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Reclaiming our Assumptions at the Intersection of Technology, Learning and Equity

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Assumptions: we cannot help but make them, rely on them, and take them for granted. Assumptions not only ground and inform our worldviews and frames of reference (Mezirow, 2000) but also serve as the foundational building blocks for our meaning making as human beings. For example, for me to write this sentence I must presuppose or assume that the reader will already possess fluency in the grammar, syntax, and mechanics of the English language. I select vocabulary and phrasing that I assume will be meaningful for readers, and that will engage their thinking and sustain their attention. Try as we might, humans cannot interact and engage with people and the world around us without presupposing a great deal. Given the number of presuppositions (or assumptions, I use the terms interchangeably) that provide the context and texture for our meaningful lives, recognizing and naming this never-ending stream of assumptions is impossible. At some point, we must take a step and trust (assume) the ground will meet our foot.

Educationalist Kieran Egan (1978) made the argument decades ago that too often disagreements about curriculum are actually fundamental clashes between unspoken and unexamined assumptions. For example, should curriculum be composed of the most well-known and respected cultural artifacts within a society? Or, should students be taught about the more localized world in which they find themselves? These questions point not to an unchallenged binary but rather to unspoken yet still guiding presuppositions. We will encounter the same concerns as we unpack, describe, and challenge the assumptions that inform our understandings of technology in relation to teaching and learning.

Even though it is impossible to notice and reference every assumption made, it is useful, and more often critical, to clarify and critique the unspoken and almost invisible presuppositions surrounding technology and educational experiences, inside and outside the formal classroom setting. "Technology" and "educational experiences" are too often discussed as if they were objects or things in themselves. This, too, is an assumption: that complex domains of human knowledge and experience such as technology and learning can be generalized in a single word. Even the relationships that exist between the supposed meanings of technology, learning, and teaching are used in such uncritical ways that additional reflection and examination is warranted. To accomplish the task of revealing presuppositions about education and technology, and opening new possibilities for thinking and reflection, we must first grapple with some fundamental assumptions about intelligence and learning in both human beings and machines.

Assumptions about Intelligence and Learning in Human Beings and Machines

Blurred meanings abound at the intersection of technology, learning, and teaching, especially in relation to artificial intelligence and machine "learning." This section opens up questions of the hidden assumptions that are made when words such as learning, intelligence, and teaching are uncritically adopted by computer sciences and various technical disciplines.

Our everyday use of language has steadily incorporated the vocabulary of computers and other technology devices (Axelrod, 2014; Lakoff & Johnson, 2003). In a recent contribution to an online resource for imaginative education, I reflected:

> At the most basic level, we talk about our technologies as having "memories" and refer to the chips that power our devices as "brains." We also define ourselves using the metaphors of technologies: we speak of needing "down time" to "reboot", of "networks" as communities of colleagues, and the variety of ways we can "connect" and "unplug." These are not simply expressions but metaphors for how we live our lives. (Kruger-Ross, 2017)

Unfortunately, these metaphors often collapse complicated differences and affordances in their seemingly straightforward comparisons. For example, we have titled the technological innovation that allows the storage of information in computers and phones as "memory" after our own (projected) understanding of how our minds work. This is a helpful metaphor to explain complex devices and processes to a novice, but neglects other powerful contextual facts. Our own memory is only memory when it is supplemented and complimented by human emotions and imagination (Egan & Nadaner, 1988), a fact that is overlooked when we collapse the meaning of memory to a technological device or process.

At present, what is truly troubling is the way that the words *intelligence* and *learning* are currently being used in association with (educational) technologies. Hubert Dreyfus was among the first to observe and attempt to unpack our conflation of human and machine notions of intelligence and learning (see Dreyfus, 1972; 2007). Dreyfus was reacting in large part to the foundational assumptions being made in the field of artificial reason and intelligence based in behaviorism. Behaviorism is a research paradigm that believes human behavior can be studied, observed, and quantified in order to predict and control future behavior. For the first half of the 20th century, behaviorism dominated North American human and social sciences (see, as exemplars, Thorndike, 1904; Skinner, 1953). For behaviorists, human intelligence is an observable, quantifiable and controllable phenomenon and can be understood as a behavior. That the mental ability of human beings can be observed and quantified, and that these numerical calculations represent meaningfully what we term as "intelligence" are two foundational assumptions behind a behaviorist perspective. Conflating the observable ability of a computer or technology with something akin to human intelligence (e.g., artificial intelligence) continues and expands on the presuppositions underpinning the behaviorist paradigm. This conflation misrepresents how we have struggled to understand our own knowledge about the nature and essence of intelligence (see, e.g., Boler, 1999; Dreyfus, 2007). Even more, the social and cultural history of intelligence studies would be enough to indicate that we should be more careful with our words. Alternative approaches to traditional understandings of intelligence such as emotional intelligence (Boler, 1999; Goleman, 2005) and Howard Gardner's (2011) multiple intelligences offer, at a minimum, greater context for entrenched quantitative research and assessment methodologies commonly associated with behavioristic social science. Boler's (1999) research at the intersection of gender, emotion, and educational praxis offers an altogether different narrative about taken-for-granted gendered conceptualizations about intelligence and the emotions.

And Why is This So? Phenomenological Bracketing as a Critical Method

Dreyfus' critique of artificial intelligence or reason was based in phenomenology, a philosophical tradition that examines the lived experiences of human beings associated with German and French philosophers such as Edmund Husserl, Martin Heidegger, and Maurice Merleau-Ponty. Phenomenology aims to describe and reflect on human meaning making in such a way that always accounts for context and background understandings. One way of encouraging this phenomenological reflection is to bracket (Heidegger, 1982) or frame an everyday understanding and repeatedly ask ourselves, "and why is this so?" In bracketing and critiquing the way we talk about computers and machines as "intelligent," this kind of analysis reveals the assumptions underpinning the everyday

ways we make meaning and speak about technology. We can continue this kind of bracketing and critique by exploring the language around technology and learning.

Assuming that technologies have capacities that mimic or mirror human abilities such as intelligence is not as alarming as recent shifts in the vocabulary of *machine learning*. At the core, this category of artificial intelligences studies presupposes that technologies are able to *learn*. What does this mean? What are the assumptions being made about human learning and the abilities of machines that enable such a phenomenon to exist? Here we begin by bracketing the idea that machines can learn as well as the notion that this idea can be equated with human learning. Is learning, of the machine kind, observing and recognizing patterns, followed by a shift in next steps? Surely this could be understood, when applied to human beings, as a *type of learning*, but not *learning* in and of itself. Would it be more appropriate to refer to this capacity of machines as "machine pattern recognition?" For if we continue to collapse (as an unspoken assumption) the meaning of learning to only mean pattern recognition and decisions based on this recognition, what is lost in our understanding of learning? In this way, our understanding of human learning is reduced, limited, and overwhelmingly decontextualized. While early cognitive scientists (who, by and large, adopted research methodologies grounded in behaviorist assumptions) were comfortable and supportive of continued research exploring the interrelationship between human and machine learning, they also made the assumptions that machine learning: (1) is possible, and (2) functions in the same manner and kind as learning in human beings.

For those who are concerned about the implications of online education for the teaching profession (see Hamilton & Feenberg, 2012), this is the nightmare coming true. Machines can learn! And, if all knowledge is available online and we presume that learning is simply the transmission of this knowledge, then teaching as we know it is dead. Current research at the intersection of artificial intelligence/machine learning and personalized education ignore the reductive the assumptions being made about machine "learning" (Essalmi, Ayed, Jemni, Sabine, & Kinshuk, 2015). In 1957, the German philosopher Martin Heidegger (1966) diagnosed this odd presupposition in terms of the difference between calculative thinking and meditative thinking. Calculative thinking is best described as the reductive logic of propositions, proofs, and representational truth. For calculative thinking to take hold, in the simplest explanation, everything must be counted and quantified. Meditative thinking may best be described as an attunement, or a way of thinking that aligns with reading and interpreting poetry or a work of art. If online learning conceptualizes and measures learning narrowly in terms of calculative thinking, human beings will not be fully supported or developed in the wide variety of ways that they know and learn about the world. In assuming learning and teaching is something that machines can do, what do we lose in our understanding of learning?

Learning is Earning?

As a mini-case study of this phenomenological approach to unpacking taken for granted presuppositions, I want to share a recent project of which I've become aware via a talk by Jane McGonigal from the Institute for the Future. The project is called "Learning is Earning 2026" and is a projection of what learning and teaching could or might look like in the future (IFTF, 2016). McGonigal presents a vision of a possible future where learning adapts and evolves according to recent innovations with blockchain, the technology that supports digital currencies such as Bitcoin. In short, blockchain provides a way for information to be chunked or blocked in anonymized way that can then be managed using what is called a ledger. The technology itself is built on our everyday ideas about currency and therefore, the system models and frames (or brackets) understanding within a monetized context. For example, (1) knowledge is conceptualized in terms of market value, (2) knowledge is assumed to be modular and static, and (3) knowledge building is a community-

independent process. In what follows, I will bracket and analyze the language of the project to highlight assumptions that we know are already reductive and not based in our lived experience.

The first is the project's name: Learning is Earning. The title embodies the assumption that we learn and gain knowledge to make money or to acquire jobs. While the purpose of education might be, in some small way, to equip students and learners with knowledge and skills, reducing learning to job preparation is dangerous. Learning is not just about knowledge and skills but about creativity and imagination, connecting and being with other human beings, animals, and the natural world. Learning is more than just an epistemological journey; it can be an ontological one, as well. In this understanding of learning, we learn to become or be in a manner different from who we are at present, not just to acquire facts, figures, names, dates, and so on.

This leads to the next presupposition underpinning this future world of learning: knowledge is static and unchanging and, therefore, is simply a matter of exchanging information from one person to another. Again, knowledge can mean this, but it does not have to be limited as such. Learning is Earning frames knowledge in terms of "blocks" that can be "learned" by individuals either at schools, on their own during independent study, through their workplace, or with apprenticing. Their program collects, organizes, and syncs all acquired knowledge blocks such that prospective employers can ensure the learners have what is perceived as necessary for the job. In turn, learners can see what kind of "block" knowledge they will obtain from their time working on the job. Jobs will be more like contract work, with workers jumping around from job to job, collecting blocks of knowledge. On the surface, and without critical reflection, this sounds like an obvious solution for the challenges being faced by learners, educators, employers, and so forth. But is learning as simple as exchanging information? Once I have learned something, gained a "block" of knowledge, do I know it forever and ever? Surely there will be assessments to ensure this system of teaching and learning is held accountable. But who writes these assessments? Whose knowledge is the standard or the norm? Knowledge in this scenario is drastically decontextualized from its origins and acquired, stored, and utilized only for employment. The (already reductive) exchange value of knowledge becomes its use value. All of these questions uncover the unspoken presuppositions being made about learning and teaching.

Finally, what does Learning is Earning assume about how educational *communities* work? On the Institute for the Future's website, they write that the project "re-imagines the future of learning—a new reality where instead of going into debt for a college degree, students are paid to learn." A troubling assumption behind this quote is that there is no need for a college degree or systemized path of learning based in a community, that is, no need for the classroom or the teacher-student/student-student relationship. Learning is earning, and it can be accomplished with little attention to the lived experience of learning and knowing. In short, it brackets the very real, lived human experience as unnecessary and even cumbersome. What is valued is not teaching, learning, knowing, and wisdom, but earning, exchange and use value, and the individualized self. Why waste your time and money on other human beings when you can get blocks of knowledge on the cheap? Getting paid to learn, building up a store of knowledge blocks, and saving on college debt sounds amazing!

And, too good to be true. Kieran Egan (1997) in his cultural research into the psychological and developmental history of education argues that there are phases or kinds of understanding. One key feature of what we today understand as a higher education, Egan argues, can only come as a result of being part of a community devoted to study and learning. In Egan's framework, this is known as philosophical and theoretical kinds of thinking, and it cannot exist without a community of learners. Science, philosophy, medicine, law—every domain of human knowledge and understanding—requires a congregation of human beings. This community comes together to think and ask questions, to critically reflect on ourselves as human beings and on the natural world. If, as

Learning is Earning would have us believe, learning and teaching is about making money and getting a job (an enormous and unquestioned assumption), of course there is no need for universities or colleges. Who needs them! Egan's perspective identifies the value of community in knowing and knowledge that is lost within the framing of learning as *only* focused on career and market concerns.

Overall, this process of bracketing and critique might reveal a variety of questionable assumptions made in the Learning is Earning project: (1) knowledge, once acquired, is retained and static over time; (2) knowledge is portable and transfers well between contexts; (3) market or exchange value of knowledge is more important than use value, and can ultimately be conflated; (4) a learning system should be designed to primarily to make learning experiences and outcomes visible to prospective employers (as opposed to other groups or community members); and (5) the artifacts of our often messy and meandering ontological or epistemological educational journeys are things we would want revealed to prospective employers in the first place.

Turning to Equity: Why Reclaim our Assumptions?

Andrew Feenberg (1999) argues that there are four perspectives toward technologies: determinism, instrumentalism, substantivism, and critical theory. Each theoretical perspective embodies a number of unspoken and unexamined assumptions that have real practical implications in our lives and understandings. To this end, the two most dangerous of the four perspectives are determinism and instrumentalism because they are the most reductive of lived experience. Both frameworks are built upon the presupposition that technologies as a whole are merely means to an end, or value-neutral. Where they differ is the ability of humans to impact the trajectory of technology. For the determinist, technologies are simply evolving in the Darwinian sense and human beings have little to no role to play in steering their development. The instrumentalist perspective continues to assume that technology is a neutral tool, but human beings are able to affect the use of the tool. (Guns don't kill people, people with guns kill people.) However, in presupposing that technologies are neutral we distort and limit human possibilities for understanding, interacting, and, ultimately, impacting technologies.

Take, for example, text messaging. The immediacy and brevity of text messaging, as well as a lack of conversational context such as facial expressions and tone, lays the foundation for frequent miscommunications. Consider how you might respond to the following single-character message from a significant other: "K." This brief text message is meaning-laden indeed, and interpretation and action will depend upon the very real context- and culturally-dependent lived experience of human beings. In assuming that technologies are neutral we often overlook their cultural entanglement. The act of naming assumptions about how technology is defined and being used in our everyday lived experience provides new avenues for thinking. If we assume an instrumentalist stance, we have one path forward. If we challenge the assumptions regarding the neutrality of technologies, many pathways are revealed.

How does this impact equity and social justice challenges related to technologies? Feenberg argues that through the lens of his critical theoretical perspective, technology can be understood not as a "destiny but a scene of struggle" (1991, p. 14). Grasping technology as a site for social justice requires a new set of presuppositions about technology. Brooks (2011) argues that Feenberg's critical theory of technology (CToT) is founded on three fundamental assumptions:

> (1) Values embodied in technology are socially specific and not narrowly limited to efficiency or control technology, (2) Technologies offer frameworks for ways of life, and (3) The design and configuration of technology does not only meet our ends; it also organizes society and subordinates members into a technocratic order. (p. 50)

This critical view of technology supports and encourages democratic discussions and deliberations about technology and its integration into social life. In this way, Feenberg "reflects Habermas' notion of a democratic speech community but includes technological design and development to promote the need for a 'democratic rationality'" (Brooks, 2011, p. 48). Whereas substantivism and instrumentalism position human beings at the whim of technological development, Feenberg's CToT asserts that social constructivism gives human agency *the* final say in the way technologies are adopted and practiced.

Technology is not determined to evolve in a particular direction; "the illusion of neutrality and autonomy of the technical professions arises from the way in which they construct their history" (Brooks, 2011, p. 50; Feenberg, 1996). Feenberg's philosophy suggests that as members of a democratic society, it is our duty to engage with technological understanding and the social world, and this includes focused study and attention paid to issues of equity, education, and technology (Eubanks, 2011). CToT challenges scholars and practitioners to understand the intersection of social justice and technologies as *radically undetermined*.

> We need to understand ourselves today in the midst of technology and technical knowledge itself cannot help us. Philosophy of technology belongs to the self-awareness of a society like ours. It teaches us to reflect on what we take for granted, specifically, rational modernity. The importance of this perspective cannot be over-estimated. (Feenberg, 2003, para. 4)

Technology, in this view, needs to be examined not as purely instrumental, neutral or natural, but rather as a part of the framework for a more equitable way of life in our schools (Brooks, 2011; Feenberg, 2003).

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