasons: first, literacy scholars are not facing our machine-human literacy future empty-handed, but have rich bodies of work to build on and draw from. Second, a long view calls for taking an active role in shaping AI's rapidly changing capacities and applications, or otherwise risk seeing AI as something that has happened to literacy without our input or approval.

In this paper, we draw from critical literacy and posthumanist theory to develop an approach for thinking of modern-day literacy practices as bound up with machines, and subject to human concerns about ethical living. It is our supposition that literacy has and will become increasingly

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entangled with machine processes, so much so that it will be difficult to separate out human literacy from machines and their data apparatuses. A posthuman conception of literacy recognizes that readers and writers are no longer uniquely human, nor necessarily individual, but a tangle of processes involving human and non-human matter. We use the term "critical posthumanist literacy" to capture this idea, along with the belief that critical literacy's commitments to understanding and interrogating relations of power will be especially helpful in building the world we would like to live in with these machine processes.

Laying the Foundation: Critical (Digital) Literacies

This work is situated within—and seeks to expand—the tradition of critical digital literacy research and practice. From this rich body of scholarship, we draw several guiding ideas for this framework, including an emphasis on questioning and dialogue in pedagogy, a social justice orientation, a focus on texts and processes in everyday life, and an explicit examination of power relations. However, we also seek to expand the tradition of critical (digital) literacy. We argue for incorporating concepts from posthuman theory into an expanded critical *posthumanist* literacy. We believe that an expanded critical posthumanist literacy will be better suited to address contemporary developments in literacy, given the complexity and ubiquity of everyday AI. While we acknowledge that a rejection of dualisms that are characteristic of humanism, such as nature/culture (Braidotti, 2013), or body/technology, could be readily taken up as a posthuman response to the history of literacy practices and scholarship, we posit that this historical moment of AI development provides an exigency toward critical posthumanist thinking.

Critical literacy scholarship and praxis have been an influential paradigm for work in literacies. Much of this work can trace its lineage directly back to Freire (1970), whose ideas of liberatory pedagogy centered around education as a way to interrogate and change systems of oppression. In broad strokes, criticality refers to the concern with systems of power. Importantly, "power" has typically meant influence and control wielded by humans as individuals or in groups. Applying this criticality to literacy, Luke (2012) defines "critical literacy" as the "use of the technologies of print and other media of communication to analyze, critique, and transform the norms, rule systems, and practices governing the social fields of everyday life" (Luke, 2012, p. 5). Furthermore, critical literacy is not limited to critique, but has the additional goal of challenging hegemonic forces in the service of changing power structures. Upon reviewing 30 years of research and professional literature, Lewison et al. (2002) synthesized a list of four interrelated dimensions of critical literacy: "(1) disrupting the commonplace, (2) interrogating multiple viewpoints, (3) focusing on sociopolitical issues, and (4) taking action and promoting social justice" (p. 382).

In digital literacies, these critical ideas have been applied to reading and writing digital texts, and, increasingly, to digital life more broadly. Pandya and Ávila (2013) define critical digital literacies as "those skills and practices that lead to the creation of digital texts that interrogate the world; they also allow and foster the interrogation of digital, multimedia texts" (p. 3). They highlight the potential for challenging dominant narratives via digital media production. Strands of critical digital literacy work have focused on a wide range of topics, including personal data practices (Pangrazio & Selwyn, 2019), social media (Pangrazio, 2013), civic action (Garcia et al., 2015), digital citizenship (Buchholz et al., 2020), critical media literacy (Kellner & Share, 2005), digital storytelling and counter-narrative (Jiang, 2024; Wargo, 2017; Lewis Ellison, 2017), and the role of platforms (Nichols & LeBlanc, 2020), among others.

Thinking with Posthumanist Theory for Critical Literacy in the Age of AI

Humanist theories have long dominated literacy scholarship. Broadly speaking, critical literacy scholarship assumes a social constructivist paradigm, with its conception of (given) nature as separate from (constructed) culture, and with its belief in theory "as a tool to apprehend and represent reality" (as described in Braidotti, 2013, p. 5). With respect to its progressive political stance, social constructivism provides critical literacy scholarship as a means to de-naturalize social differences and discursive formations, showing them rather to be human-constructed and contingent (Braidotti, 2013). At the same time, posthumanist theories have also been developing in literacy scholarship, to the extent that edited collections of work on literacy teaching and learning have emerged in the past several years (e.g., Kuby et al., 2019). Posthumanist literacy scholars have explored how literacy is (and has been) a more-than-human endeavor, examining relations of literacy and materiality in a child's play (Boldt & Leander, 2017), literacy and slavery (Snaza, 2019), affective atmospheres in video game play (Hollett & Ehret, 2015), and literacy and the politics of ethnic studies (Niccolini, 2019). Much of this work labors to tease out the ethical ramifications of engaging in posthuman thought and theory.

As a contribution to this ongoing critical literacy scholarship inspired and transformed by the posthuman, we explore four concepts: ontology, agency, ethics and justice, and pedagogy. For each concept, we describe posthumanist theory we are "thinking with" (a term borrowed from Jackson & Mazzei, 2013), and bringing into relation with a critical literacy perspective. In providing a sketch of a critical posthumanist literacy, we hope to offer an approach more powerfully suited to understanding literacy in an AI-infused world.

We agree with ecologist and posthumanist theorist Morton (2013) when he asserts that "nonhuman beings are responsible for the next moment of human history and thinking" (p. 201). Our continued human existence—writing, reading, and all—depends on nonhumans, so it behooves us to think with and about them. Drawing on ideas from posthumanist thinkers to conceive of how "human" literacies are fundamentally intertwined with machine processes, we outline a critical posthumanist literacy approach to conceptualizing (1) ontology, (2) agency, (3) ethics and justice, and (4) pedagogy in the following sections. We illustrate our movement toward a critical posthumanist literacy by focusing explicitly on AI (see Figure 1), although we recognize that our approach is not dependent on AI and could be marshaled to approach other domains of literacy scholarship and practice.

Concept 1: Toward a Critical Posthumanist Literacy Approach to Ontology

Developments in AI serve to highlight trouble or predicaments around questions of ontology. How we conceive of AI, including what kind of a thing or process it is, is consequential for how we teach about and with it. Posthumanist theories offer us at least two important ways of thinking about AI that are relevant to an expanded version of critical literacy: an object-oriented approach and a process-oriented approach.

Object-Oriented Ontology: AI as Hyperobject

As a philosophical orientation, object-oriented ontology (OOO, or "triple-O") claims that objects exist outside of how we perceive them, and outside of their relationships/actions (Harman, 2018). In OOO, objects are those things that are "irreducible in both directions: an object is *more than its pieces and less than its effects*" (Harman, 2018, p. 53).

One useful concept from OOO for thinking of AI ontology is Morton's (2013) hyperobject. A hyperobject is a special kind of object, something so distributed in space and time that one of its hallmarks is being difficult to see from the human perspective. Morton offers us the

FIGURE 1
Diagramming a Critical Posthumanist Literacy Approach and its Application to Literacy Vis-à-Vis AI

	Critical Literacy	Critical Posthumanist Literacy (CPL)	Applying CPL to AI & Literacy
Ontology	Texts as sociocultural production, humans as individuals operating in systems	Human-nonhuman assemblages/meshes as readers & writers, texts as/in heterogenous, dynamic networks	AI is distributed, agentive, consequential, tangled with(in) humans/human labor & communication
Agency	Students as change agents and political participants, concern with human power structures and systems	Agency in assemblage, responsibility for action (e.g., text production) shared among humans and nonhumans	AI acts in the world, and constrains and enables certain (dominantly) human actions, and vice versa
Ethics & Justice	Goal is social justice, democratic participation, equitable (human) participation	Goal is sociotechnical justice, working to build ethical human-nonhuman assemblages	Entangled technical functions & human-dominant systems/relations must all be considered when working toward justice
Pedagogy	Text analysis and resistance, text production, social action	Speculation, interdisciplinarity, flexibility, unpredictability as part of critique and design of texts	Literacy educators must teach about/with AI in emergent, flexible, and speculative ways

idea of objects as bound up in "meshes," which "are potent metaphors for the strange interconnectedness that does not allow for perfect, lossless transmission of information, but is instead full of gaps and absences" (p. 83). Although Morton focuses on global warming as his primary example of a hyperobject, his thinking around this example is interesting when applied to AI (see also Zeilinger, 2022, and Lollini, 2022, for more discussion of AI as hyperobject). Is a drop of rain global warming? No, not by itself, but it is part of the mesh of the larger object. AI is similarly difficult to "see" for how distributed it is across heterogeneous components in space and time, including flows of data, human users, and machine processes that operate at different spatiotemporal scales. Parts of its mesh are literally invisible to unaided human eyes (like microscopic computer chip components or Wi-Fi signals), parts are hidden (like human content moderators and the psychological toll this work takes on them, or proprietary code), parts are physically distant (like server farms across the world), and parts are inscrutable (like black box algorithms). AI is complicated for humans to visualize and includes far more disparate components and processes than we can see with our eyes at any given moment. Just as with climate change, so too do human beings and doings get bound up in the hyperobject mesh of AI.

This theory opposes others that conceptualize/ontologize things as being reducible to dynamic connections, flows, or processes, as discussed below. From a non-dualistic perspective, the mesh of the larger object comes together as a type of assemblage (Deleuze & Guattari, 1987), and the identity of the "human user," "data," and "machine processes" are not predetermined, but are rather entangled in the hyperobject. Critical questions of power relations thus become questions concerning the hyperobject. When humans are not privileged "outside" of the mesh, how can we conceive of power moving across humans–data–machines, in multiple directions? This prompts us to think beyond either apocalyptic or utopic visions of "humans vs. machines," as humans are, already, part (of the) machine, and vice versa. Taking up the idea of person as cyborg, or "a hybrid of machine and organism…a creature simultaneously animal and machine" (Haraway, 1991, p. 149), we can think of our human selves as enmeshed with and co-constituting the AI hyperobject in ways that become important for understanding social power. If cyborgs, rather than humans, are the "dominant social and cultural formations that are active throughout the social fabric" (Braidotti, 2013, p. 90), then how does AI as hyperobject take up a way of being that enacts power in distinctive ways, challenging our notions of the human as author/actor/subject and the computer model as an inert technological tool?

Process-Oriented Ontology: AI as Actor—Network, Phenomenon

The networked view of ontology that Morton (2013) and Harman (2018) write against has a long history in posthumanist theory. The most well-known example of this conceptualization is Latour's (2005) actor–networks. Latourian actor–networks emphasize the actor-ness of the network and the network-ness of the actor. Things are constituted by their dynamic relationships to/with other things, human and non-human. In a different but still process-oriented ontology, Barad (2007) put forward the idea that instead of focusing on things, or representations of things, we should attend more closely to "matters of practicings, doings, and actions" (p. 135). Barad (2007) insists that "the primary ontological units are not 'things' but phenomena—dynamic topological reconfigurings/entanglements/relationalities/(re)articulations of the world" (p. 141). This also is an explanation of how things are actually performative, or processes of "enacting boundaries." Barad's conception of agents as phenomena formed through a process of "cutting" them differs from OOO's assertion that objects pre-exist in any such cuts. Using these ideas, we can think of AI as a phenomenon or an actor–network comprised of humans, data, servers, computers, and algorithms all pushing and pulling one another in a constant state of performing AI. This line of thinking encourages us to think about how we constitute ourselves alongside our data. The process of making it makes us, and can form a part of the agential unit of "us" depending on where we make our "cut."

Though these ideas are opposed in their framing of ontology as primarily concerned with (meshes of) objects versus actions, they both provide lenses for seeing beyond humans and AI as fundamentally separate and static. Rather, humans and AI are bound up together, not separate but separable through human analysis, or "cuts" we make to draw distinctions from within. For example, consider the everyday activity of recognizing a face. In a critical posthumanist literacy perspective of ontology, the "face" is not merely perceived by a human who is "using" (or not) face-recognition software. Rather, the "coming to be" of faces, and the ways they are recognized, is caught up in a network (or mesh) of human and non-human relations. What counts as a face—with all of the deep power implications associated with that—is bound up in this mesh.

Thinking with these theories allows us to ask new, critical posthumanist literacy questions about ourselves and our interconnections with AI: How does thinking of ourselves as tangled up in a dynamic network of human–data–AI processes change how we think of ourselves (our identities) and our capacity to make change (our agency)? Most importantly, who or what has the power to enact these boundaries? What these ontologies do for us is move

away from the idea of AI as merely an inert tool for humans to use; AI also uses and moves us, relying on the data we generate to operate and shaping—often invisibly—our (literacy) activities.

Concept 2: Toward a Critical Posthumanist Literacy Approach to Agency

We first reflect on humanist understandings of agency in education research, then consider how posthumanist ideas about agency allow us to take a new, different look at how we think of student capacities for action in the AI-infused world.

Humanist Agency in Literacy

A dominant paradigm of agency in literacy work, and in education work writ large, is that of explicit or implied humanism. This humanism often relies on the neoliberal conception of the individual as a powerful agent (Miller, 2016) and emphasizes individual responsibility and decision-making, defining agency as an individual's capability or capacity to act. Most sociocultural theories offer a strong view of human agency, and in fact are predicated on the (Marxist) concept of humans changing the world and themselves via objects and mediational means. For example, Holland et al. (1998) define agency as "the realized capacity of people to act upon their world and not only to know about or give personal or intersubjective significance to it," which is "the power of people to act purposively and reflectively, in more or less complex interrelationships with one another" (p. 41–42). In this definition, it is people who act on the world (not vice versa), and there is little consideration of how non-human agents might affect human agency.

Similarly, in critical work, technologies are primarily treated as tools used to achieve or disrupt social dominance, from a social constructivist viewpoint that separates nature/culture. In critical digital literacies work, agency has become closely linked to ideas about participation (including "production," "invention," and ideas around good citizenship) rather than consumption as a key feature of critical literacy (e.g., Mirra et al., 2018). "Digital citizenship" has also become a popular framing for work that foregrounds production and participation as an important part of being a good citizen (e.g., Buchholz et al., 2020). In these formulations, participation with digital literacies aims toward molding empowered citizens. This is a valuable critical perspective, especially as protectionist approaches tend to underestimate the agentic potential of young people. However, conceptualizations of "digital citizenship" often treat technologies as tools for enacting human power, rather than agentive forces in themselves.

Posthumanist Agency à la Latour and Bennett

At its core, actor–network theory (ANT) advocates for the return of agency to things as well as people. For Latour, one of ANT's founders, action need not be shackled to consciousness, or, by extension, intention. An actor is *any* entity that acts, that does work in/on the world. Latour (2005) also insists that intentionality is not a prerequisite of agency and that objects are neither causal nor "mere intermediaries," but rather "things might authorize, allow, afford, encourage, permit, suggest, influence, block, render possible, and so on" (p. 72). This lifting up of the object is not intended to demote the status of the human, but rather to restore the balance from a time in sociology when the material world was largely ignored in favor of the human-semiotic.

Law (1992) also adds an interesting take on "social agents" as always networks. Human "agentic" practices (like thinking) are never accomplished by some essentialized individual person/body, but rather "that thinking, acting, writing, loving, earning—all the attributes that we normally ascribe to human beings, are generated in networks that pass through and ramify both within and beyond the body" (p. 384). Actor and actor–network are inseparable, as actors never accomplish anything—or exert agency—on their own, or outside of emerging entangled human–non-human networks. From a Latourian perspective, agency is not something we identify a priori (as in the case of humanism). Rather, capacities to act, move, block, shift, etc. are described relationally in process or retrospectively as emergent outcomes across a network of actors.

Unsurprisingly, researchers have applied ANT to examining algorithms, big data systems and, to a lesser extent, analyses of AIs. For example, Tufekci (2015) uses ANT to drive her conceptualization of "computational agency," warning that "[algorithms] are armed with our data, and can even divine private information that we have not disclosed. They are interactive, act with agency in the world, and are often answerable only to the major corporations that own them" (p. 217). She gives examples of algorithmic "gatekeeping" and decision-making that are entwined with human actions and that may perpetuate bias and even affect voting patterns, like Facebook's feed algorithms suppressing information on protests in Ferguson, alongside delays in human-mediated news outlets, and Facebook's 2010 and 2012 experiments to "nudge" people to the polls by telling them their friends voted (Tufekci, 2015).

Jane Bennett (2010), describing "distributive agency," links Latourian thought to Deleuze and Guattari's concept of "assemblage" (or *agencement*). She defines an assemblage as "ad hoc groupings of diverse elements, of vibrant materials of all sorts" that "are living, throbbing, confederations that are able to function despite the persistent

presence of energies that confound them from within" (p. 23–24). Bennett (2010) uses the lens of the assemblage and distributed agency to analyze what happened during a massive blackout in the US in 2003, highlighting the interconnections of human and non-human actors and the confluence of factors that led to this unanticipated event—including elements ranging "from a quirky electron flow and a spontaneous fire to members of Congress" (p. 28). In her analysis, agency is distributed among them rather than localizable to single objects or people. Instead of tracing cause and effect through individuals and their actions, Bennett shows how an unruly mix of human–non-human vibrant matter contributed (with varying degrees of responsibility) to catastrophe.

Using a critical posthumanist literacy lens, we might think of agency as bound up in human–AI assemblages, where humans and non-humans accomplish things as interconnected. Bennett (2010) describes how her concept of agency, rather than "attenuat[ing] the blame game," "broadens the range of places to look for sources [of harmful effects]" (p. 37). Taking Bennett's cue, we might broaden critical literacy's focus on understanding the effects of systems of (human) power and think about agency as distributed among human–non-human actors in assemblage. This allows us to ask new, critical posthumanist literacy questions about ourselves and our interconnections with AI, including, for example, questions about power and authorship: Who/what writes a text, or is responsible for a text, when AI is involved (e.g., in suggesting or creating text)? Seeing human agency as entangled with AI asks us to think about "writers" as confederations rather than individuals, word/image/sound choice as a joint accomplishment, and the impact of texts as traceable to human–non-human assemblages rather than singular human authors. Reconceiving of the text and author in non-dualistic terms, where both are entanglements or enmeshments of nature/culture, and human/non-human, complicates a critical analysis of power beyond, for instance, placing the individual human or group of humans within a social "system."

Concept 3: Toward a Critical Posthumanist Literacy Approach to Ethics and Sociotechnical Justice

A general definition of "ethics" is "systematizing, defending, and recommending concepts of right and wrong behavior" (Wrenn, n.d.). Typically, humans are understood to be the ones doing the systematizing *and* the behaving (rightly and wrongly). However, work in the ethics of AI as well as in posthumanist scholarship challenges this assumption. Scholars studying the ethics of AI have challenged both human separability from the operation of AIs and also humans' status as the only ones capable of moral agency (Behdadi & Munthe, 2020). Given these new developments, it makes sense to draw on ideas of ethics that complicate human/ethics relations. In addition to drawing on posthumanist theories, literacy scholars can also draw on work from the field of AI ethics, discussed below.

Drawing on Disciplinary AI Ethics Scholarship

In critical literacies work, scholars and practitioners aspire to be ethical, invoking ideals of justice, democracy, and equity frequently. However, literacies scholarship rarely examines the ethicotheoretical basis of these claims and aims, relying instead on normative and/or implicit definitions of these terms. This is a hindrance when faced with the massive changes that have accompanied complex computation, and our entanglement within it.

Computer ethics has had to reckon with the paradigm shift accompanying the ubiquity of complex computational systems. As Johnstone (2007) writes,

> Standard ethical theory is concerned with the analysis and evaluation of volitional action…there are however reasons to doubt whether this kind of analysis based on discrete actions and identifiable agents and outcomes—essentially, the attribution of responsibility—is adequate to address the full range of concerns (p. 74).

Johnstone (2007) and other computer ethics scholars (e.g., Mittelstadt et al., 2016) debate how to understand who or what might be deemed responsible given these complications around actions, agents, and outcomes. As AI ethics scholars grapple with these changes, literacy scholars can look to them for guidance in our own critical digital literacy practice. For example, this kind of relational ethical theory may be instructive when we think about "responsibility" for a text as no longer linked so directly to "volitional action" of a human author, and could inform discussions about what plagiarism and authorial integrity mean in the age of AI.

Posthumanizing Ethics with Barad's "Cuts"

Posthumanist theory also contributes to new understandings of ethics as more-than-human. Hollin et al. (2017) contend that Barad's contribution to ethics is often understated, pointing to how the "cuts" people make in separating bodies and objects have ethical consequences. These "cuts" are not pre-ordained, but rather made as people act in the world. Because people form certain arrangements and ideas about which things are separate, they also foreclose certain possibilities. Hollin et al. (2017) explain,

> A focus on agential cuts, therefore, is generative of particular sets of ethical responsibilities; though matter itself has stability, it is still necessary to be accountable for the cuts that created this stability and to grapple not just with the ethical

consequences of these cuts, but with the constitutive exclusions that underpin them (p. 933–934).

This reading of Barad's ethics, as stemming from our interpretations and enactments of certain patterns of agential cuts, opens up the possibility of different agential and ethical arrangements if we are able to see them as potentially mutable performative patterns rather than pre-determined distinctions. This re-working of agent into a separable but not pre-figured entity allows us to consider how and why people make distinctions between tool and person, human and machine, in ways that might help us see different ethical possibilities. For example, we might think of a human reader as making independent choices about what to read, attend to, or think about, but perhaps our choices have already been algorithmically narrowed and nudged toward certain content, presented in certain ways, designed to evoke a certain response. Human readers on social media, for example, often make joint decisions about what to attend to alongside AI recommendation algorithms. Where our readerly and authorial autonomy begin and end in an AI ecosystem may need to be separated by "cuts" that allow us to understand our choices as motivated not only by our conscious desires, but also by sometimes hidden algorithmic factors.

With respect to expanding toward a critical posthumanist literacy, the issue of agential cuts also implicates and raises questions about literacy research as ethical practice. In this framing, the question of how we make distinctions between humans and technologies, for instance, are not merely questions of speculative theory, they are deeply ethical considerations. Critically speaking, coming to understand power in these relations involves raising questions about the determinations we make concerning the boundaries of the human, and the technical, and their degrees of entanglement. In this modality, critical research does not merely identify lines of power and identity; rather, it reflexively seeks to understand how it is performing those relations with the "cuts" it makes within its process: how categorization, coding, sorting, subject/object relations, representing, and other movements in research perform agential cuts that perform (a version of) the world rather than merely describing it. In a posthuman reconsideration, the move toward a relational ethics can be imagined as a form of experimentation, moving away toward assumed social norms and a unitary human subjectivity and toward open ways of becoming ethical:

> The elaboration of new normative frameworks for the posthuman subject is the focus of collectively enacted, non-profit-oriented experimentations with intensity, that is to say with what we are actually capable of becoming. They are a praxis (a grounded shared project), not a doxa (common sense belief) (Braidotti, 2013, pp. 92-93).

Sociotechnical Justice

We have put ethics and social justice together because they are closely related and because critical literacies scholars often use these terms together (e.g., Luke, 2018; Shor, 1999). We have included both for two reasons: first, ethics has a different disciplinary tradition associated with it that is a key source of materials and tools for analysis; second, "social justice" has a rich history in critical literacies but has typically centered human relationships in a way that may limit our understanding of literacy in the age of AI.

We draw from disciplinary AI and posthumanist ethics a concern with the non-human as central to human existence—and, by extension, our ideas of justice. In previous work, we (Leander & Burriss, 2020) outline a vision of how posthumanist theory can help us embrace action toward a more expansive notion of social justice via posthumanist ethics, "where human agents can leverage computational machines and processes to become more ethical assemblages with them" (p. 1274). Beyond merely identifying our entanglements with AI, these theories can give us ways to think about changing our world and ourselves from within the tangle.

Here, we build on that work and signal a reorientation toward incorporating non-humans in our understanding of justice by using the term "sociotechnical justice," which indicates that our ideas about producing equity among human beings in social systems are now always also inherently technical because of our everyday entanglement with AI (see Collins, 2020 for a use of this term in healthcare). This conception of justice recognizes that humans can no longer achieve social justice without technological justice as well. Justice is no longer merely social and no longer exclusively human; it is bound up with ever-changing technologies. This notion allows us to ask new, critical posthumanist literacy questions about ethics and justice in the age of AI: How are texts evaluated and shared in human–non-human networks, spread or suppressed by obscure(d) algorithms that operate within and sometimes extend systems of social domination? While social media is the obvious context for this kind of question, we also may start to see these influences in other spaces, like schools, as AI becomes part of writing instruction and algorithms shape and judge what counts as "good writing."

Concept 4: Toward a Critical Posthumanist Literacy Approach to Pedagogy

A major concern of this theory is pedagogical: how should educators best teach about AI and its impact on our lives? "Pedagogy" has been used and defined in a variety of ways, from a science to an art (Murphy, 1996). We are using the

term to mean, simply, a theoretically grounded understanding of the "how" of teaching. In particular, we focus on trying to design and use a set of theoretically grounded teaching practices that, when mixed with students, content, and activity structures, create meaningful learning experiences.

There is a large body of work discussing "critical pedagogy," as well as a significant body of work outlining critical *literacy* pedagogy. Although some scholars have cautioned against providing any sort of strict formula for doing critical literacy, there are core practices that traverse this work. Behrman (2006) outlines six types of practices: "reading supplementary texts, reading multiple texts, reading from a resistant perspective, producing countertexts, conducting student-choice research projects, and taking social action" (p. 492). Comber (2015) suggests that key "pedagogical moves" in critical literacy are "Repositioning students as researchers of language, respecting student resistance and exploring minority culture constructions of literacy, and problematizing classroom and public texts" (p. 363). There are variations of these sets of practices from different viewpoints, but they share common ideas about positioning students as creators and agents of social change, and consuming, analyzing, and producing texts (broadly defined) in ways that interrogate hegemonic power structures.

Teaching with Emergence

Posthumanist theory offers an expansive lens for thinking about pedagogy as emergent and affective. Rautio et al. (2019) describe emergent pedagogy as centering the unplanned "disturbances" or "distractions" as key sites of learning, rather than pre-designed plans. They emphasize that in this model of emergent pedagogy, learning cannot and should not be "fully controlled," teaching and learning is socio-material "rather than individual interactions between humans," and that these ideas necessitate rethinking individual assessment (p. 233). Hickey-Moody (2009) explores interaction with music, literature, and dance as posthuman pedagogy, where "affect in art is a vector of pedagogy" (p. 274). In these two discussions of posthumanist pedagogy, widening the understanding (and evaluation) of learning to include more than just individual humans and exploring affective relationships with art are key practices.

Teaching with Unpredictability

Embracing emergent pedagogy is both particularly useful and necessary when teaching with AI, a notoriously slippery–shifting in meaning and capabilities, hidden behind proprietary claims–subject. Drawing on critical literacy pedagogy, we might seek to analyze how power operates in and through a largely static text. Extending this practice into a critical posthumanist literacy pedagogy, educators would need to address changes to a text that are unpredictable and subject to corporate whims, as in the case of an algorithmically curated social media feed. Furthermore, given the opaque nature of many AI systems, educators may not (be able to) know, for example, on which data a model was trained, what the model will predict/generate, or why it would make such a prediction/synthetic text. This kind of opacity and unpredictability poses a challenge to traditional modes of critical literacy inquiry, which rely on more transparent and straightforward chains of (human) cause and effect, and it necessitates a more flexible and experimental approach where human expertise is not guaranteed or, sometimes, even possible.

Teaching as Speculation

A speculative orientation in teaching approaches pedagogy with wonderment about what can be opened up and imagined in the process of learning. Critical literacy teaching has unique resources through which to enter into such speculation, including literary fiction. Science fiction in particular has long been acknowledged as an arena for exploring thorny sociotechnical issues, at times reflecting nagging fears of the day, predicting future dilemmas, and sounding dire warnings (Blackford, 2017). In discussing speculative fiction pedagogy, Boaz (2020) writes,

> There is a reason that writers are among the first people targeted at the dawn of authoritarianism. Writers—particularly those who work in the genre known as speculative fiction—can offer their audiences inroads to truths inaccessible in other public realms (p. 242).

This powerful truth-telling function is but one way that encountering speculative fiction can affect us. Some scholars have explored the various ways that engaging with literature in the classroom can shape ethics and morality. Collin (2020) offers four ways: transmitting, transacting, clarifying, and cultural identity and difference. Others have noted how speculative practices like Haraway's "speculative fabulation" can be a powerful site of resistance and response to a largely White, European canon and speculative spaces that have historically devalued or underrepresented contributions of queer, trans, Black, Indigenous, and People of Color (Truman, 2019).

In addition to these functions, science fiction can provide a way to exercise human agency without fear of physical consequences. Students and instructors can "test out" an idea or an AI and see where it takes us without causing offline harm. In physics and philosophy, the idea of a "thought experiment" is not trivial or fanciful, but rather an important mode of research and exploration with key ideas. Such testing out or thought experiments expands the critical realm into the imaginative. In this manner, critical literacy becomes associated not merely with rational critique or response to other texts, but also with imaginative lines of flight toward the possible, following and

playing with the relations of the more-than-human that are already upon us.

A Critical Posthumanist Literacy Approach

Incorporating posthumanist ideas into critical literacy theory and practice offers us new ways to understand ontology, agency, ethics and justice, and pedagogy in the age of AI. These concepts are examples of how keeping long-held commitments of critical literacy, but bringing in posthumanist ways of thinking about AI and literacy practice with it, can help us theorize for what is already happening and what should happen in our AI-infused world. For example, when we consider justice as bound up in more-than-human systems (as *sociotechnical* instead of social), educators might work with students to envision futures that address how texts circulate with algorithmic influence that can often mean perpetuating–and sometimes exacerbating–human biases.

Our reading, writing, and communication are increasingly bound up with machines and machine processes, including AI. We have found that neither critical literacy nor posthumanist theories on their own give us all the tools necessary to envision a sociotechnically just literacy pedagogy. In our view, critical posthumanist literacy helps us think about literacy in the age of AI by using critical literacy as a foundation from which we reach toward ideas from posthumanist theory about existing and acting in human–machine meshes. Critical literacies have a rich tradition of pedagogical theory and practice, including an orientation toward social justice and concern with democratic participation, dialogic practices, critical questioning of power relationships, and techniques for analyzing texts of many types. These commitments and techniques remain at the core of our theorizing, but we posit we need to expand beyond these commitments to account for how agentive machines are entangled with "human" readers and writers, and how such entanglements underscore questions of how we have been separating out "human" identities in literacy all along.

We can–and perhaps must–draw from posthumanist theory to guide our critical literacy work as it becomes increasingly entangled with machine processes. We have summarized these convergences in the figure above, where we show in the center column how critical posthumanist literacy can provide an expansive approach to literacy research and practice, and how such an approach might inform our understanding of rapidly developing AI. The discussion of critical posthumanist literacy here is one entry point into theorizing for a sociotechnically just human–machine future that is, just as AI itself, not predetermined.

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Conflict of Interest

The authors have no conflicts of interest to report.

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