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Learning How to Learn: The Infinite Learner

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Abstract
Across all time periods, in all life forms, organisms have encountered the challenges of learning how to learn to sustain life. The purpose of this paper is to illustrate the human dimensions and dynamics of "Learning How to Learn" from four distinctive inflection points: Roman brick makers, Leonardo da Vinci, COVID-19 ICU physicians, and the Infinite Learner. These four inflection points disrupted learning how to learn in people's personal and professional lives in ways that were not fully understood at the time.

Introduction

In T. H. White's (1958) *The Once and Future King*, Merlin the magician teaches the young prince who is to become King Arthur that nonstop learning is the key to leading a happy and fulfilling life. Merlin counsels the prince that "the best thing for being sad is to learn something. Learn why the world wags and what wags it. That is the only thing that never fails, the only thing that the mind cannot exhaust, never alienate, never be tortured by, never fear or distrust and never dream of regretting. Learning is the only thing for you. Look what a lot of things there are to learn" (p. 186). Across all time periods, in all life forms, organisms have encountered the challenges of learning how to learn to sustain life. The purpose of this paper is to explore the human dimensions and dynamics of "Learning How to Learn" from four historically distinctive inflection points: Roman brick makers, Leonard de Vinci, COVID-19 ICU physicians, and the Infinite Learner. While clearly not exhaustive, each of these four inflection points disrupted personal and professional lives by transforming "Learning How to Learn" in ways that were not fully understood at the time.

Learning How to Learn: Innate Impulse

In *The Craftsman*, sociologist Richard Sennett (2008) documents an historical account of the concept of craft from ancient Roman brick makers to Renaissance goldsmiths to the printing presses of Enlightenment Paris, and the factories of industrial London. Across time, craftsmanship has encapsulated an enduring, basic human impulse: the desire to do a job well for its own sake. Historically, craftsmanship has transcended traditional manual labor. When practiced as a skilled craft today, medical doctors, artists, computer programmers, and educators focus on "objective standards, not on the thing itself" (Kinni, 2020). The recurring theme in Sennett's research is the surprising extent to which individuals and teams across time have learned how to learn through the labor of designing and creating things that reflect objective standards.

Learning how to learn is exemplified in the inspirational story of a team of students at the Massachusetts Institute of Technology (MIT). Briefly, after the firm SpaceX announced that it would give a prize to the university team that could design a critical component of the proposed Hyperloop high-speed transportation system envisioned by Elon Musk, a team of MIT students from aeronautics, mechanical

engineering, electrical engineering, and computer science tackled the challenge collaboratively. After the team won the competition, a *Boston Herald* reporter asked students why they had been so relentlessly committed to working together. Was it to win the prize? A student team member responded succinctly, "That's why we go to school to meet challenges and solve problems" (Ancona and Gregersen, 2018, p. 32).

The craftsmanship involved in designing a vital component for the proposed Hyperloop high-speed transportation evoked an emotional sense in students that they were self-educating to where their passions and interests lie. In confronting the challenges and solving problems related to the SpaceX project, students sensed that deeper learning is synonymous with emotional engagement (Mehta and Fine, 2019.) Moreover, the challenge in working collaboratively on the Hyperloop project highlighted a body of research that suggests that learners crave community and form learning communities naturally in a mind-set of discovery and shared meaning (Senge, 1999; Bowman, 2019).

In *Craft: an American History*, scholar Glenn Adamson (2020) traces the erosion of craftsmanship that occurred as the U.S. transitioned from a nation of artisans to an industrialized economy. The author retells a familiar story about Henry Ford's disruptive assembly line with an insightful twist regarding learning how to learn. Briefly, in the first year of the assembly line, so many workers walked out of the Ford plant in disgust that more than 52,000 had to be hired just to maintain a constant labor force of 14,000. In massively deskilling the process of assembly, the intrinsic impulse of craftsmanship was eviscerated. In its place, workers were left with essentially *meaningless* work tasked by scientific management (Kinni, 2020).

In Mehta and Fine's (2019) *In Search of Deeper Learning: the Quest to Remake the American High School*, the researchers' analysis of what works and what does not in American high school education revealed that for many students the most memorable parts of the school experience were participating in all-consuming activities such as a drama production, debate, school newspaper, and school yearbook, all of which occur on the edges of the core curriculum. Moreover, activities such as painting elaborate sets for a drama production, learning to hang stage lights, or taking charge as a stage manager all involved craftsmanship and objective standards of excellence.

Each of these all-consuming extracurricular activities mirrors key aspects of learning how to learn through craftsmanship: Autonomy over tasks (what one does), time (when does it), technique (how one does it), and team (whom one engages with). Specifically, the MIT students' craftsmanship mirrored Mehta and Fine's (2019) research findings that suggest that both in life and in academic environments deeper learning occurs when students embrace challenges by trying to produce something consequential, when they see purpose in what they are doing, when they have a choice involving what they are doing, when they have constructive feedback on their work, and when they are part of an academic community that not only supports them but also holds them to high objective standards.

Learning How to Learn: Inquisitiveness

The Denver Museum of Nature & Science recently featured the exhibition *Leonardo da Vinci: 500 Years of Genius.* Leonardo, the 15th-century Florentine polymath, made groundbreaking discoveries in optics, engineering, anatomy, geology, fluid dynamics, weaponry, and painting. His ability to make *connections* across disciplines is highlighted in his 7,200 pages of well-preserved notes (Isaacson, 2017). Leonardo's genius resided in an *inquisitiveness* that allowed him to imagine beyond what was known. In creating *Mona Lisa*, da Vinci learned how to artfully blend inquisitiveness and imagination to bring images in his

mind to canvas. Five hundred years later, inquisitiveness and imagination mirror the dynamics of learning how to learn.

In contemporary academic settings, the concept of inclusion serves as a compelling test of learners' ability to tap their inquisitive nature in creating the human *connections* essential in a diverse and inclusive culture. In multiple instructional environments, fear and anxiety emerge contextually around demographically-based issues of race, ethnicity, gender, age, sexual orientation, prejudice, and feelings of being marginalized (Kennedy, 2009). Diversity, however, is not simply demographic. Shifting patterns of immigration in the nation's schools suggest that "diversity in the years ahead will therefore be increasingly understood as a diversity of values" (Helgesen, 2012, p. 64).

In a dialogic classroom setting, communication about core values and beliefs is not simply "who" says "what" to whom. Rather communication involves the co-creation of meaning *between students* (Fairhurst, 2011). In practice, the co-creation of meaning shapes reality including context-shaping consequences for others. In classroom discussions, exemplary educators manage meaning in ways that connect with students' values and beliefs. In doing so, educators support learners in satisfying two fundamental human needs: the need to feel authentic and the need to belong (Johnson, 2020).

The instructional implications related to the increasing diversity of values in the nation's classrooms are compelling. While the visual and verbal cues in learners' contributions to classroom discussions are often readily apparent, what is less obvious is the back story behind those behaviors: the motivation, traditions, history, and religious beliefs of a culture that ultimately inform one's behavior. In Hu-Chan's (2020) *Saving Face: How to Preserve Dignity and Trust*, that author argues that "Saving Face" is both a universal concept and a vibrant form of social currency in instructional environments. In contentious classroom discussions, for example, the ability of educators and students to save and honor face for others breaks down cultural barriers, builds interpersonal trust, and strengthens academic relationships.

Conceptually, diversity is the spectrum of human experience (Harris, 2019). Learners' prior experiences affect how they think and feel about what is present in their midst. Students think that they are seeing reality---seeing what is *there*. In the everydayness of life, however, students' mental frames consist of assumptions or beliefs that they layer onto reality (Edmondson, 2018). As a result, learners' subjective view of reality undercuts their ability to imagine what others are seeing and experiencing. In daily practice, the idealism of educators can serve as an inspiration to students to probe the deeply-held values, assumptions, beliefs, and cultural practices that either honor or marginalize the viewpoints of others (Bowman, 2017). In contrast, academic models focused on surfacing bias frequently create backlash and deepen division by alienating and even shaming those assumed to be privileged (Newkirk, 2019). Moreover, contrary to the current prevailing belief in organizational settings, diversity is not a "goal." Rather, diversity simply mirrors the nature of the global talent pool. Whether in a corporate or classroom setting, inclusion is the *means* by which this diverse pool is effectively engaged in productive work (Johnson, 2020).

In essence, the promise of diversity in academic environments is one of imagining other people's lives and other versions of reality. In instructional settings, diversity humanizes class activities by giving individuals a "chance to tell their true story in a wholehearted way and to be accepted for who we are " (Tschang, 2019, p. 23). Self-knowledge is the blood of all resonant stories (Hsu, 2008). Personal anecdotes and stories create psychological realism, prompting listeners' inquisitiveness: "If I were this

person in these circumstances, what would I do?" (McKee, 2003) In storytelling in a classroom environment, *emotion-eliciting* input alters listeners' brain functioning after only 12 milliseconds---far before students become consciously aware of it (Reisyan, 2016). When educators fail to appreciate the importance of students' emotions in learning how to learn, they fail to recognize a critical force in students' development. In a word, educators fail to appreciate the very *reason* that students learn at all (Immordino-Yang and Damasio, 2016). In *Tiny Habits,* Stanford University professor B. J. Fogg (2020) argues that *emotions* create habits, not repetition. Pointedly, he contends that in learning how to learn tiny habits are the only consistent, sustainable way to undertake changes in human behavior.

In instructional settings, inquisitiveness reflects a mutual obligation to ensure that all voices are welcomed and heard to more accurately represent reality (Mindell, 2000). Listening inquisitively goes beyond making sure that one has heard accurately what others have said; it is about the impact, the motive, and the intent of what is shared dialogically (Harris, 2019). Because instructional environments permit educators to confer credibility on diverse perspectives and ignite conversations that others cannot ignore, the single most important characteristic of any vibrant instructional culture is a willingness to pursue truth openly (Bowman, 2017). At its core, diversity involves choice. Being both curious and rigidly judgmental are seemingly incompatible choices in learning how to learn about diversity, equity, inclusion, and belonging (Harris, 2019).

Learning How to Learn: Discrete Domains of Knowledge

During the summer of 2020, I spent several weeks in a COVID-19 Intensive Care Unit (ICU) struggling to breathe, yet still hoping to greet the next day's sunrise. My extended hospitalization proved to be a tutorial in learning how to learn. Initially, what became evident across the medical center campus was that organizational cultures develop rituals, symbols, and uniforms that permit staff members to be placed in one of two organizational structures: the "doers" and the "thinkers." In learning how to learn, "doers" are *trained* to reduce cognitive variability while the "thinkers" are *educated* to increase cognitive variability. Briefly, the valet is trained to return one's car keys with all four fenders intact. At a minimum, the door greeter is expected to consistently display a practiced welcoming smile. The information desk personnel are trained to assist patients in getting to the right clinical floor, while the medical department schedulers are expected to assist patients in locating their assigned exam rooms. At a minimum, nurses' aides are expected to check and chart the patient's vitals, including blood pressure, temperature, and weight, as well as reviewing the patient's medication list. In each instance, the medical protocols that staff members follow are designed to *reduce variability* in the intended results. Importantly, the domain of knowledge for which the protocols are designed is knowable, specifiable, and masterable. Moreover, learning how to learn for "doers" must satisfy three criteria: Obtainable, sustainable, and relevant. Simply put, "Can I learn to do this exceedingly well?" Secondly, "Is this something that I passionately want to do in the future?" Thirdly, "Is this training something that is highly relevant to what my organization needs me to be good at?" (Zenger and Folkman, 2020)

In contrast, medical doctors are characteristically educated as "thinkers" to increase cognitive variability in diagnosing and treating patients. Specifically, physicians seek to "balance thinking, learning, and robust decision-making against goal-oriented 'doing' behaviors" (Marquet, 2019, p. 11). In practice, the domain of knowledge for pathogens like COVID-19 is not fully knowable, specifiable, or masterable. Beyond a confirmed positive diagnosis of COVID-19, for example, doctors are educated as "thinkers" to identify a continuum of issues, concerns, and hypotheses related to the patient's condition: What will be the likely interplay between prescribing steroids and the patient's glucose levels? How many liters of

oxygen will be optimal, if ventilators are not used? Should a regimen of antibiotics be prescribed? What clinical or investigational drugs are readily available? Should convalescent plasma be prescribed? Unlike that of the "doers," learning how to learn for physicians centers on consciously increasing variability to enhance both the patient's initial diagnosis and subsequent treatment. In practice, learning how to learn for "thinkers" involves a growth mind-set tethered to an infinite domain of knowledge. Tellingly, what "doers" and "thinkers" ultimately have in common, however, is that they are both responsible for results that need to be accomplished, and for which someone is responsible.

Instructionally, the concept of discrete domains of knowledge forces a fundamental question in diverse academic settings: Does effective teaching *increase* or *decrease* individual differences? In a pre-K setting, for example, the domain of knowledge that includes activities such as learning letters of the alphabet and learning how to tie one's shoes is specifiable, knowable, and masterable. Thus, the instructional intent is one *decreasing* individual differences in academic attainment. In a high school creative writing class, for example, in which students create original forms of descriptive writing, poetry, drama, and fiction, the domain of knowledge is demonstrably not fully knowable, specifiable, and masterable for even the most gifted learners. Thus, the instructional intent is one of increasing individual differences in achievement. Moreover, in a writing class focused on critical thinking, the domain of knowledge is infinite. Thus, the instructional intent is one of increasing learners' cognitive variability in learning how to learn involving an array of critical-thinking assignments.

Learning How to Learn: The Voice of the Future

For contemporary students, learning how learn in the very near future will involve learning everywhere all the time, using video, blogs, online courses, in-person courses, books, You Tube, journal articles, team projects, conferences, and podcasts to prepare for emergent careers. Disruptive technology coupled with increasingly available content will enable *personalized learning* beyond that of traditional educational institutions, corporate learning, and event-based learning. Two of the most essential attributes that individuals can exhibit in being in control of their own learning and their own careers involve learning agility in a world of artificial intelligence, robotics, and digitally enabled platforms together with the desire to learn continuously through day-to-day experience. Deep engagement in one's own learning mirrors the essence of an infinite learning philosophy (Palmer and Blake, 2018). Learning how to learn is about results. Exemplary teachers invite infinite learners to think in aspirational terms in developing their ordinary qualities to an extraordinary degree to contribute to a vital purpose both on campus and in the community.

Discussion

In his book *Shared* Reality, social psychologist E. Troy Higgins (2019) argues that learning how to learn is anchored in the way that individuals discern information as either trustworthy or not. In an academic environment, for example, students understanding of what matters depends largely the context of their relationships. When classroom discussions regarding issues such as climate change become a recurring instructional theme in a group setting that one trusts, learners tend to regard what is shared as worthwhile, and their commitment to that issue grows. As a result, learners' shared reality becomes the world that they live in and know. Insightfully, Higgins posits that s*haring is believing.* Instructionally, one of the most effective starting places for motivating students to change habits regarding environmental issues, for example, is the development of a new shared reality. In learning how to learn, however, "the compelling nature of a new shared reality starts *not with its substance*---what is being said---but with its context: who is saying it and why that person or organization is credible" (Lee, Pino, and Johnston, 2020, p. 52).

In William Butler Yeats' *The Coming of Wisdom with Time*, the poet recounts the countervailing notion of the coming of wisdom with age: "the lying days of my youth" and "to wither into the truth." Poetry has

redemptive power in coming to terms with the soul-truth of "who I am." In emotionally intense classroom discussions regarding issues like climate change and law enforcement practices, truthfulness is often the first casualty. In *On the Brink of Everything,* Parker Palmer (2018) frames the issue retrospectively: "My youthful 'lies' weren't intentional. I just didn't know enough about myself, the world, and the right relationship of the two to tell the truth. So what I said on those subjects often came from my ego, a notorious liar" (p. 23).

Conclusion

In Dweck's (2006) *Mindset: The New Psychology of* Success, the psychology researcher contends that it is in educators and students' interest to cultivate a culture in which human capability is assumed to be infinite. As an infinite learner, learning how to learn mirrors a growth mind-set. From that perspective, individuals will advance their cognitive skills and performance not just in the classroom but throughout their lives. In digital learning, for example, engagement and advancing competence will likely emerge in learning how to solve problems in a novel way, imagining how work that matters can be done more productively, and in integrating disruptive digital technologies into daily life. Both in the classroom and in the everydayness of life, learning how to learn serves as a path of discovery and engagement in getting "fierce with reality" (Scott-Maxwell, 1983, p. 42). In getting fierce with reality, infinite learners see everything and question everything in their ongoing quest to learn about the self and the world.

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