

Of teachers and centaurs: Exploring the interactions and intra-actions of educators on AI education platforms

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Education Platforms

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Abstract

Recent advancements in generative Artificial Intelligence (GenAI) brought with it both hype and fear regarding the ways in which such technologies of automation would replace human labor in various fields, including education. Rather than focusing on the replacement of humans in teaching, this piece uses new materialist thought (Barad 2007) to consider how a new subjectivity, the centaur, might offer a different orientation toward GenAI technologies as tools that possess potentiality for new becomings in teaching. This theoretical piece looks at three AI education (AIED) platforms as a means of diagnosing how current models of AI tools attempt to design for teacher-centaurs by ushering in a more productive teacher workforce. The article also offers an alternative perspective of what might be considered centaur teaching practices, entangling humans and AI in ways that imagine how human-technical relations might be otherwise.

Keywords: generative artificial intelligence, new materialism, subjectivities, teacher labor, centaur

In 1997, IBM's Deep Blue became a legend in the world of Artificial Intelligence when it defeated World Chess Champion Garry Kasparov in a game of chess. The embittered Kasparov requested a rematch, believing that the match was in some way rigged through clandestine human intervention. IBM chose instead to revel in its technological achievement and retire Deep Blue in the Smithsonian, denying Kasparov's incendiary claims and refusing him his rematch. A year later, Kasparov would play the first game of 'advanced chess' in which humans and computers cooperate to play against other human/analytical engine teams. This style of chess has since been given the monikers 'centaur chess' and 'cyborg chess.' Advanced chess has experimented with different permutations of human/AI competition and has concluded that, regardless of how powerful AI technology becomes, humans teamed up with AI are consistently more capable of defeating humans and AI playing independently.

A quarter of a century after Kasparov's defeat, a study by IBM Institute for Business Value (2023, 2) made a now oft-cited claim about the future of labor: 'AI won't replace people—but people who use AI will replace people who don't.' With this aphorism in mind, AI engineers would adapt the idea of human-computer symbiosis (Licklider 1960) to think about how humans and their AI-enabled technologies could be optimized for centaurs (Case 2018; Schnoebelen 2018). The concept of centaurs serves not merely as a useful metaphor for the imagined ways in which humans and technology enter into symbiotic relationships, but reinforces the idea that such relationships can support an economic drive to achieve more at a faster pace than what was believed to be humanly possible. As a result, the centaur is a subjectivity (or perhaps simply a user) to be designed for and marketed to, playing on the modern impulse toward productivity and economic prosperity. Recent advancements in Generative Artificial Intelligence (GenAI) brought with it hype (Nemorin et al. 2023; Humble and Mozeliuss 2022), much of it galvanizing

economic concerns related to the future restructuring of labor and capital. Education was no exception, as scholars began speculating about the diminished role that teachers would play in the age of AI-automation (Selwyn et al. 2023; Decuypere et al. 2023). Such speculations are often situated within a critical stance around AI that paints a grim picture of the future of education.

It is worth considering how the economic ideas of speed and stamina are directly connected to competition and the economic pressures associated with a late-stage capitalist impulse toward efficiency for the sake of increased productivity. While some fear that the introduction of GenAI into the workforce will lead to the progressive replacement of humans within certain fields, Chace (2016, 252) believes that the centaur has ‘become a metaphor for the hope that humans will not be rendered economically redundant by intelligent machines, but instead will work ever more closely with them.’ So, it is in response to such economic fears that the centaur becomes a figuration of the future, not necessarily because it is believed that the combination of humans and intelligent machines ultimately will improve outputs, rather because it ensures that humans remain economically viable.

Not all portrayals of the centaur proffer images of a future meant to protect human flourishing. In particular, Pasquale (2020) describes how centaurs have been adopted by the military industrial complex to increase the efficiency of military strikes through drone warfare. Pasquale explains that a world in which humans use remote controls to navigate weapons of war cheapens the cost of war by making it easier to surveil and kill at scale without the human costs associated with manning aircrafts. War, he argues, is something that *should be* costly and inefficient because it makes the stakes of attack necessarily high. While this article does not deal with such high stakes, Pasquale’s work brings about an important question about centaurs: just

because humans and AI technology can create greater efficiencies, should that be something we desire?

Bringing this concept more directly into contact with the teaching context, we might imagine a teacher who has dozens of papers to grade along with lessons to plan all while juggling meetings and/or sponsoring extracurricular activities after school. GenAI platforms can help support the grading of essays and develop ideas for lesson plans, which not only accelerates the grading and planning process, but also provides the teacher with greater stamina, allowing the busy teacher to complete these time-consuming tasks faster and with less required energy. Stated differently, teaching tasks that might have taken hours to do now could take a fraction of the time and energy, which means that such finite resources could be re-allocated elsewhere for the teacher.

In this article, I develop the subjectivity of the teacher-centaur as an extension from the world of chess and platform engineering to consider how it might respond to the economic pressures facing education today. The choice of centaurs over cyborgs may seem curious at first. Greek myths depict centaurs as hybrid beings, fusing the torso and head of the human with the body and legs of a horse. When humans are paired with horses, they retain their humanity through their cognitive skills while also adopting two important equestrian features: speed and stamina. Alternatively, cyborgs are cybernetic humans augmented by technology and are defined by a few important features, specifically prosthetic body parts such as bionic eyes meant to provide humans with precise, extra-human vision. Much has been made of the inaccuracy of the early versions of GenAI models, referring to the misinformation and ‘hallucinations’ (Salvagno, Taccone, and Gerli 2023) that permeate GenAI platforms. As a result, the current functionality of GenAI lies not in its precision, but in the promise of greater efficiency and productivity for

human labor. I attempt to underscore how the concept of the centaur has practical considerations as GenAI has entered into the personal and professional lives of millions of users. Subjectivities, while abstract, are not merely cultural artifacts used to merely name a phenomena; they are metaphors we live by (Lakoff and Johnson 2011), giving shape to relationships between humans and tools. Thus, the stakes are significant. We should seek precision as we identify subjectivities that help describe the way we shape and are shaped by novel technologies. Subjectivities in this sense are not just anticipatory science fictions, but fabulations meant to be productive conceptual persona intended to help us consider how we might ethically accommodate monsters-to-come.

Barad's Agential Realism

Barad (2007) argued for agential realist accounts of humans and nature which refuse the primacy of humans and instead views them as co-constitutive of the material they find themselves arranged with. They describe agential realism as 'an epistemological, ontological, and ethical framework' (32) or an 'intertwining of ethics, knowing and being' (185). This article offers a unique perspective of GenAI's integration into education, focusing on the pervasive discourses of automation and exploring how educational scholarship might co-opt the concept of the centaur from the grasp of the current economic forces working on and against teachers in order to offer different ways of thinking about what becomings are possible through burgeoning human-AI arrangements in schools. A new materialist theoretical framework is used to offer speculative insights into how teacher-AI entanglements produce new becomings in schools. For Barad (2007, 36) ethico-onto-epistem-ology makes evident how 'technologies are inextricably intertwined, as are the issues they bring into focus: the intra-activity of becoming, the ontology of knowing, and the ethics of mattering.' Whereas epistemic questions abound regarding what

knowledge is in an age of AI (Markauskaite et al. 2022), this article underscores the ontological and ethical *potentia* of emergent becomings on the fringes of a possible AI renaissance.

Ontology of Knowing

Barad (2007, 33) describes engagements with different bodies, not as unidirectional interactions rather, as intra-actions in which bodies are productive of one another. Phenomena is thus ‘the ontological inseparability of agentially intra-acting components.’ An onto-epistemological stance recognizes that knowing and being are inextricably linked. Barad states ‘The “knower” cannot be assumed to be a self-contained rational human subject, nor even its prosthetically enhanced variant’ (379). Centaurs, then, are not stable and persistent ontic beings with their own self-contained knowledge. Knowledge is dynamic—an effect of articulated configurations with other beings through entangled material practices. The centaur, then, is not an identity, but a constituted subjectivity made intelligible through phenomena, in this case the intra-action between humans, AI, and any other apparatus which creates ‘agential cuts.’

It is worth lingering on the concept of epistemology as it relates to GenAI, as this article takes seriously the knowledge of all bodies while also recognizing the fraught nature of technologies believed to possess intelligence, artificial or otherwise. GenAI technologies are developed through the crawling of digital content and trained using supervised reinforcement learning which help create the large language models to produce an output using natural language processing. Barad (2007, 380) argues for rejection of ‘intellection in the humanist sense,’ believing knowing to be performative and responsive to that which matters. With GenAI, this rejection becomes increasingly more difficult particularly given the choice to name technologies after human likeness through the use terms like ‘intelligence,’ ‘neural networks,’

and ‘machine learning.’ The trap, then, is to understand the agency of GenAI without being overly deterministic.

The metaphor of language learning with technology elides the issues associated with linguistic representationalism. Barad (2007, 97) takes issue with the ‘the assumption that language is a transparent medium that transmits a homologous picture of reality to the knowing mind,’ particularly as it relates to reporting observational findings in science. But this extends beyond the realm of scientific discovery as we consider how AI, without eyes to observe the world, reflects how it has been trained to express an understanding of the world as interpreted through text—as though language could encapsulate reality. Rather than translating all things into words, performativity must be a ‘contestation of the unexamined habits of mind’ (133) in which we challenge the power granted to language to reflect our ontologies by untethering words from matter.

Intra-activity of Becoming

For Barad (2007, 152), ‘All bodies, not merely “human” bodies, come to matter through the world's iterative intra-activity—its performativity.’ Intra-action is a central concept for Barad (2007), stating that, ‘in contrast to the usual "interaction," which assumes that there are separate individual agencies that precede their interaction, the notion of intra-action recognizes that distinct agencies do not precede, but rather emerge through, their intra-action’ (33). This ontology of relationality attempts to disrupt notions of individually determinate entities in exchange for the idea that ‘things’ only come to *matter* through their engagements with other bodies—through phenomena. Barad makes clear that intra-actions are causal, but nondeterministic, and reinforces that no bodies are constantly creating and re-creating themselves through relations they find themselves entangled with.

Although Barad's agential realism provides a radical departure from materialist ontologies which promote a hierarchical humanism, their work is more than just a provocative philosophy that encourages humans to grant agency to the inanimate world. Rather, new materialist thought offers an alternative orientation meant to temper human exceptionalism by seeing the material world as lively and always already imbued with agency, bringing with it new ethical imperatives of care for beings we find ourselves entangled with. This theory has proven to offer different insights about education, including the datafication of students (Dixon-Román 2016), safe spaces for LGBTQ+ students, (Allen, Fenaughty, and Cowie 2022), and youth literacies (Jusslin and Höglund 2021). This article takes seriously the agency of GenAI platforms and the performativity of algorithms (Mackenzie and Vurdubakis 2011) in shaping educators and their approach to planning, instruction, and assessment.

Throughout this article, I refer to bodies in this more expansive manner, one which attempts to include the human and non-human to underscore the vitality of all matter. This can provide a unique challenge given that AI is algorithmic—a set of code written in its own language and seemingly encased within browsers and apps within hardware. However, through the lens of new materialist thought, GenAI is a body that is constituted through material-discursive phenomena. It is not a body that was created through large language models and made more perfect through reinforcement learning. GenAI is a body made, un-made, and re-made through agential cuts—enactments which 'cut "things" together and apart' (Barad, 2007, 179)—that happen through intra-actions with other human and non-human bodies. Put differently, these bodies are performed. They are not things in themselves that are *in* the world so much as they are *of* the world. Barad's work has been used to think about algorithmic performativity, or the idea that, while at first humans shape algorithms through the development and training phases,

eventually those same algorithms are integrated into our technologies to shape human beliefs and actions (Gustavsson and Ljungberg 2021). The performativity of source code is often disbursed across a number of tech companies, platforms, and engineers/hackers working on it. And yet, for those outside of the tech community, code is that concealed language, which when executed unleashes a series of predictive models which possesses within it in ability to ‘make things happen’ (Mackenzie and Vurdubakis 2011, 6). Algorithms, then, cannot be understood as neutral code which when deployed simply represents or mirrors our world, but which enact a level of autonomy through discursive performativity, impacting much of our lives while remaining mostly hidden from our awareness. Algorithms are programmed to solve perceived problems, such as curating social media content, making reservations, or fixing grammatical errors in writing. In doing so, they act agentially by shaping our beliefs, social lives, and knowledge work.

A greater challenge lies in trying to disabuse ourselves of the idea that humans are the initiators of centaur subjectivity. Barad (2007, 136) makes clear that new materialism must not be ‘calibrated to the human.’ Rather, we must break away from human exceptionalism while at the same time recognizing our role in the ‘differential constitution and differential positioning of the human among other creatures (both living and nonliving)’ (136). Intra-actions attempt to reimagine materiality by shifting ‘ontology from things to phenomena’ (336). Centaurs, then, are (re)configurations constituted through human-AI entanglements. In considering a GenAI new materialist subjectivity, centaurs enter into and out of material subjectivity, not simply by moving closer to and away from AI tools, but through productive differential material arrangements where their AI-enabled subjectivity is immaterial.

Drawing on Foucault, Barad (2007) refuses the existence of the ‘autonomous subject that stands before discourse-power-knowledge practices’ (62). Indeed, we have never been

autonomous. However, in a time where autonomous machines threaten to take human jobs, we might re-interpret such fears as GenAI taking jobs we once believed were uniquely human. At the core of such economic threats is not simply that humans realize they are not as intelligent or capable as once believed, but there is also a concern of autonomous machines taking away human autonomy. Recent impulses in different industries to integrate AI in the labor force suggests that current conditions may privilege not simply those who are willing to use AI over those who do not, but that those early adopters of AI may actually be training the machines that will one day take their jobs.

Another way we might apply Barad's thinking around this current moment with GenAI is in thinking about how much power we have ascribed to generated text. According to Barad (2007, 150), 'Outside of particular agential intra-actions, "words" and "things" are indeterminate.' This makes perfect sense with GenAI, as AI-generated text does not pre-exist the prompting. Text generation is bounded by our intra-actions with it, underscoring how such phenomena only comes to 'matter' through discursive practice. However, *we* also come to matter through our intra-actions with GenAI. This requires a reworking of the assumed asymmetries associated with subjects/objects and instead recognizes matter, not as a thing, but as a doing, or a 'congealing of agency' (210). Thus, teachers and students are always being 'intra-actively (re)constituted as part of the world's becoming' (206) through their arrangements with materials in schools, including AI.

Ethics of Mattering

For Barad (2007), ethics are not meant to be universal nor reductive edicts for moral behavior, so much as a commitment to difference. According to Barad, 'We are not merely differently situated in the world; "each of us" is part of the intra-active ongoing articulation of

the world in its differential mattering' (381). Such relationality underscores the importance of responsibility and an increased sense of accountability to the other as beings continually cut together and apart. Re-imagining such an ethical commitment to 'the other' poses some challenges associated as it can be difficult to align ourselves with that we have historically not understood as existing on the same plane as us. Such an approach requires us to reject a humanist ethics and recognize our responsibility to all bodies we find ourselves entangled with, even when 'the "face" of the other that is "looking" back at me is all eyes, or has no eyes' (392).

Barad (2007, 59) draws their inspiration for their ethical stance from Haraway, stating 'cyborg politics are not merely about the cross between human and machine but also about the technobiopolitics of the differentially human and their motley kin.' Again, the responsibility of mattering, particularly with technology, is a commitment to difference for oneself and the other—even if that other is technological body. Barad points out that 'Technoscientific practices are about making different worldly entanglements, and ethics is about accounting for our part of the entangled webs we weave' (384), later describing ethics simply as 'an ethics of worlding' (392).

Ultimately, Barad (2007, 383-384) makes the point that that one must not simply consider 'how nonhuman animals are being appropriated for human desires but also about how our desires and our beings are co-constitutively reconfigured as well.' This article takes seriously the ways in which teachers' desires are being reconfigured differently in the face of teacher shortages, as economic pressures collide with the introduction of GenAI into the labor force. It is worth speculating about the compulsion toward speed and stamina might impact teaching practice (for better or worse). Moreover, we might consider the desires of AI engineers and big tech as well

and the extent to which autonomous AI machines might force us into desiring something different in education.

Ethical AI is a topic that has become more prominent as GenAI platforms have gained popularity. Yet, it is easy for one to prompt a GenAI platform and not fully understand how their seemingly localized intra-action is participating in a much larger phenomenon. For example, a teenager in California prompting Khan Academy's Khanmigo chatbot to proofread a research paper for a high school English project could be entangled not just with the writing assignment, a laptop, the internet, and AI platform in that moment. Rather, he is entangled with algorithms and the humans that trained them along with the data on a server in a data center in Virginia running GPUs 24 hours a day, emitting dangerous levels of CO₂ emissions into the atmosphere. At the same time, other ethical questions enter the fray when discursive questions around the bias of the AI and school policies around academic honesty determine whether the teenager is learning from the generated results, cheating, or being misled by potentially hallucinated results. In turn, these have epistemic implications for the student. Additionally, the student also becomes entangled with the Khan Academy's data retention policy, which claims to not use student data for training purposes, but does collect data in order to recall students' interests and learning (Khan 2024). As a result, the Khanmigo bot, which is taught to remember the students' interests to tailor future instruction, is being shaped by the student's knowledge and personal proclivities, demonstrating the co-constitutive nature of the centaur.

Teachers and Centaurs

An agential realist account of the centaur in a classroom setting is one in which the teacher prompts AI for an idea for an activity or a novel way to approach content and the platform generates a response that opens the possibility for dynamic and creative possibilities,

but perhaps not quite what the teacher had in mind. The human then might refine the request by rephrasing the prompt, which then leads to something closer to what they imagined. This back-and-forth might happen until the centaur has arrived at a solution. The aleatory affordances of GenAI allows for an unpredictable outcome which further underscores the indeterminacies of the centaur. While at any given time the GenAI platform can never know what a human will prompt it to do, the human is equally uncertain of how the model will respond.

Such indeterminacies should not be viewed as an inconvenience, as it opens different potentialities for approaching educational conundrums. Recall, however, that the centaur is defined by their equestrian affordances of providing humans with greater speed and stamina. In the phenomena described above, what drew the teacher to GenAI was some knotty problem related to planning, or perhaps it was a curiosity or desire for something different to try in the classroom. It is possible that the ideas generated by the intra-action would have been the same ones the teacher would have arrived at on their own. But, the product for the centaur might be less significant than the phenomena and the affordances of speed that help them arrive at a result sooner and without expending as much energy.

Fostering the centaur comes with certain responsibilities as well. It is not only about how humans come to matter and how teachers are likely to reap the benefits of GenAI tools, but the shared obligation centaurs have in such intra-actions. The next section considers not just that responsibility, but the ways in which the concept of the centaur has been taken up by those engineering AIED tools and toward what ends and whose interests centaurs are being constituted in educational contexts.

AIED Platforms and Centaurs

One of the challenges in developing new materialist subjectivities is that they are not intended to serve as stable identities. Just as the student described above using Khanmigo is shaping and being shaped by GenAI platforms through their intra-actions, teachers are likely to find themselves entering into unstable and co-constitutive relations with the GenAI tools aimed at supporting their teaching practice. As such, the centaur is difficult to observe within any particular educational ecosystem, as their entanglements with GenAI may be fleeting and, as GenAI becomes increasingly built into often used digital tools like search engines and writing software, they become invisible actants. However, due to the growing popularity of AIED platforms—and given that the centaur is a subjectivity that comes from the field of AI engineering—one interpretation of the teacher-centaur can be better understood through the discursive practices of AIED platforms.

What follows is an exploration of various AIED platforms and the ways they use GenAI to alter teacher labor related to planning, instruction, and providing feedback. In order to consider how teacher-centaurs are being produced through their use of these platforms, I began by reflecting on my own teaching practice when I was a middle school English language arts teacher and thinking about tasks I would have considered outsourcing to GenAI: planning, instruction, and providing feedback on written work. Next, I searched for specific AIED platforms that specialized in those tasks. The platforms discussed below were chosen based on their popularity, determined primarily by self-reported user metrics, in order to consider which tools current teacher-centaurs would be most likely to adopt for their teaching practice.

Planning with MagicSchool

The self-proclaimed ‘leading AI platform for teachers’ (MagicSchool, n.d., para. 3) is MagicSchool.ai, an AI-powered assistant that uses OpenAI’s LLM to help teachers in seemingly every facet of their jobs. The homepage displays the slogan ‘the magic of AI to help educators with saving time’ (MagicSchool, n.d., para. 1) stating that it can help teachers reclaim ‘10+ hours a week’ (MagicSchool, n.d., para. 3) through a suite of over 60 GenAI tools. In addition, it touts its over 2 million users and partnerships with over 3,500 schools and districts worldwide. CEO Adeel Khan argues that the strength of MagicSchool is that,

It democratizes knowledge...[Teachers] can go to this platform and say, 'oh I can use it for drafting a letter to a family. I can use it for leveling a text for a student who's behind in grade level. I can use it for generating questions associated with a text.' (Abeyta 2023, para. 6)

The website also links to profiles of teachers using MagicSchool who were featured in various media stories. These profiles do not discuss the specifics of the content generated using the platform nor how the teaching and learning process is changed. The focus, rather, was on the ways in which many of the tasks outside of instruction have been streamlined to improve working conditions and quality of life. One Colorado high school teacher, Zach Kennelly, stated that the benefit of MagicSchool is that it ‘accesses excellent high-level information, increases ease of intellectual prep for me, ease of getting it to the student, and then I can make it so relevant’ (Abeyta 2023, para. 2). Tim Ballaret, a math and science teacher in Los Angeles used it for lesson planning and found that,

Taking back my summer helped me be more refreshed for a new school year...When I'm not spending so much time at home doing these things, I'm able to spend more time with

my family and my friends and my wife so I can be my best at work, instead of being tired or rundown. (Johnson 2023, para. 3)

MagicSchool underscores the central tenets of the centaur: speed and stamina. When the website claims that MagicSchool can save teachers over 10 hours of work per week and prevent burnout that forces teachers to leave the profession, it gestures toward an idea that teaching is hard because of all of the responsibilities educators have beyond the act of teaching: planning/creating materials, grading, differentiation, meetings, responding to emails, etc. What MagicSchool offers is a utopian vision where those ‘lower-level’ tasks are outsourced to GenAI so that teachers are able to reclaim their time. This helps demonstrate how speed and stamina are imbricated for the centaur: as more tasks are completed at a faster clip, teachers ostensibly feel less burned out and can show up in their classrooms more ‘refreshed’ having now re-allocated the time they would typically dedicate to planning to their students as well as their families.

Feedback with Brisk Teaching

Brisk Teaching is an AI-powered Chrome extension that integrates with the Google suite (Docs, Slides, Forms, and YouTube) along with a variety of Learning Management Systems (LMS) including Google Classroom and Canvas. The key refrain on the website is that Brisk easily integrates with tools that teachers already use, allowing them to ‘automate your workload without adding to it’ (Brisk Teaching, n.d.-b, para. 1). According to their website, Brisk’s 30+ AI tools are used by 200,000 educators—half the tools and 1/10th the users of MagicSchool. And yet, it makes similar claims that it can save teachers an average of 10 hours of work time each week. Unlike MagicSchool, Brisk states that it does not only use OpenAI, but a variety of LLM’s which allows them to tailor their tools based on the affordances of different models. However, the website does not disclose which LLM’s are specifically used for each teacher tool.

Perhaps one of the most onerous teaching tasks—particularly for teachers of writing—is providing timely feedback to students. This is where Brisk’s integration with Google Docs and LMS comes in handy, as it provides instantaneous feedback on student writing. Teachers need only click on the widget that appears at the bottom right corner of a Google Doc and hit ‘Brisk It’ to have the extension review student writing. Teachers using the paid version have the option to evaluate student writing against a set of criteria from a rubric as well provide ‘targeted’ feedback by highlighting student text and providing comments in the margins. The free version offers a more general approach to feedback by giving a ‘glow,’ ‘grow,’ and a ‘wonder’—or praise, a recommended revision, and a question—which summarizes suggested improvements to the draft. Interestingly, when a teacher with a paid subscription opts for targeted feedback on student writing, the comments are created in the margins using the teacher’s Google username, shrouding any evidence that the feedback was generated by AI, implying that the revision suggestions were written by the teacher themselves.

The first thing users see when they open the Brisk homepage are the words ‘Teaching is irreplaceable. For the rest of your workload, there’s Brisk’ (Brisk Teaching, n.d.-b, para. 1). This comment seems like a clear attempt to address an AI-driven replacement theory of education that suggests that teachers could one day be supplanted by teacher bots. As part of their resources, Brisk’s teacher’s guide suggests that teachers embrace the 80/20 rule, stating ‘AI can do 80% of the work but make sure you do the final 20% to review for accuracy, personalize, and make the material relevant to your students. This is where your expertise and personality as the teacher in the classroom comes into play’ (Brisk Teaching, n.d.-a, para. 12). The website also provides testimonials from teachers who have used Brisk. One 5th grade teacher from Wisconsin stated, ‘As a Language Arts teacher, one of the hardest parts of my job is providing enough meaningful

feedback for my students. Brisk has allowed me to provide way more specific and actionable feedback for my students’ (Brisk Teaching, n.d.-b, para. 9) while a middle school teacher from Georgia said, ‘This targeted feedback is ridiculously accurate and has already saved me hours’ (Brisk Teaching, n.d.-b, para. 9).

It is worth pausing on the name Brisk for an AI teacher tool—a term which denotes a hastening of activity. Similar to MagicSchool, Brisk embraced the discourse of teacher burnout through the discussion of time and efficiency. Tools like Brisk offer a vision of the teaching profession in which tasks like grading are sped up without sacrificing quality and, by extension, utility for student learning. When the teacher testimonials discuss the difficulties of providing feedback, they seem to draw specifically on metrics of quantity: both how much time it takes and how much feedback is enough. These concepts run parallel to one another; it takes time to assess writing and offer thoughtful comments that are sufficient to help students revise their work or justify a particular grade. Tools like Brisk offer to take on the responsibility of assessment by doing 80% of the work and leaving the teacher with the remaining 20% by manually opening each Google Doc, reviewing the AI-generated feedback, and revising it as needed. So, when Brisk claims that ‘Teaching is irreplaceable. For the rest of your workload, there’s Brisk’ (Brisk Teaching, n.d.-b, para. 1), there is a clear implication that parts of the job can be automated—one of those being assessing student writing.

Instruction with Mizou

If Brisk’s marketing materials suggest that instruction is the one area where the human is irreplaceable, then Mizou attempts to challenge that claim by providing access to chatbots powered by OpenAI which, according to the homepage, can ‘tutor, assess, and grade your students in 50 languages!’ (Mizou, n.d.-b, para. 1). On the ‘Safety’ page of their website, Mizou

explains that their use of OpenAI is ‘specifically trained for educational settings, sourcing its information from reliable educational blogs, articles, and forums. This training approach minimizes the risk of providing inaccurate or irrelevant information—a common issue with general AI tools’ (Mizou 2023, para. 6). Mizou offers a selection of chatbots, many of which were created by teachers, that engage students in a variety of topics ranging from first grade to college-level content. In a video, Mizou refers new users to an activity called ‘Lost Brain Files’ in which Albert Einstein has forgotten the formulas for his theories. Students are then tasked with reminding the Einstein chatbot about his theory of relativity and explaining it back to him in simple language to help jog his memory. Mizou simulates a tutoring session by providing students the ability to test their knowledge of a particular topics through a more conversational, formative assessment.

All conversations students have with Mizou’s chatbots are archived and sent to the teacher for review. However, the teacher does not need to look over the transcripts if they choose not to, as ‘The AI grades the student, providing all the essential information the teacher might need’ (Mizou, n.d.-a, 1:20). Mizou’s website offered similar discourses to that of Brisk’s around grading, stating in various places on their site, ‘The bot that’s been crafted actually grades all the students’ (Mizou, n.d.-a, 1:02), ‘No more spending hours grading each student manually’ (Mizou, n.d.-a, 1:08), and ‘AI Chatbot that uses your rubrics. No more late-night grading marathons’ (Mizou, n.d.-b, para. 4). However, the Safety page on Mizou’s website also included an interesting comment which stated that AI, when left unchecked, was believed to lead to a lack of critical thinking and academic dishonesty. Such concerns, they argued, led to a contentious relationship between AI and teachers, suggesting that Mizou

changes this dynamic by empowering teachers to combine their teaching abilities with

AI, fostering a collaborative rather than competitive relationship. Teachers' deep understanding of student needs allows them to effectively leverage Mizou, enhancing their teaching effectiveness. (Mizou 2023, para. 2)

Exactly how Mizou fosters this collaborative relationship is unclear. The site is comprised mostly of chatbots, using the GPT-4 LLM as of this writing, and activities that were created by other teachers and posted to the public community board. It is seemingly less about building collaborative relationships with AI and more about participating in a community of teachers interested in exploring ways to use chatbots as a tool for engaging students differently in the tutoring and formative assessment process. What is clear is that Mizou recognizes the potential for leveraging this affordance of the website, stating, 'Mizou is more than just a tool for teachers. It's a community of thousands of educators embracing AI. Don't be left behind' (Mizou, n.d.-a, 1:31). This final sentence points toward another concerning discourse surrounding AI: those who do not embrace Mizou, or AI chatbots more broadly, are doomed to be consigned to the annals of archaic teaching practice.

Designing Otherwise for Teacher-Centaurs

This article described GenAI through the lens of new materialist thought, considering how the concept of the centaur could frame ontological, epistemological, and ethical issues related to GenAI. Connections to educational settings were then explored by explaining what a teacher-centaur might become, first from the standpoint of new materialism and then AIED platforms. Such explorations make clear that there exists a wide berth between the new materialist and techno-utopian visions of what GenAI currently is and could be in educational settings. Tools like MagicSchool, Brisk, and Mizou purport to allow teachers to complete lesson planning, grading, and instruction more efficiently to re-appropriate their time toward other

teaching tasks and perhaps to improve work-life balance. Such re-imaginings of teaching practice illustrate how desiring humans are already intra-acting with AI-algorithm-computer-internet-techno-bodies.

The marketing materials that appear on these AIED platforms demonstrate how the idea of the centaur has indeed been taken up by tech companies by embracing the perceived value of speed and stamina in teacher practice. This is a different vision of the centaur than that of the new materialist subjectivity: one that values speed and stamina while also becoming intimately entangled through a co-generative process. The concept of the centaur is popular in the realm of AI engineering, so perhaps it is not surprising that it is framed by a late-stage capitalist impulse toward productivity. MagicSchool, Brisk, and Mizou seemed to use speed and stamina as a means of teacher-labor arbitrage: taking teaching tasks away from teachers completely so that they could focus on other responsibilities, both related to teaching and their personal life. The result of such relations is transactional: less like a centaur and more like a human riding a horse—privileging interactions over intra-actions.

The frustration that this article addresses is the lost opportunity to use the aleatory nature of GenAI to create spaces for greater play in education. Current iterations ChatGPT, Claude, and Gemini provide the opportunity for haptic experiences such that when we tap into AI, it taps us back by allowing us if we want to re-generate a response or refine a prompt. Even the hallucinations these platforms have become known for generating something to the effect of a stochastic swerve that lends itself to creative, if not tangential, play. Agential realist arrangements still allow for the speed and stamina of the centaur while also allowing for the stochastic intensities that might lead to difference and novel ways of approaching teaching and learning. The goal for the new materialist is to open new possibilities for productive

arrangements without privileging productivity. What these AIED platforms have demonstrated is an overdetermination of speed and stamina that forecloses creative possibility by arguing for a trend toward automation, rather than the agential realist potentiality of the centaur.

Agential realism suggests a radical view of materialism, one in which ‘Matter is produced and productive, generated and generative. Matter is agential, not a fixed essence or property of things’ (Barad 2007, 137). Barad further describes the phenomenon of intra-action in terms of the author, explaining that, ‘since writing is not a unidirectional practice of creation that flows from author to page, but rather the practice of writing is an iterative and mutually constitutive working out, and reworking, of “book” and “author”’ (x). While AI was not a specific concern of Barad’s, these notions of matter as generated and generative and writing as bi-directional co-constitutive are linguistically significant if not prescient of the manner in which we might consider the (re)production of bodies in the era of GenAI. Thinking specifically of teachers and technological bodies, their choice in metaphor of writing seems particularly apt when considering how humans using GenAI are producing text with a generator while also being produced through the generation of ideas offered by GenAI. Put differently, GenAI is producing teachers while teachers are producing GenAI. Such a performative loop demonstrates a strange reorientation of causality, one in which agency cannot be imagined to belong on either side of the asymmetries associated with the human/technology binary, rather a shared accountability for the production of another.

Taken together, this new materialist stance offers one perspective of what a different new materialist subjectivity might look like in the age of GenAI. The centaur is a speculative figuration in which human bodies intra-act with other matter, both digital (large language models, GenAI platforms, the internet, etc.) and physical (computer screens, keyboards, routers,

etc.) to co-constitute the other by cutting together into one teacher-LLM-platform-internet-computer-keyboard. The challenge, as with any agential realist account, is to determine where to draw boundaries around any given phenomena. Centaurs are cut together and apart seemingly any time a human prompts a GenAI platform. However, discursive material created by humans and published on blogs, wikis, and social media is being hoovered by web crawlers to train future iterations of LLMs, demonstrating how centaurs are also seemingly constituted in the background. Such deep learning processes illustrate the indeterminacies of authorship, which is an important consideration for the centaur. Barad (2007, 205) was careful to note that, while perhaps invisible, reality is not composed of ‘things-behind phenomena, but things-in-phenomena.’ So, authorship with generative is a complicated concept, as it is not only the words that are being produced through a human/technical arrangement, but the centaur is also being authored/generated by the human/GenAI arrangement.

Barad concludes *Meeting the Universe Halfway* with a call to action. Remaining open to new *potentia* for becoming for Barad (2007, 396) is ultimately an ethical commitment, one which requires us to ‘meet the universe halfway, to take responsibility for the role that we play in the world's differential becoming.’ In a time in which real concerns are being raised about the impact of AI on human flourishing through its integration into the justice system (Berk 2021), autonomous cars (Miller et al. 2024), and its dangerous augmentation of climate change (Coleman 2023) and human bias (Buolamwini 2023), the ethical implications related to teaching practice by comparison may seem insignificant. However, teachers play important roles in shaping the lives and literacies of students well beyond their formative school years, which raises the stakes for how educators approach GenAI in a critical and ethical manner. New materialism offers teachers and educational researchers tools for thinking about ethical practice with AI,

forcing educators to not only consider how AI will impact their teaching practice, but how teachers might impact AI matterings and how together they will take seriously their ethical responsibility to one another for creating the world to come. While I have discussed the concern of keeping human teachers in the classroom, we also have a responsibility for taking care of that which we have created—something that will seem more reasonable not by simply anthropomorphizing GenAI, but through the recognition that GenAI is deeply entangled with us. This constant configuring and reconfiguring is a process that not only helps underscore the agency of different bodies, but also forces us to consider how teachers are creative forces that are shaping GenAI models of the future.

The centaur, then, is an important concept for helping to bring teacher and AI bodies together through intra-actions that *matter*. Returning to Kasparov and his approach to chess, he recognized that centaur chess is powerful because of the way humans and AI play a game more successfully and creatively together. While chess is a finite game with winners and losers, teaching might be differently understood as an infinite game, where the purpose is to keep playing as the players and rules of the game continually change (Carse 1986). Understood this way, the stamina afforded to teacher-centaurs might be one that allows them to continue playing the game of education, even as the students, technologies, politics, and discourses continually change and provide novel challenges. GenAI is clearly a tool that can be used in education to produce centaurs that teach with greater speed and stamina. And yet the centaur is also a new materialist subjectivity, one that can resist current visions of AIED platforms in exchange for ones that honor the vitality of GenAI and shapes a future in which intra-actions allow for greater speed and stamina, not as a means of increased productivity, but as a creative force that opens new possibilities in classrooms.

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