

## An Adverbial Theory of Skill: Putting a Kink in the Educational Adoption of Blockchain

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**Abstract:** “Skills” as commonly used in education discourse refers to tasks performed at minimal, determined-to-be-competent levels. The metaphor for “skill” is the machine learning algorithm: neural nets correctly distinguish between apples/oranges 93% of the time = students correctly distinguish apples/oranges 93% of the time = students have “categorization skills.” The metaphor is *humans* modeling *machine* attempts to *model* humans. The machine model, to which humans should be adapted, best orients them to a machine-mediated world. The error here is a category mistake treating “skills” as substantives when “skills” performs in language an adverbial/aesthetic function. We present an adverbial alternative to dominant conceptions of skills that avoids category mistake and advocates for the significance of skilled social action and the role of education in fostering such action.

Take two trends: one is very evident while the other is far less noted. The first trend is the staggering increase in applications of digital technology to education. There is rapid integration of data<sup>1</sup> with new digital algorithmic technologies (so-called artificial intelligence, deep learning, large language models, neural nets, big data, etc.). While Chat GTP has received a great deal of attention, a more mundane but widely heralded and integral part of data intensive algorithmic technologies is *blockchain* (a distributed ledger technology popularized by crypto currency). The adoption of blockchain for educational purposes is accelerating transformation of education to mere preparation for employment.<sup>2</sup> Replacing traditional educational degrees with micro credentials, digital badges, and learning records is central to calls for educational use of blockchain. In turn, these learning records stored in blockchain support a radical restructuring of the existing economic and political system, which critics note will vastly lower the standard of living and further undermine democratic decision-making.

From these new blockchain-inspired credentials systems, the second and less obvious trend comes into view: the word *skills* increasingly dominates educational discourse, framing both the purpose and evaluation of education in terms of marketable *competencies*.<sup>3</sup> This framing is central to what the World Economic Forum has termed the “fourth industrial revolution.”<sup>4</sup> This paper explores this trend in relation to the adoption of blockchain by educational institutions in

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<sup>1</sup> Much has been written to problematize “data,” with some critical of its “objectivism;” here, we take data simply to be recorded observations, with the understanding that such a definition does not include the assumption recorded observations are accurate or true. See for example, Martin Dodge and Rob Kitchin, *Code/Space: Software and Everyday Life* (Cambridge, MA: MIT Press, 2011).

<sup>2</sup> “New Book Argues Education Shouldn’t Be the Key to a Job,” accessed March 22, 2023, <https://www.insidehighered.com/news/2023/03/14/new-book-argues-education-shouldnt-be-key-job>.

<sup>3</sup> Deron Robert Boyles, “An Argument for the Deletion of the Word ‘Skills’ from the English Language,” *Journal of Thought* 28, no. 1/2 (1993): 95–100; Mark J. Garrison, “Feeling like a Robot: Origin, Critique and Alternative to ‘Social-Emotional Learning,’” *Educational Abundance* 1 (2020): 6–18; John Preston, *Competence Based Education and Training (CBET) and the End of Human Learning: The Existential Threat of Competency* (Springer, 2017).

<sup>4</sup> <https://www.weforum.org/focus/fourth-industrial-revolution>.

the form of digital credentials and or learning records.<sup>5</sup> The nexus between what we term *skillsification*, blockchain technology, and digital credentials has rarely been subjected to serious critique. We hope this paper begins to fill that void.

While we doubt few will challenge the claim that “skills talk” is quite common, a few examples help scaffold our argument. Note that we did not seek out the examples. They were observed in the course of our daily work. Consider each:

- In discussing debates about the heritability of IQ, three psychologists argued that “rather than thinking there is no way to influence intelligence by improving the environment, we think there *is*, in fact, good reason to believe that improving children’s environments will improve their cognitive skills.”<sup>6</sup> As Deron Boyles asked, does the addition of the word “skills” contribute much here? Would we have lost something if they had written, “improve their cognition”?<sup>7</sup> Might heightened intellectual capacity be a more accurate account than narrow tests of “cognitive skills”?

- According to a KnowledgeWorks blog post about an event discussing the future of education in Nevada, Summer Stephens, superintendent with Churchill County School District, said: “We know we can find a lot of content. What we need is a lot of skills. Durable skills.”<sup>8</sup> According to the Oxford English Dictionary, the noun *skill* can refer to “practical knowledge in combination with ability,” a meaning dated up to 1980.<sup>9</sup> What value is gained by so forcefully separating, as the quote above suggests, “content” from “skills;” can one really have context- and content-free “skill”? What might be troubling about comparing human ability to stored products which last at least three years (“durable goods”)?

- One critical scholar wrote this in a book prospectus: “The point not to be missed is that Social Emotional Learning programs [...] do not emphasize learning the social and political skills to interpret and act to change those circumstances.” While we certainly agree that current approaches to social-emotional development do not offer youth a chance to be political, we must ask: Is something lost here by suggesting that *being* political is the same as having political skills? Does one *have* political skills? Or does one engage in the world as a skilled politician, a skilled agent of change?

- Spurred by grants from the United States Department of Education and a host of “edupreneurs”, *Education Week* reported efforts to embed daily readiness assessments in kindergarten classrooms. “Nearly one-third of the skills [teachers have] been trained to look for are in the domain of ‘social foundations,’ which includes skills such as expressing concern for others, following multi-step directions, and working cooperatively.”<sup>10</sup> Is “expressing concern for others” a skill? Are emotions and their expression properly analyzed in skills-terms? Emotions

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<sup>5</sup> Kerri Lemoie and Louis Soares, “Connected Impact: Unlocking Education and Workforce Opportunity through Blockchain” (Washington, DC: American Council on Education, 2020), <https://www.acenet.edu/Documents/ACE-Education-Blockchain-Initiative-Connected-Impact-June2020.pdf>.

<sup>6</sup> Eric Turkheimer, Kathryn Paige Harden, and Richard E. Nisbett, “There’s Still No Good Reason to Believe Black-White IQ Differences Are Due to Genes,” *Vox*, June 15, 2017, <https://www.vox.com/the-big-idea/2017/6/15/15797120/race-black-white-iq-response-critics>.

<sup>7</sup> Boyles, “An Argument for the Deletion of the Word ‘Skills’ from the English Language,” 96.

<sup>8</sup> <https://knowledgeworks.org/resources/nevada-portrait-learner-community-vision/>. KnowledgeWorks is a well-funded advocate for competency-based learning, and widescale adoption of for-profit educational technologies.

<sup>9</sup> <https://www.oed.com/viewdictionaryentry/Entry/180865>

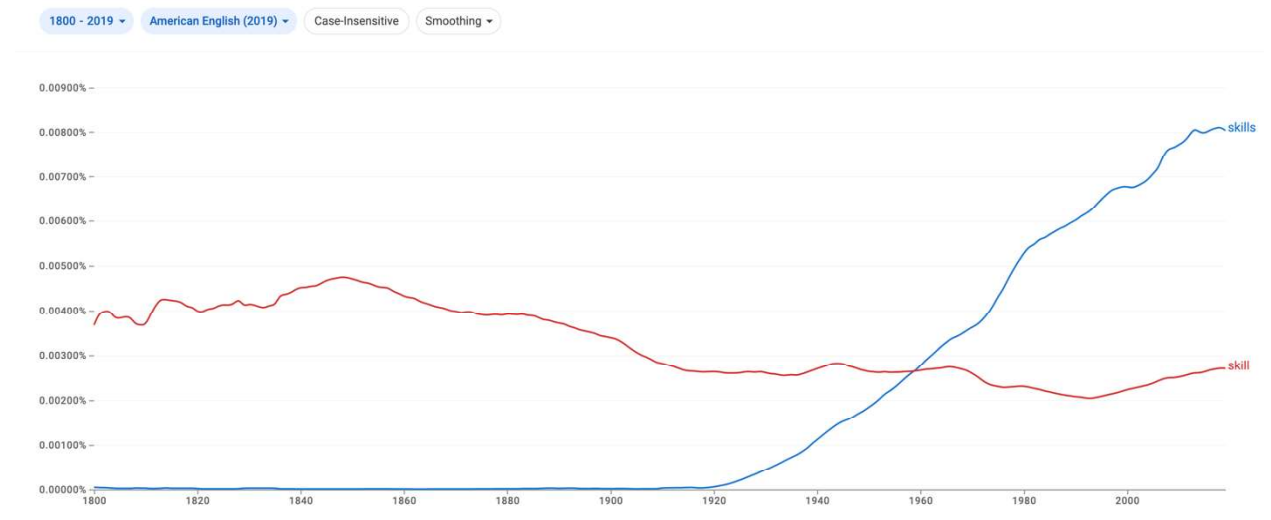
<sup>10</sup> Catherine Gewertz, “Kindergarten-Readiness Tests Gain Ground,” *Education Week*, October 7, 2014.

might best be understood, according to Margaret Archer, as commentaries on human concerns. One can, for example, emotionally respond to the character of their performance (“I didn’t do well.”) but such emotional responses themselves are not properly understood as skills as SEL proponents contend.<sup>11</sup>

Each example represents a distortion: human ontology (thinking or feeling or political agency) is reduced to behavior rankings. There is only behavior because this is all that can be digitally and continuously recorded. As we shall see, this behaviorist focus is integral to the demand that extensive digital records of human behavior (“learning”) be maintained and constantly updated.

### **The Movement from “Skill” to “Skills”**

It is clear from Figure 1 that the phenomenon of interest is with respect to *skills*, and not simply skill, per se. The use of the word “skill” is relatively stable over the 200 years of published books contained in Google’s database; in fact, its usage mostly declined between 1840 and 2019. The trend for the word “skills” is markedly different. The plural form is absent until the 20<sup>th</sup> century, barely evident until after 1920. Thus, the plural form is significant. It, we believe, suggests “assets in the bank” and not simply “practical knowledge in combination with ability.” The move is from one having skill (characterization of a person’s work, e.g., skilled carpenter) to one “having skills.” “Skills” is the now-preferred nomenclature for discussing labor-power as it functions to mask the origin of value in the labor process itself (and not in capital), setting the stage for rendering all laborers as capitalists (despite owning no means of production).<sup>12</sup>



**Figure 1: Google Ngram Viewer Comparison of the Singular and Plural Form of “Skill,” 1800 – 2019**

This newer conception (“skills”) refers to tasks that can be performed at a minimal or determined-to-be competent level and includes character traits and social ratings. The metaphor for this notion of skill is not the tradesperson, but rather the machine learning algorithm: the

<sup>11</sup> Margaret Scotford Archer, *Being Human: The Problem of Agency* (Cambridge University Press, 2000), see chapter 6, “Humanity and Reality: Emotions as Commentaries on Human Concerns,” 193-221.

<sup>12</sup> For the classic understanding, see: [https://www.marxists.org/archive/marx/works/1885-c2/ch20\\_02.htm#10](https://www.marxists.org/archive/marx/works/1885-c2/ch20_02.htm#10)

neural net can correctly distinguish between apples and oranges 93% of the time = the student can correctly distinguish between apples and oranges 93% of the time = “the student has categorization skills.” The metaphor, importantly, is in the direction of *humans* modeling *machine* attempts to *model* humans. On this view, the machine model of cognition and affect is the model to which (most) humans should be adapted, as this best situates them to a machine-mediated world.

Expanding on this line of reasoning, our critique of skills and a proposed alternative draws inspiration from three bodies of literature: (1) critiques of capitalist political economy and associated cultural and political forms accompanying late-capitalist forms of education;<sup>13</sup> (2) conceptions of skill and evaluations of competency-based education and the increasing role data intensive algorithmic technologies play in perpetuating competency-based education;<sup>14</sup> and (3) philosophical investigations into the nature of human agency and consciousness in relation to the development of skillful action.<sup>15</sup>

### **Origin of Skillsification**

While digital technologies and conceptions of artificial intelligence have a much longer history than most realize,<sup>16</sup> skillsification has a long history as well. Figure 1 suggests skills talk began with rise of Taylorism and time-motion studies. The skills talk trend continues through the post-WWII economic boom and increases still more when post-Fordist, human capital ideas were clearly ascendant. The move in focus from “skill” to “skills” is a result of at least two related developments.

The first development is an accounting ideal that tends toward the quantification of everything. Although the “quantification imperative” proceeds capitalist formations, it nevertheless flourishes under them.<sup>17</sup> Weber observes of capitalism: “Exact calculation — the

<sup>13</sup> Mark J. Garrison, “Resurgent Behaviorism and the Rise of Neoliberal Schooling,” in *Handbook of Global Education Reform*, ed. Kenneth Saltman and Alex Means (Hoboken, NY: Wiley-Blackwell, 2018), 323–49; Alexander J. Means, *Learning to Save the Future: Rethinking Education and Work in an Era of Digital Capitalism* (New York, NY: Routledge, 2018); Theodore M. Porter, “Quantification and the Accounting Ideal in Science,” *Social Studies of Science* 22, no. 4 (1992): 633–51; Max Weber, *The Protestant Ethic and the Spirit of Capitalism* (Routledge, 2001).

<sup>14</sup> Mark J. Garrison, “Confronting the Digital Leviathan in Education: On Cybernetic Pedagogy and Data-Intensive Algorithmic Technologies,” in *Handbook of Critical Approaches to Politics and Policy of Education*, ed. Kenneth J. Saltman and Nicole Nguyen (Routledge, 2022), 225–40; Geoffrey Hinchliffe, “Situating Skills,” *Journal of Philosophy of Education* 36, no. 2 (2002): 187–205; Kamran Khan and Sankaranarayanan Ramachandran, “Conceptual Framework for Performance Assessment: Competency, Competence and Performance in the Context of Assessments in Healthcare — ‘Deciphering the Terminology,’” *Medical Teacher* 34, no. 11 (October 8, 2012): 920–28; Artyom Kosmarski, “Blockchain Adoption in Academia: Promises and Challenges,” *Journal of Open Innovation: Technology, Market, and Complexity* 6, no. 4 (October 16, 2020): 117; Lemoie and Soares, “Connected Impact”; Preston, *Competence Based Education and Training (CBET) and the End of Human Learning*; Rubi Román, “Micro-Credentials in Education: A Blockchain Application” (*Observatory* | Institute for the Future of Education, July 26, 2021), <https://observatory.tec.mx/edu-news/micro-credentials-in-education-a-blockchain-application>.

<sup>15</sup> Geoffrey Hinchliffe, “Situating Skills,” *Journal of Philosophy of Education* 36, no. 2 (2002): 187–205 offers a thorough treatment of the philosophical deadends to which educational analysis of “skills” has tended to lead.

<sup>16</sup> See, Garrison, “Confronting the Digital Leviathan in Education.”

<sup>17</sup> Joel Michell, “The Quantitative Imperative: Positivism, Naïve Realism and the Place of Qualitative Methods in Psychology,” *Theory & Psychology* 13, no. 1 (2003): 5–31.

basis of everything else — is possible only on the basis of free labor.”<sup>18</sup> Such labor is “free” when laborers are kept separate from one another (to preempt collective bargaining and orient production towards piecework). As we shall see, educational adaptations of blockchain are premised on a piecework economy.<sup>19</sup> The capacity of that labor must be calculated, and for this to easily occur, notions of human labor power must be simplified and depoliticized (rendering human capacity as a tool). It is not shocking that as capitalism matured and digital technologies advanced, human performances would be increasingly subject to this accounting logic, that, in essence, human capacity as “skills” would be monetized, and the cost of their production and management a source of profit as “social impact investing.”<sup>20</sup> This accounting for and trading of human labor power required a type of reification, where the characterization of a human performance as qualitatively “skilled” leads to it becoming things, “skills,” abstracted from human beings. Thus, a simplified and one-sided conception of human capacity results, one that treats this capacity as a mere tool.

Importantly, this drive to quantify human capacity originates in part from capital’s drive to reduce the cost of producing labor-power — the second development. The neo-liberal attack on social welfare is an effort to reduce the cost of the production of labor power by, among other things, lowering standards of living and increasing privatization (including education, healthcare, cultural institutions). From the point of view of capital, education is a cost which must be kept to the minimum, or what is now projected as “competency.” Education as the development of human power is to be limited to what the market can bear, on the one hand, and suited to the technological restructuring of the economy, on the other. So-called 21<sup>st</sup> century “skills” evidence a person has been socialized for work in a digitally mediated political economy, including its precarity.

This new socialization demand is directly related to other trends that contribute to skillsification. Key among them are broad changes in the main purpose of education. This shift is characterized as moving from a focus (however limited and limiting) on nation-building and fostering democratic citizenship in the 19<sup>th</sup> century, to more and more of an emphasis since the latter part of the 20<sup>th</sup> century on the economic benefits resulting from obtained education credentials. In outlining the argument of his new book, *The Myth of Education as Equalizer*, Jon Shelton summarized the essence of the change that occurred. In the 19<sup>th</sup> century, he notes, the purpose was not to train future students for jobs, it was about citizenship. “And so, when massive inequality emerged from industrialization in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, the primary way that working people dealt with that wasn’t through arguing for more education; it was through forming labor unions, pushing for reforms that would do everything from reduce child labor to establish workers’ compensation.” During the 1950s and ’60s, the idea of human capital led to the view that “education should do something different, that it should provide the job skills for future working people to be successful.” This would, Shelton argued, eliminate the need for social reforms that would reduce profits (e.g., minimum wage, labor rights, progressive taxation). The myth was that education would help to alleviate the inequalities that existed.<sup>21</sup> While Horace

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<sup>18</sup> Weber, *The Protestant Ethic and the Spirit of Capitalism*, 6.

<sup>19</sup> Veena Dubal, “Digital Piecework,” *Dissent Magazine*, October 12, 2020, <https://www.dissentmagazine.org/article/digital-piecework>.

<sup>20</sup> For a critical introduction, see Kenneth J. Saltman, *The Swindle of Innovative Educational Finance* (Minneapolis: University of Minnesota Press, 2018).

<sup>21</sup> “New Book Argues Education Shouldn’t Be the Key to a Job.”

Mann made similar arguments,<sup>22</sup> the point about more recent and closer connection between capitalization of education and schooling’s turn toward skillsification still stands.

With this shift came an intensified commodification of labor-power, and this is behind much of the skills talk, as is the demand to reduce the costs of its production and upkeep. The AI frenzy is finance capital’s means for lowering the value of human labor-power and a mechanism to reduce the quality and extent of what is provided as part of its “upkeep,” namely education, healthcare, the natural environment, etc. This intensification entails new arrangements for financialization in the development, trade, and governance of labor-power. Importantly, there is now trading in skills futures and debts incurred in skills development (as securities and wage garnishment) and impact investing in skills development as “solutions” to social problems. That data regarding “skills” is a tradable asset in these myriad ways attests to the significance of these changes, all of which are associated with and to various degrees depend upon blockchain technology.

A final point of origin lies within behaviorist psychology. While certainly not separate from market rationalities, or the purpose given to education, particular conceptions of human psychology have played a very significant role in skillsification. Behaviorist psychology is at the heart of the idea of competency-based (or personalized) education, and behind the idea that education is about getting students to demonstrate competencies. In this view, which predates data intensive algorithmic technologies, skill “is the ability to perform a task to a pre-defined standard of competence.” This of course is a very reductive, impersonal, and thus an inaccurate understanding of the complexity and depth of skilled human performance.<sup>23</sup> Advanced capitalism and the radical restructuring of education via data intensive algorithmic technologies requires a narrow and disempowering conception of human capacities. A parallel development to behaviorist psychology was cybernetics. It was concerned principally with human-machine interaction, adopting behaviorist conceptions of control and communication rooted in the dynamics of feedback loops. These models were unmistakably analogies to the “invisible hand,” the idea that capitalist markets are naturally self-regulating systems.<sup>24</sup>

### **Blockchain in Education: The New Digital Tracking Matrix**

Narratives used by proponents of blockchain in education are rife with liberatory language. One hears about democracy, security, personal control and convenience. All manner of logistical problems — such as accessing transcripts from shuttered colleges — are used to justify the introduction of blockchain. Yet even a cursory review of the social and educational applications of blockchain reveals a new form of tracking — a digital form of tracking that extends beyond ability grouping and putting students on different educational pathways suited to their “ability.” Blockchain is used to record digital assets, not just crypto currency. For example, “The video game industry in coming to rely on blockchain to manage their in-game economies. These token economies are being normalized for children through the widespread adoption of gamified platforms like Class Dojo, ClassCraft, Red Critter, and PBIS.”<sup>25</sup>

<sup>22</sup> Mark J. Garrison, *A Measure of Failure: The Political Origins of Standardized Testing* (Albany, NY: SUNY Press, 2009).

<sup>23</sup> Hinchliffe, “Situating Skills,” 189.

<sup>24</sup> Garrison, “Confronting the Digital Leviathan in Education.”

<sup>25</sup> Alison Hawver McDowell, “Blockchain Education, a Ticket to Digital Serfdom,” *Wrench in the Gears*, September 22, 2020, <https://wrenchinthegears.com/2020/09/22/blockchain-education-a-ticket-to-digital-serfdom/>.

This tracking system not only includes more information — demographic, behavioral, psychological temperament and disposition, as well as academic history and performance (however reductionist and inaccurate) — but uses the information for objectional purposes. It is important to grasp how the nature of this information and how it is to be used have dramatically shifted towards production and perpetuation of social inequality. That is, what has not shifted is the link between this new tracking system and political, cultural and social disempowerment. In fact, the rise of education via blockchain coincides with historically unprecedented levels of wealth inequality.<sup>26</sup>

Blockchain allows for the ongoing recording of both static (e.g., birth certificate) and fluctuating (e.g., behavioral) data in “real time.” Once captured (permanently), this data can be processed by automated algorithms linked to tracking systems which can be integrated into automated decision matrices. These systems, like their predecessors based on IQ tests, are now being tested to both initiate and justify decisions regarding who gets what, where they get it, when they get it, and how they get it. This classic political function of educational assessment<sup>27</sup> has been dramatically expanded with blockchain, and aims to operate at a much larger scale, cover a much broader scope, and do so over a much longer period of an individual’s life (“lifelong learning”). Finally, this system is not passive. It functions as a means of governing individual behavior, by way of “nudges,” incentives or threats. The entire apparatus is to function as a feedback loop.<sup>28</sup>

At the heart of this blockchain system is the idea of a “digital identity”. In the words of parent-activist Alison McDowell:

Whether we know it or not, when we agree to have our lives linked to blockchain, we are agreeing to live in a behaviorist panopticon. In exchange for convenience and limited privileges, we give up our free will. The future being handed to us is one that will be shaped by surveillance, artificial intelligence, predictive analytics, machine learning, and feedback loops. We risk swapping our vibrant human spirits, beautiful in their passionate creativity and flawed vulnerability, for sanitized digital twins that will be managed as human capital by callous technocrats to profit social impact investors. Before we walk through the door of digital identity, realize it opens onto a maze designed to disorient, confuse, and control us.<sup>29</sup>

Youth and family access to social services and educational opportunities will be determined based on their integration into blockchain identity management systems and successful compliance with system requirements and incentives. Proponents call this a “learning ecosystem” and link it to education in service of the “gig economy” by way of “lifelong learning.” These lifelong learning records (e.g., “learning logs”) are to be managed via

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<sup>26</sup> “Richest 1% Bag Nearly Twice as Much Wealth as the Rest of the World Put Together over the Past Two Years,” *Oxfam International*, February 1, 2023, <https://www.oxfam.org/en/press-releases/richest-1-bag-nearly-twice-much-wealth-rest-world-put-together-over-past-two-years>.

<sup>27</sup> Garrison, *A Measure of Failure*.

<sup>28</sup> For a discussion of the role of cybernetic logic at the heart of data intensive algorithmic technologies, see Garrison, “Confronting the Digital Leviathan in Education.”

<sup>29</sup> McDowell, “Blockchain Education, a Ticket to Digital Serfdom.”

blockchain.<sup>30</sup> Blockchain records will be used to “sift and sort children and workers based on demonstrated standardized skills.”<sup>31</sup>

Should readers think this critique esoteric or possibly overwrought, we note the following elements of the 2019 NAACP resolution “Opposition to the Use of Black Chain Identity.” The resolution states, in part:

**WHEREAS**, Blockchain technologies are being developed as tools of digital identity management; and

**WHEREAS**, transaction data pertaining to vital records, voting, ownership, healthcare, professional and educational credentials, employment, and financial income can be stored on Blockchain systems; and

**WHEREAS**, global technology interests are placing heavy pressure on governments to scale Blockchain adoption as a financial tool within proposals to privatize public services, including 'Public-Private Partnerships (P3)'; and

**WHEREAS**, governmental interests are exploring the use of 'smart contracts' on Blockchain as a means of delivering public benefits; and

**WHEREAS**, aggregation of an individual's public benefit data within a Blockchain identity system could exacerbate punitive profiling of recipients of services; and

**WHEREAS**, prototypes linking Blockchain systems to profit extraction through social impact investment initiatives have already been developed; and

**WHEREAS**, hundreds of billions of dollars have already been directed into social impact investments by the world's most powerful individuals and financial institutions; and

**WHEREAS**, consolidation of personal data in Blockchain identity systems will position the global poor who receive benefits via smart contracts to become data backbones upon which "impact" metrics would rest, in effect amplifying investment wealth of elite investors on the backs of vulnerable communities; ...

**THEREFORE, BE IT RESOLVED**, that the NAACP opposes any state or federal legislation that would require an individual to create a Blockchain identity in order to receive any public services or benefits, including but not limited to: education, healthcare, addiction treatment, behavioral health services, law enforcement, housing, and/or food and nutrition.<sup>32</sup>

The blockchain revolution offers a capitalist-inspired reconstruction of schooling. The very name of the system — blockchain — indicates conception of education as a compendium (chain)

<sup>30</sup> Patrick Ocheja et al., “Managing Lifelong Learning Records through Blockchain,” *Research and Practice in Technology Enhanced Learning* 14, no. 1 (December 2019), <https://doi.org/10.1186/s41039-019-0097-0>.

<sup>31</sup> Alison Hawver McDowell, “Mother of Conscience Gets Bumped by Social Innovators for Explaining How Children Will Be Securitized on Blockchain,” *Wrench in the Gears*, March 24, 2023, <https://wrenchinthegears.com/2023/03/24/mother-of-conscience-gets-bumped-by-social-innovators-for-explaining-how-children-will-be-securitized-on-blockchain/>.

<sup>32</sup> “Opposition to the Use of Black [sic] Chain Identity,” NAACP [The National Association for the Advancement of Colored People], January 1, 2019, <https://naacp.org/resources/opposition-use-black-chain-identity>.



of discrete elements (blocks) strung together as learners progress through schooling or gigs. Through technologies such as “badging” and micro credentials, the Internet is programmed to determine and record the determined value — from birth certificates to school transcripts, credit histories, eligibility for government services and skills badges — and anything else expressible in computer code. The blockchain has been described as a “*Ledger of Everything*.”<sup>33</sup>

While the above offers only a summary of concerns that have been raised about blockchain and its application to education, few have directly challenged a key building block of this application: the assumption that knowledge is reducible to its simplest component parts, that human ability is merely a collection of discrete, behaviorally manifest “skills.” Blockchain technology requires human capacity be rendered as “parts” that can only exist as recorded behavior. As such, the behaviorist conception of “skills” dominates, including the idea that social and emotional expression only exist as skills. Blockchain technologies thus enforce conceptions of skill that are inaccurate, philosophically untenable, and ideologically retrogressive. Countering blockchain in education, then, requires more than exposing nefarious political and economic interests — it requires philosophical critique.

### **An Adverbial Theory of “Skills”**

Buttressed by critique of capitalist-inspired rendering of skill, the main purpose of this paper is to present an alternative to the dominant conception of skills, one that simultaneously challenges category mistakes and ontological error and advocates for the significance of skilled social action and the role of education in fostering such action beyond employment goals. The thesis is that there is no such thing as “skills,” only things done more or less, skillfully. The error is a kind of category mistake. The category mistake is treating “skills” as a substantive, when what “skill” and cognates of “skills” perform in language is an adverbial and aesthetic function. One cannot have skills like one can have clothes.

Long before the blockchain revolution, but in a decade deepening commitment to skills talk in education, exasperated, philosopher of education Deron Boyles published “An Argument for the Deletion of the Word ‘Skills’ from the English Language.”<sup>34</sup> This was in 1993! The source of Boyles’ frustration? The ubiquity of skills in education discourse. Appended to everything from “play” to “language acquisition” to “computation” and “critical thinking”, “skills” serves as a handy-dandy, all-purpose, sure-fire add-on to anything education. Skills, as Boyles sees it, has become “an enacted *non sequitur* where purposes are shrouded in vague assumptions rather than used to define specific issues”<sup>35</sup> “[I]n order to bureaucratically notate objectives ‘met’,” Boyles continues, “educators pander to a technorational hierarchy by qualifying their intent and ability to reflect a language of economics.” “The problem,” Boyles concludes, “is situated with the increasing number of educators who do not make the distinction between education as a process of engaged inquiry rather than education as a static place for indoctrination.”<sup>36</sup>

On Boyles’ reading, skills may be seen to function in education discourse more like a language particle than a part of language. For instance, skills may function as a discourse

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<sup>33</sup> Don Tapscott and Alex Tapscott, *Blockchain Revolution: How the Technology behind Bitcoin and Other Cryptocurrencies Is Changing the World*, Reprint edition (Portfolio, 2018).

<sup>34</sup> Boyles, “An Argument for the Deletion of the Word ‘Skills’ from the English Language.”

<sup>35</sup> Boyles, 95.

<sup>36</sup> Boyles, 97.

particle. Discourse particles flavor sentences as regards tone or attitude, but do not affect the grammatical structure of sentences. So, for example, when we say things like, “Now, where were we?” or “Well, what have we here.” or “Phew! That was a close one.” or “What *are* you saying, then?” we express attentiveness, puzzlement, relief, and impatience, respectively; but the sentences all stand perfectly well on their own without the added ‘tude.

Skills may work similarly as a marker of importance or *gravitas* associated with an educational topic under consideration. Considered as a discourse particle, “skills” certainly deserves the death Boyles advises. When “skills,” is applied as a discourse particle to “math” or “listening” or “decision-making”, etc., all that is being said is that math, listening, decision-making, or whatnot are important to some context of consideration. Or, as Boyles summarizes the situation, the subject under consideration is given “a nebulous nod of approval.”<sup>37</sup> If that’s all there is to “skills” then Boyles is right to counsel deletion. Further, if Boyles is right that in characterizing learners as skillful, skill binds education to some system of collection of competency certificates, not only can we get along without “skills,” but we will also be better off when we stop using the word. However, eliminating use of a word without coming to terms with the underlying philosophical problem associated with it seems unwise. Certainly, use of “skills” in educational discourse has become problematic in ways Boyles describes. However, we wish to suggest a use of *skill* that need not be perceived as limiting education solely to a system of certified and digitally recorded competencies. Developing that expanded sense of skill begins with giving a slightly different account of the economic origins of an educational discourse of “skills.”

Educators who speak in terms of “skills” are not merely pandering in economic language. They are working in a superstructural context of capitalism that pushes everything, including education, towards assessment in quantitative terms, preferably quantitative terms alone. What has happened to the word “skill” during its development in education-speak into the word “skills” is not so much that it has become meaningless but that qualitative aspects of skill, those aspects we refer to when we ask, for instance, how skillfully someone has accomplished something, have been squeezed out of account.

Skills have certainly become more salable; but not necessarily more useful. This has led to two unfortunate ideas in schooling: 1) the possession of skills is a matter of mere competency/competencies, like having “assets in the bank” and 2) developing skills means having a wide range of behavioral competencies, possession of which is typically marked by certifications achieved via testing or some, in principle, similar ordeal. This dynamic leads to overuse of the questionable pluralized form, “skills,” derived from the original, singular form, “skill.” Quality has given way to competence; one can perform an action but not have done so skillfully. To get past these impoverished understandings of education we explore a way to return qualitative significance to our understanding of “skill” as *the quality of an enacted human ability*. Restoration of qualitative content to the idea of skill (The plural form is a quantitative reduction.) permits us, in turn, to restore the distinction between education as indoctrination and education as inquiry, but in an inclusive rather than a dichotomous way.

As things stand, however, skills are like tools and machines (which are related to autonomous systems). Tools and machines are used to accomplish tasks. So, with “skills” theory, these “tools” — cognitive and affective — are being abstracted from the worker, and made into a

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<sup>37</sup> Boyles, 98.

tradable commodity, including trading in futures in the form of data about “skills.” One acquires skills (tools) and renders their value through market exchange (which requires quantification). But control over the skills does not reside with the person. Skills become property of employers; the idea is, now, relationships between employed and employer are navigated via blockchain. “Skills” are given as abstracted from human persons. What you know is reduced to documented certifications of competencies achieved, while your own claims to know are made irrelevant because undocumented. Some see this development as an existential threat to humanity because memory moves outside persons and becomes something more akin to a “chain of events” controlled and nudged by institutional documentation. This leaves us in the situation Boyles describes: Education enacting a scholasticism of skills and a medievalism of the mundane.

Education is much better served by schooling focused through an aesthetic of the developmental journey of mastery. Focus on considerations of mastery enjoins schooling to consider quality of learning beyond competency expressed by passing a test. Better to discover elements in learning environments and processes of schooling that promote learning to perform educationally important tasks skillfully than settle for lessons that present students with skills to be learned only competently. (We might speculate that the plural form of the word is associated with an overall decline in the value of education as a foundational cultural activity.) Discovery of those elements will create criteria by which to judge the value and quality of learning in any environment. Can these be meaningfully captured in terms of blockchains?

Understanding the problem of skills as an artifact of capitalist quantification, the educational commitment to skills talk is the problem of returning qualitative meaning to the idea of skill. Skill might be more like “fish” than like “dollar”, where the plural form makes an obvious difference. To have skill in a domain — “She is a very skilled musician.” — entails those things which comprise the domain. That she knows her scales, reads music well, and can execute changes in volume and speed of performance with ease would all be assumed by use of the singular form, skill. “Music skills” adds nothing — other than the pedagogy of education by way of discrete skill drill. If our pianist was lacking in something central to the domain, we would not designate her as being a skilled musician, but a novice or developing one. Similarly, if the musician performed each of these components only competently, we would also deny her the status of “skillful” musician. Breaking musicianship down into all its elements — into its “skill set,” or, more precisely, its connoted set of human abilities — can be a useful exercise, but disassembled, one cannot understand what a skilled musician is. As Goethe remarks: “When scholars study a thing, they strive/ to kill it first, if it's alive;/ then they have the parts and they've lost the whole,/ for the link that's missing was the living soul” (*Faust*, Part I, lines 1934-1939).

Skill is a type; skills is a quantity.<sup>38</sup> Thus, resolution of the problem posed by use of “skills” in education discourse cannot be achieved by banning use of the word. (Although we, like Boyles, recommend the practice of *not* using it!) The possibility of returning a qualitative dimension to skill is better actualized by treating skill as a different kind of language particle, an adverbial particle. Adverbial particles modify verbs, expanding meaning by adding extended detail to the action. Adverbial particles often appear in English in the form of phrasal verbs. Phrasal verbs are constructs like “driving along” or “eating up.” These idioms attach a kind of normalcy to the act of driving or suggest an intensity in the act of eating.

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<sup>38</sup> Stergios Chatzikyriakidis and Zhaohui Luo, “Adjectival and Adverbial Modification: The View from Modern Type Theories,” *Journal of Logic, Language and Information* 26, no. 1 (2017): 45–88.

Understanding “skill” as an adverbial particle makes it possible to say there’s no such things as skills. There are only things accomplished more or less skillfully. Call this the adverbial theory of skills. When teachers say things like, “We are working on our math skills,” what they are (and should be) saying is: “We are seeking to become more skillful mathematicians.” It is the quality of mathematical reasoning to which skills refers, not some combination of discrete mathematical competencies. Same with any word or phrase to which skill is appended. Quality of performance is the central concern of adverbially construed skill. On an adverbial view of skill, the business of education is not adding competencies *ad infinitum* to student resumé. Rather, it is about making students skillful beyond mere competence, beyond, essentially, just being able to “do”.

In its most developed form education is a matter of turning novices into experts. When “skill” is taken as an adverb it becomes a part of speech that modifies an action. Thus, skill cannot be divorced from the use of means to achieve the end of the action it modifies. Considered as an adverb, skill becomes a range of descriptors between, say, clumsy and deft. Also, as inherently action-oriented, an adverbial understanding of skill cannot be divorced from contexts in which the action modified by skill is undertaken.<sup>39</sup> Finally, on an adverbial theory of skill, schooling becomes understood as motivated by the idea that action can be modified via planned experience. Successful education modifies performance of action so that the performance of it is increasingly subject to favorable evaluation in terms of skill, i.e., how skillfully the student performs an action. Education is not so much about how many blocks you’ve chained together. Education is more a matter of how many blocks you’ve been around.

Still, there is a matter of what looks to be a legitimately substantive use of skills. When skills are considered in terms of something like “the smallest component parts of actions,” “skills” (or “skill sets”) seems to refer to a noun. Boyles offers a good defense against this observation. Using the example of intellectualism, Boyles concedes that “intellectualism depends, in part, on communication, reading, writing, listening, etc.” However, that relation of dependence need not be one of composition. It might be one more like implication or *entailment*. If you are going to do action “x” then you also must be able to perform actions “y” and “z” (such as noted above in terms of a musician).

On an adverbial theory of skill, the additional argument can be made that whatever the relation between lower-level and higher-level skills may be, any substantive use of skill is haunted by the question of quality. Whenever a substantive skill — size doesn’t matter — is attributed to an individual, a question of quality of attribution is ineradicably raised. Whenever a skill is put to use, we will want to know, not just the detailed description of the skill, but the quality of its application in a specific case.<sup>40</sup>

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<sup>39</sup> For more on this situated notion, see: Hinchliffe, “Situating Skills.” Collapse of the act/object distinction seems a *sine qua non* for successful use of adverbial theory. See Alan Thomas, “An Adverbial Theory of Consciousness,” *Phenomenology and the Cognitive Sciences* 2, no. 3 (September 1, 2003): 161–85. Failure completely to collapse the act/object distinction in sensory experience is the nemesis of adverbial theories of perception. See Michael Tye, “The Adverbial Approach to Visual Experience,” *The Philosophical Review* 93, no. 2 (1984): 195–225; E. W. Van Steenburgh, “Adverbial Sensing,” *Mind: A Quarterly Review of Psychology and Philosophy* 96, no. 383 (1987): 376–80; and Ran Lahav, “An Alternative to the Adverbial Theory: Dis-Phenomenalism,” *Philosophy and Phenomenological Research* 50, no. 3 (1990): 553–68.

<sup>40</sup> The argument here may find a useful analogy in G. E. Moore’s open question argument from his *Principia Ethica* (Cambridge: Cambridge Press, 1903).

Reliance on competence, as a measure of skillfulness, offers no hope here. First, it is question begging to define competence independently of context of action. Passing a test may show only a student is a competent test-taker, not that the student is “competent” in the subject being tested. (Note, too, that competence often is simply a stipulation of how many test items were answered correctly.) Context of action is part of the measure of competence. Second, like skills, competencies are neutral as measures of quality. Competencies are minimalist descriptions of how skillfully tasks are performed. While skillful work is, by definition, *competent work*, *competent work is not necessarily work skillfully accomplished*. Indeed, work merely competent in its level of accomplishment often implies, as noted above, lack of skillfulness in its completion. To borrow an old saw: “A jack-of-all-trades does not a master make.” While the block chain may be good at creating jacks-of-all-trades, it is not so good at making masters. But the real point is the way in which the now dominant view of skills pushes a problematic, solely quantitative notion of how we should understand activated human ability.

In contrast to quantitative understanding of human behavior, quality permeates human activity on an adverbial theory of “skills.” We may even concede the existence of something substantive to which “skill” may refer, something like component or entailed abilities, and the adverbial function of skill remain intact. Admitting a substantive sense of skill as connoted behavior permits description of education as a two-part process of, in alphabetical order, indoctrination and inquiry. Indoctrination may be said of things like learning conventions — substantive bodies of fact, proven methodological tools, etc. — associated with a subject matter or activity. Inquiry may be said of learning to use and learning to develop/design/critique conventions in a subject matter or area. Inquiry demands you put conventions to use, more or less skillfully, — either in completing a study of a topic in a subject matter or suggesting changes to subject matter conventions — in ways that qualitatively strengthen, deepen, affirm, expand, rectify, etc., the field/area of study.

This is just to restate the age-old distinction between knowing-that and knowing-how, between propositional knowledge and generative knowledge, between remembering facts and coming up with good ways to get new ones. But it helps make clear for educators the distinction, per Boyles’ apropos but uncritical invocation of two approaches to schooling, between education as indoctrination and education as engaged inquiry. However, on an ontology that admits the existence of substantive skills understood as connoted abilities, educators must know the difference between indoctrination and inquiry, must know when they are doing one, the other, or some combination of both, and must skillfully teach students both conventions and intelligent use of conventions in contexts of student work.<sup>41</sup> To express both these aspects of education we suggest use in education parlance of the word “smarts” rather than the word “skills.”

### **The Movement from “Skills” to “Smarts”**

We make the recommendation about using “smarts” as an alternative expression to “skills” in awareness of evidence that, as currently used in school contexts, “smarts” (and the related idea of “smartness”) is embedded in an ideological system of social control seemingly intractably supportive of classism, racism, and sexism. As Beth Hatt observes: “How smartness is defined

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<sup>41</sup> See Kamran Khan and Sankaranarayanan Ramachandran, “Conceptual Framework for Performance Assessment” who distinguish between two different processes, observation of performance (competence) and assessment of performance (competency), as a way of addressing concerns of quality in tracking what they call students’ “progression of skills (920).”

within schools contributes to low academic achievement by poor and racial/ethnic students.” Jordan Corson puts Hatt’s point more generally when he remarks that what is taught and learned in schools stands in direct relationship to the structure of society in which the schooling takes place.<sup>42</sup> What must not be kept unsaid about this line of investigation into discriminatory uses of “smarts,” however, is that its primary import is to show that “smarts” is a cultural construct not a biological certainty or social destiny.<sup>43</sup> This means that schools are sites for the negotiation of smartness.<sup>44</sup> The basis of those negotiations is competing value systems between schools and students, a process of negotiation sometimes productive of student resistance to perceived mechanisms of control, especially when exercised along class/race/sex/gender/etc., lines.<sup>45</sup>

“Smarts” provides a normative core to schooling.<sup>46</sup> First, the way “smarts” gets defined in some school context or other tells you what bodies of knowledge are valued by that school. Second, how a school goes about deciding what gets defined as “smarts” tells you who is of value in the school. Schools are subject to criticism as centers of ideological thinking because schools tend to define “smarts” independently of the life circumstances of their students. This seems a likely source of the traditional disconnect between inert school smarts — skills? — and agentic street smarts.<sup>47</sup>

Another way “smarts” provides a normative core to schooling, particularly in schools as we know them, is that “smartness” gets articulated in terms of capitalist values when “smarts” is understood like “skills,” as competencies, as commodities one owns. Substantive accounts of “smarts” project a proprietary notion of “smartness.”<sup>48</sup> On this proprietary definition of “smarts” the whole issue surrounding the adverbial theory of “skills” breaks out again. The issue may be resolved, again, by noting that “smarts” is at least as adverbial as “skills.” “Smartness” is not a property one has. “Smarts” is an event one helps make happen. To say someone *has* smarts is to refer, not to a property of that person, but to the strength of that person’s capacity to contribute intelligently to achievement of desired outcomes in some context of action.

Consider the case of “smart technology.” Its “smartness” consists in a limited number of functions it performs (We hope!) competently. No determinate thinking going on with smart technology. A *caveat* as old as computers themselves warns: “Computers never do what you

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<sup>42</sup> Beth Hatt, “Street Smarts vs. Book Smarts: The Figured World of Smartness in the Lives of Marginalized, Urban Youth,” *The Urban Review* 39, no. 2 (June 2007), 145. DOI: 10.1007/s11256-007-0047-9 Jordan Corson, “Schools of the Walking Dead: Schools, Societies, Smartness, and Educational Sanctuary,” *Journal of Curriculum Theorizing* 37, no. 2 (2022): 32-43. See, also, Hatt’s editor’s introduction to a special issue of *Race Ethnicity and Education* at Beth Hatt, “Racializing Smartness,” *Race Ethnicity and Education*, 19, no. 6 (2016): 1141-1148, DOI: 10.1080/13613324.2016.1168537

<sup>43</sup> Beth Hatt, “Smartness as Cultural Practice in Schools,” *American Educational Research Journal* 49, no. 3 (June, 2012): 438-460. DOI: 10.3102/0002831211415661 and Helena Korp, “What Counts as Being Smart Around Here? The Performance of Smartness and Masculinity in Vocational Upper Secondary Education,” *Citizenship and Social Justice* 6, no. 1 (2011): 21-27. DOI: 10.1177/17461979103979

<sup>44</sup> Ulla Lundqvist, “The Burden of Smartness: Teacher’s Pet and Classmates’ Teasing in a Danish Classroom,” *Linguistics and Education* 52 (2019): 24-32.

<sup>45</sup> Pamela Twyman Hoff, “‘Fool me once, shame on you; fool me twice, shame on me’: African American Students’ Reclamation of Smartness as Resistance,” *Race, Ethnicity and Education*, 19, no. 6 (2016): 1200-1208, DOI: 10.1080/13613324.2016.1168542 and Hatt, “Smartness as Cultural Practice in Schools.”

<sup>46</sup> Zeus Leonardo and Alicia A. Broderick, “Smartness as Property: A Critical Exploration of Intersections between Whiteness and Disability Studies,” *Teachers College Record* 113, no. 10 (October, 2011): 2206-2232.

<sup>47</sup> Hatt, “Street Smarts vs. Book Smarts.”

<sup>48</sup> Leonardo and Broderick, “Smartness as Property.”

want them to, only what you tell them to.” “Smarts” is not “many types of smart.” Smarts is an orientation, as opposed to a collection. Skill may be presented as many (types of) skills; but “smarts” refers to a disposition towards the acquisition and application of knowledge; and re-centers persons’ actions in reference to their own interests. Skills may be made transferable and something that can be abstracted from persons for the benefit of someone else; but smarts is embedded in persons and their culture(s).

The normative core of schooling changes fundamentally when “smarts” gets defined in ways that create an adverbial counter-hegemony to oppressively reified conceptual systems presently operative in schools. As Billye Sankofa Waters correctly observes, “It is imperative to explore multiple approaches to intelligence and public education that fundamentally integrate the ideas and lived experiences of students – with particular interest to those who are most disenfranchised.”<sup>49</sup> First, following Waters’ advice makes clear to students that what they know and what they need to know are of value to the school. Second, when student concerns are fully integrated into curriculum delivery school becomes a source of support rather than a confrontational social structure. Third, connecting school knowledge to life circumstances of students adds an agentic edge to school smarts. Students may now put intelligently to use in their lives lessons they have learned at school. On Waters’ vision of schooling, schools offer not a preset list of competencies to own independently of life circumstances but a set of life problems to master by use of lessons learned at school. On this model, schooling becomes a critique of the social structure, an institution oriented away from exclusionary definitions of knowledge and towards inclusive ones, a process oriented away from a proprietary understanding of education and towards a participatory one. School is not to be thought of as a place where individuals earn competencies. School is a place where students become skillful in working with others to decide together how to make life better.

Where “smarts in x” is understood as something like “self- or group-generated, intelligent use of knowledge, both propositional and generative, in x”, then concerns about quality imbue acts of learning. The aim of schooling is to learn how to put curricular materials intelligently to use. Intelligent use of what you know is a sign of mastery or skillfulness not mere competence. True, there may come a day when online simulations are so similar to life circumstances that the blockchain will be able to claim more than competence. But even in that case, education, in its engaged inquiry sense, will continue to involve learners more significantly than simulations in skillfully meeting, assessing, and resolving real-life problems.

As John Preston has observed, the focus on competence is an existential threat to human learning.<sup>50</sup> Concrete alternatives to this conception are required to confront this crisis. Educators are often caught up in conventional, uncritical discourse arguing for their favored approach or reform based on the claim that it, and not some other method, produces desired “skills” (whether “soft” or “hard,” “low-level” or “high-level”). The adverbial theory of skill turns us away from quantitative consideration of “skills” and towards qualitative consideration of “skill.” Thus, an adverbial understanding of “skill(s)” has profound implications for how education is conceived and evaluated. Emphasis on masterful use of course material focuses schooling on matters of personal and cultural development. Emphasis on competency as the mark of acquired “skills”

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<sup>49</sup> Billye Sankofa Waters, “Freedom Lessons: Black Mothers Asserting *Smartness* of Their Children,” *Race, Ethnicity and Education* 19, no. 6 (2016): 1223-1235. DOI: 10.1080/13613324.2016.1168545

<sup>50</sup> Preston, *Competence Based Education and Training (CBET) and the End of Human Learning: The Existential Threat of Competency*.

undercuts considerations of quality of schooling in favor of quantity of schooling. In turn, insistence on the exactitude of calculation necessitates a view of education as the accumulation of decontextualized, disembodied, and transferable skills. At best, blockchain approaches enforce an aesthetic of mediocrity on education. Not surprisingly, in this case too, market values drive out other values. They “block” quality schooling and “chain” learning to capitalist ends. Education is better served by schooling focused through an aesthetic of skillful action in service of human flourishing.