



Science Education: From an Ideology of Greed to an Ideology of Thriving

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We are still living in a time when greed is normalized and used as a motivation for politics, business, research, scholarship, and education. Greed is the root ideology that creates social injustices and unsustainability, but despite its destructive outcomes, greed continues to motivate us. Teachers, parents, and politicians tell students at an early age that their success in school is tied to their ability to earn a higher salary, which means that we are reinforcing greed as a motivator. Greed drives capitalism as it did feudalism. Greed begets exploitation for profit. Greed created slavery via the invention of race as assigned to groups of humans in order to generate and concentrate profit via exploitation. Greed is the evolving force behind globalization (slavery 2.0). Greed is the destructive force behind global climate change, which was created by scientists and engineers who fueled the exploitative Industrial Revolution with fossil fuel technology. Greed seeps into every aspect of mainstream education, and science education is influenced by a corporate-STEM movement to create employees for

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companies that concentrate wealth, contribute to weaponizing governments into “global powers,” and push profit-based technological solutions rather than more balance with nature and protection of the commons. Scholars across all content areas use a greed discourse for their own personal profit/status in their fields, and science education is no exception. Greed is normalized and moralized in the current corporate-STEM movement in science education, which is coupled with the willing omission of scientist and engineer contributions to climate change, widespread destruction via nuclear weapons, and labor exploitation.

This chapter uses a (semi-)fictional context (a device used by philosophers such as Plato, Friedrich Nietzsche, Voltaire, and James Baldwin) in order to more fully humanize thinking. This chapter is written in the form of a story in order to explore waves of greed ideology that flow into and through professional discourse from the perspective of a complete outsider looking in ... a perspective very much needed in order to better see ourselves and our entrenchments that blind us.

The unanswered aspects, the disequilibria, and the loose ends of this story are intentional—much like a movie that asks the audience to keep thinking about the storyline. It is my intent to leave spaces open, ambiguous, and awkward at times for the sake of the reader’s pleasant discomfort. Consider it yoga for the mind.

Most importantly, let’s implore each other to move toward an ideology of thriving, whatever that may be.

PART I: SCIENCE EDUCATION TOWARD GREED AND *HOMO GREEDYUS*

“Interesting,” said the alien, who was soun ding more like a counselor than ... well ... an alien (pejorative). The non-Earth being (NEB) (non-pejorative) sat on a single chair in the lobby of a major hotel chain in a major metropolitan city (in a country that thinks that it’s “totally major”) talking to a person with a majorly recognizable name around the “world” (a word with a rather confusing usage to the NEB) of science education researchers ... speaking only in the key of D minor because of its calming effect (while also being the most popular minor scale, which is to say, familiar and comforting, as the NEB hoped). The NEB, who was able to morph into various life forms after considerable training, sat in the hotel lobby with a laptop, an iced chai tea, and a universal translator in its fake

human ear disguised as a very popular stylized white cordless earbud. The NEB assumed a pseudonym (as another layer of human social camouflage) based on the name of a very real science education researcher who typically avoided professional conferences unless absolutely necessary. “So, learning science in public schools is ultimately tied to broader socioeconomic outcomes like money, salaries, and businesses? Doesn’t that just mean that science education is ultimately just a costly externality for societies that benefits STEM-based corporations?”

The notable researcher, who was on his third cocktail at 5:45 pm, after presenting in two sessions earlier, and listening to only one session that day (because it was a colleague in his university department) said, “What are you talking about? It’s FREE public education. I mean, ya know, taxes, but it’s FREE.” The word seemed to have a whimsical feeling in his mouth almost like the word “weeee.”

It was not entirely clear to the NEB if the notable researcher (who was also notably inebriated) understood or even considered the controversial point that the NEB posed. “By definition, that’s not free. It’s just differently funded.” The NEB quickly found a definition of “free” in an online dictionary just to be sure. The projection of the definition flashed in front of its fake human face in infrared lighting so the *homo sapiens sapiens* (HSS) in the room could not see it. “Free: not costing or charging anything ... *free school?*” (Merriam-Webster). Oh, so that’s why the HSS said that statement. The dictionary even seems to believe that schools are free, which the NEB thought was weird since nearly all students of color attend schools that are underfunded throughout this country that constantly boasted of itself like an insecure teenage boy. The language usage seemed sloppy, but this was a pattern that happened fairly consistently ... never mind the poor spelling of words.

The HSS professor looked at the NEB and paused for a moment. “Yea, you’re right!” he exclaimed and finished his cocktail. “Why do we call it ‘free’ instead of ‘publicly funded’? That’s totally inaccurate.” The NEB assessed the HSS professor to be at a minor level of inebriation with a maximum amount of mental plasticity.

The HSS professor seemed to go into car salesman mode: “But, we live in a capitalist society, ergo it goes that little de facto capitalists we make. Yes, even in science. Or, maybe on some level because of science, right?” He was a little surprised by his own admission. “Was I loud just then?” The HSS professor had become very well known in recent years and made a second career with keynote speeches, speaking engagements, and large

corporate-funded grants that his university boasted about on their web page and he boasted about on his curriculum vitae and others boasted about when they introduced him prior to him giving a speech that they paid him for. The NEB made a face gesture that was deliberately ambiguous. “Ok, good,” said the HSS professor. “I can’t believe that I just said that.” It was almost like he broke character or forgot his line. “Well, maybe I can. I am certainly doing a lot better financially these days,” he whispered rather deviantly, like a kid who just realized that he got away with stealing a pocketful of candy from a convenience store.

The NEB already knew the answer, but the HSS professor was always happy to hear the affections of an adoring academic, “I know. What you’re saying seems to be really well-received by so many in the field, right now.” Fortunately, the NEB species biologically has no gag reflex.

In a moment the NEB froze, scared that one of the HSS in the room called to it by its actual name. Then, the NEB reminded itself for the 42nd time that its real name was also pronounced very similarly to the acronym of that conference organization. The NEB hummed a few notes of the D minor scale to get back in tune.

“So, here’s the thing. Here’s what people in our profession don’t realize about all of this.”

“That it’s all male cow manure?” asked the NEB with a perfectly straight face.

The HSS professor replayed that statement in his head. “Ha!” He chuckled some more, stopped the waiter’s forward motion, ordered another 14-dollar hotel lobby beverage, and stated, “It’s like a balanced chemical equation. If you say STEM or STEAM enough times, talk about future jobs, and call it ‘equitable,’ you can cash in, too.” He paused, carefully looked around the room for possible competitors, and turned back to the NEB dressed as a human, “I’m White, right? So are most academics in science education, aren’t they? I genuinely want all people of all backgrounds to come into STEM fields. I genuinely do. But, when you look at it through critical eyes, you know that this is just another iteration of White dominance. I’m not saying that I want that. I don’t. But, the STEM fields are not truly open to diversity, social justice, cultural criticality ... Oooo, I’m not even sure what that means, but I like the sound of it. It’s all whitewashing and capitalist at the end of the day. Kids are being treated like ‘pre-employees’ at best. On the one hand, I love STEM and science education, but on the other hand, I know that they are both just about

jobs. It's been that way since the U.S.'s response to Sputnik. It's dehumanizing, and I feel dehumanized every time I talk about it like that."

The NEB said, "You seem conflicted." The NEB learned a simple counseling technique and utilized it at that moment to see what response it might elicit from the HSS professor.

"Yeah. I am. I have talked about STEM education as a form of equity for so long that I actually started to uncritically believe it. But, here's what really happens. Someone poor or someone diverse does better in school, does well in math and science classes, majors in some kind of engineering in college maybe with some scholarships, and then they are happy to go work for Exxon or Bayer. Can you see the problem there, maybe? It's not okay. If they go to Exxon, they become a scientist who helps add more carbon dioxide to the atmosphere or they work for Bayer and create pesticides that kill off primary pollinators like bees and create colony collapses. Not exactly the best uses of STEM, but at least they have an upper middle class paycheck, right?" He sighed. "Social justice, everybody! High five yourselves. Job well done. Equitable Anthropocene, right there!"

He paused again. "Sorry, I don't *normally* talk like this. I *normally* play the buttoned up, self-important professor part much better." He paused and looked at the NEB as if he told a pun and was waiting for the NEB to respond. "Ah? See what I did there?" The NEB saw a flash of Fozzie Bear in the HSS professor. "Get it? 'NORMally' and 'play the part?' That's what we are all expected to do here, not that we all do, of course. When you start getting more attention, you pay more attention to what sells rather than what you really think, apparently." He looked disgusted at himself for a moment but became instantly aware of the colleague (who really wasn't his colleague) looking at him.

"So, you're saying that money and prestige are keeping you from saying more openly to your colleagues what you're really thinking?" The NEB assumed this was the moment to finally ask that direct, critical, and personal question. The HSS professor nodded his head and sighed.

"Yes." The HSS professor recoiled a bit. "I don't know." He sighed, again. "Probably." The HSS professor took a breath, began to speak, but then paused to consider what he was about to say. "The history of science is not neutral. There is a long story, since at least Francis Bacon, of scientists performing as showmen for profit. Bacon did it for the king, and many others did it for people with power and wealth (Merchant, 1980). In that sense, scientists are not unlike many artists throughout history. Many artists produced art for nobility, the Church, and very wealthy

people largely because that was their source of revenue, as well as notoriety. Similarly, scientists throughout the ages have made discoveries and created technologies that connected to their own personal gain in the form of profit and notoriety. In that sense, many of us are greedy servants to the wealthy class, right now.”

The NEB quoted Max Horkheimer and Theodor Adorno in the *Dialectic of the Enlightenment* (2007), “What human beings seek to learn from nature is how to use it to dominate wholly both it and human beings” (p. 2).

The HSS professor came back with more Horkheimer and Adorno, “The earth is radiant with triumphant calamity” (p. 1). The HSS professor continued, “I think I and so many others in science education may be carrying on the tradition, sadly. Why are there so many conference presentations on STEM and so few about sustainability in science education, no less? The International Panel on Climate Change has been saying for years that we have only until 2030 to make change if we have any hope of staving off the catastrophic effects of global warming, but here we are at a conference where STEM for corporate interests dominates while science education for sustainability is still not a full-throated effort on our parts. We care far more about diversity and equity for STEM, which really means just having a more diverse set of STEM employees that ultimately funnel more wealth to the already super wealthy, rather than putting all of our efforts into reconfiguring science education to aim towards sustainability. Maybe it gets a couple of weeks per school year or is a discussion on Earth Day, but we resort back to STEM for profit as the default. I’m doing it, too. Why? Are we really so trapped in greed motives that we can’t operate in a different mindset? Are we so trapped in Western thinking that we are inevitably just going to destroy the planet?”

“Are *homo sapiens sapiens* really just *homo greedysus*?” asked the NEB. The HSS professor snickered. “It seems like there’s a tokenizing of people of color in a White-dominated STEM culture in order to justify that domination. It seems like an attempt to wallpaper over white walls where the foundation ultimately remains unchanged. Have you made a name for yourself, in a way ... probably not intentionally, though ... doing some of that wallpapering?”

The HSS professor stared deeply into the glass in his hand now less filled with alcohol. “I wish I could say that I hadn’t.”

The NEB’s curiosity about the HSS professor’s thoughts was intensifying. The NEB wanted to know how important aiming toward

sustainability was to the HSS professor. The NEB continued, “It seems to me that sustainability or its current failings are more of a cultural and values problem than they are a science problem. On the one hand, greed seems to be driving the show in science education similarly as it did throughout the history of science in many cases (Merchant, 1980). Greed is ideologically tied to freedom for Western thinkers, right? They may not say it that way, but personal profit is a major motivator and a measure of success, and they want the freedom to pursue it. And the portrayal of pursuing that greed is framed as a kind of freedom in this society. To that end, the framing of science, science research, and science education is heavily influenced by this culture of greed. Despite knowing pretty well what to do scientifically about climate change and having strong inklings of how to proceed sustainably as a society, *homo greedus* views STEM with profit in mind, which is then inherent in how equity and diversity are viewed.” The NEB was waiting for pushback.

“Well, I think maybe Chet Bowers (2006) had it right by focusing on it as a cultural issue rather than a species issue, but I certainly take the point. If you mean *homo greedus* as a tongue-in-cheek way of describing members of the human species enacting a culture that is oriented around mindsets, values, and practices of greed, then I can agree with that.” The HSS professor was nodding his head as he spoke. “The death grip of greed in the long history of humans is relentless, especially in industrialized, really post-industrialized societies. It manages to colonize our minds just as it has done for hundreds, if not, thousands of years. I’m aware of it, and yet I’m still complicit way more than I even recognize.” He was looking into the distance as he spoke, but did not seem to focus on anything.

The HSS professor continued, “STEM/STEAM education is constructed in the tradition of a greed ideology with the veneer of a meritocracy packaging to make it all shiny and equitable.”

“Sometimes I feel like I’m from another planet,” said the NEB as it chuckled to itself. “The United Nations’ IPCC said that 2030 is about as long as humanity has to make any real changes to slow down the catastrophic effects of climate change. It’s a growing calamity right before our eyes. And, yet, when I come to these conferences, read the journals, or look at the standards, the dominant message does not connect. If I didn’t know any better, I would say that this is a modern-day evolution of centuries of colonization and a pro-colonization mindset, which is really to say greed and domination. Climate change and sustainability are every bit a STEM/STEAM-based set of issues, content, and practices. Yet, many

‘experts’ in science education still seem to be ensnared or even willing soldiers of the colonization of corporate, for-profit STEM/STEAM. When climate change and sustainability are actually taken up, they rarely rise above pro forma performances for each other.”

“Perhaps, we are more ensnared than we are willing soldiers. I wouldn’t call myself a willing soldier of corporate greed, but I am realizing how entangled in it my pro-STEM/STEAM discourse tends to be. I think we are tricked discursively by a ‘good guy syndrome’ or something to that effect.” The HSS professor stared off into the distance, again, but seemingly came rushing back. “‘We’re the good guys’ is really holding us back. As we said before, science is neither inherently good nor inherently bad. The ‘goods’ and ‘bads,’ so to speak, are built into it by the builders and maintainers. Humans have done plenty of damage using science and technology throughout history. Science and technology are what we make of them. Humans, led by greed (and deliberately cloaking it in discourse of ‘progress, opportunity, and advancement’), used STEM to create a fossil fuel-dependent industry, which was incredibly exploitative. It employed and still employs people in ways that exploited them, and it exploited the environment, right? Science, technology, engineering, and mathematics were all used to that end. STEM is currently used today to continue exploitation and destruction. STEM is used to create pesticides that kill off bee colonies. STEM is used to create war technology. STEM is partly behind school violence in gun technology. STEM is used in eugenics research. STEM/STEAM isn’t all bad, of course, but it’s not all good, either. Science education and STEM/STEAM education have a driving discourse that herofies science, which acts as a form of indoctrination in schools if teachers leverage it that way.”

The HSS professor looked at his cell phone and saw that it was 6:23 pm. He was giving a dinner keynote at 6:30 pm entitled: *STEAMing into the Future: How STEAM Education Programs Create Equity and Social Justice Opportunities*. His 45-minute speech was going to be recorded in the multi-million-dollar grand ballroom, in the multi-million-dollar hotel that was part of a multi-billion-dollar hotel business, and the focus of the speech was the claim that STEAM education addresses equity and social justice (just to reiterate a point of irony). The room resembled a small mega church but with a buffet line. STEAM was the gospel. The HSS professor had become a cardinal. “It was quite the spectacle of hegemonic hubris,” the NEB wrote in its infrared notes.

“Oh my goodness! I need to go. It was really nice running into you, again. It’s been so long. Let’s find a time to talk in a couple of months or so.” The HSS patted his shirt pocket to make sure that the thumb drive with his presentation was still there, which it was. “Take care!” With that, he darted over to the ballroom and was immediately greeted by the session moderator, who seemed to be trying to play off that he was not a little starstruck by the keynote HSS professor. They disappeared into the very busy, dimly lit room.

The NEB glanced at the waiter walking by with a tray full of empty glasses that were previously all filled with overpriced alcohol. The NEB looked into the eyes of the waiter and wondered how often and how deeply humans think about their societies’ systems of control, limitations, and exploitation, especially about how it affects them individually. Was everything just so normalized and reified that oppression was not even seen any more in these societies? Did they realize that from at least toddlerhood through elderhood there was a very powerful group profiting that used social constructs and personal insecurities to create exploitative labor and addictive consumerism? The NEB wondered further if humans—who were exploited Earth day after Earth day, Earth year after Earth year—considered that only one social construct (money, which was a manifestation of greed) was at the root of every social and environmental issue of dominance and exploitation. Would humans ever drill down far enough and see how they filter nearly all of their thinking through money? The NEB added to its infrared notes, “Money, which is to say, the desire to exploit in the form of a socially constructed symbol, is the greatest mental trap of humanity and will likely parallel the outcomes of a planetary impact by a comet if the patterns remain undeterred.” From the NEB’s perspective, based on its home planet where societies banded together to eliminate exploitative practices, Earth seemed excessively and preventably stressful, but humans showed very few signs of actually changing. The NEB, who was a professor on its home planet, was happy that this portion of its ethnographic data collection was done.

PART 2: SCIENCE EDUCATION TOWARD THRIVING
AND *HOMO THRIVEUS*

It took a few moments, but the video call app opened on the laptop. The app was acting a little glitchy, a pet peeve of the NEB. “Why is tech on this planet so inconsistent? It’s so annoying,” the NEB thought. A notification appeared on the screen asking for a participant to join. The NEB accepted.

“How are you?” asked the voice on the screen. She was using a fake background in her video that made her appear like she was in the captain’s seat on the bridge of the U.S.S. Enterprise from *Star Trek*.

“Live long and prosper,” exclaimed the NEB, who wished that it used the pineapple under the sea background. The NEB morphed into and assumed the form of a White, female graduate student who was in a science education doctorate program. The video call was supposed to be an interview for a smaller paper for a course that looked at contemporary thinking in science education. “Thank you so much for taking the time for this interview. I really appreciate it. I also love the arguments that you make in your publications, so it is really nice to meet you and talk with you.” The NEB was not an actual human or even a graduate student on its home planet, but of all the HSS written work that it read regarding science education, this HSS professor seemed to be unknowingly aligned with the core philosophies and practices on its home planet. The NEB was very curious why this HSS professor seemed to be at that point in her thinking, as much of the rest of that field of thinkers just did not seem to get there, yet.

“My pleasure. How can I help?” There was a genuineness about the HSS professor.

“I guess that I am most intrigued about how you arrived at your arguments, in general. It’s not just that I tend to agree with them, but it’s more that I do not see others really writing about this perspective, at least not at the depth that you’ve gone.” The NEB had read many articles and books about science education and the very popular rebranding in the form of STEM/STEAM education, but so much of it rang hollow for the NEB, especially given the history of its home planet. Coming from a planet where life once teetered on the edge of existence because of the powerful elites who used to vehemently defend a system of exploitation that favored only them, but living in a time after that turmoil was fairly resolved, the NEB wanted to see more closely how those dynamics were playing out on Earth in real time. Much had been written about the Great

Peaceful Transition on its home planet, but mostly in retrospect. To potentially observe it in real time, or at least to talk directly with HSSs who might be forming the base rationale for their own transition, could provide some deeper insight about how new thinking emerges and grows in a sustained way.

“I wish that I could have some of the little, fleeting thoughts over the last decade that have culminated in my thinking, today. I’m not intending that in an egocentric way at all,” said the HSS professor, “but I find it fascinating to know that, as just one individual, I have had years of thinking that somehow formed a fairly cohesive argument at some point. I imagine that others have that kind of punctuated disequilibrium happening regularly, too. It’s a difficult thing to pin down and describe, now that you’ve got me thinking about that.” The HSS professor was seemingly increasing with intrigue as she talked more about it.

“Well, if we were to break the facade a bit, and try to isolate some of those seemingly random thoughts, are there ones that you can look back on that seemed to punctuate your disequilibrium?” The NEB could not tell if the universal translator asked the question in a nuanced enough way.

“Uuuuummm, hmmm...” the HSS professor shared profoundly. “I guess I probably did what I imagine a lot of people do when they are an angry teenager. I questioned the hell out of everything. I felt like the way we were living life was so totally off and so totally below our greatest potential as a relatively advanced species (at least on this planet), that I just kept picking apart our motives for doing things. As a teenager, I loved old school punk, but the giant spiked hairstyle was long gone by the time I hit my teens. I loved how pissed off that music was. I was pissed off, but I also had this deep appreciation of what it meant to be human, or at least I kept trying to figure out what that was. I still am, of course.”

“What do you mean by that?”

“Yeah, I had a feeling that you were going to ask me that as soon as I said it,” she laughed. “It’s weird to me that academia doesn’t seem to go here very often. I think academia wants to portray itself as organized and confident, but life just feels so disorganized, vulnerable, and raw most of the time, at least to me. I don’t even know why I publish because I never feel organized or confident about what I’m writing about.” The HSS professor paused.

“Well, I can say this. Your writings inspire me to remain open and humble as someone who wants to be a thinking thinker.” Again, the NEB

was unsure about the universal translator's ability to provide enough nuance.

"That's really all I'm aiming for here. I just want to be a thinker who thinks ... critically questions, doesn't stop asking why, stays vulnerable, and connects with the rawness of life, at least as I feel it within and around me. That's where much of my thinking and writing comes from. I'm actually surprised every time something gets accepted for publication or for a conference." She rolled her eyes.

"Conferences?" The NEB knew that the HSS professor stopped going to science education conferences eight years ago.

"There aren't a lot of vulnerable, raw presentations at science education conferences," she laughed hard at that one. "But, there really should be. Science isn't about performing personas or getting all flashy with the newest trend, and it certainly shouldn't be involved in propping up globalization, climate change, or other destructive practices. As much as I love science education is as much as it depresses me. As a child through my young adult years, science was a way for me to get closer to nature, but at a certain point, I began feeling like science was very much about keeping nature at a distance so that it could be observed and exploited. The very thing that gave me an oasis at my soul was now becoming a profound source of sadness. Science, well, really STEM was destroying the planet, exploiting people, and continuing colonization, and somehow I was expected to be on the science education bandwagon like a cheerleader. Like I just told you, even as a kid, I could never be that. I had to question everything, especially if other people were banding together around an idea and trying to sell it. I hate when things get popular. I can't function in that space."

"Are you a contrarian by nature?"

"I'm a skeptic more than a contrarian. If someone else is jazzed up about something, that's fine for them. I'm very filled with energy and passion for life. This is a pretty damn amazing thing, life. It never fails to intrigue the hell out of me, but I need to ask why, and poke around doing my own evaluations of it. I do it even more if someone agrees with me about something, especially science education. I'm very aware of the craze of paradigmatic thinking, and that scares me, constantly." She seemed to have an awareness of the of level how much she was sounding different than what she perceived to be the thought culture of her field. "Does any of this make sense?"

"Well, if I agree, are you going to be uneasy?" The NEB laughed.

She laughed, “Definitely.”

“So, how does all of that manifest into articulating a framework of thriving in the context of science education?” The NEB was very aware of key historical figures on its home planet who started the thought revolutions that led to generations of thinking, rethinking, and unthinking that eventually broke the stranglehold of the powerful elites. The NEB was sure that the kind of unthinking that this HSS professor was doing was similar to the historical figures on its home planet.

“I think for me it just came down to seeing the extent to which exploitation was occurring in science education. It was never more clear to me than when the wave of popularity grew around STEM education. At first, I thought that the idea of integrating science, technology, engineering, and mathematics was a great idea, but then my inner skeptic wondered about the underlying motives, which, as it turned out were openly expressed. Jobs. That’s it, people. Nothing more to see, here. Jobs. I was disappointed in myself. How could I have been naive as to think that STEM education was for anything but the greed of the wealthy, dominant class? The wealthy, dominant class has only been colonizing the planet for 500 years in some form of capitalism, and for thousands of years in feudalism, kingdoms (that is domination by a king), imperialism, and any form of takeover that they can get away with. Now, we just call it ‘globalization.’ Why would that stop, now? Or, at the very least, why wouldn’t the academic class not continue to support that motive since they are paid to provide the thinking in order to continue respective contemporaneous practices of satiating greed? They, too, benefit from it. They go on their little speaking tours, increase their status, and get groupies or whatever. I have had enough of that. That, all of that, is greed to me. Education, more broadly, suffers from the same underlying motive. Greed tells us to tell the kids that social justice means getting an upper middle class job for four decades of their life, making someone else richer.” The other HSS professor at the conference made a very similar point. Could it be that professors on seemingly different ends of the spectrum were starting to merge their analyses much like what happened on the NEB’s home planet?

The HSS professor continued, “Science education should be about caring for the planet, figuring out ways to do that better, and excavating out root values that stall us from doing these practices that would hopefully be more sustainable and help us thrive as a society ... and not just be at the beck and call of the wealthy class who ensnares us with their mediocre salaries for most of our lives. One of the things that always bothered me, even

as a middle schooler in science class, was that science pretended to not be of humans. Like, somehow it was pure, neutral, and free from toxins. Science/STEM/STEAM is all human based, and its outcomes are as good or as bad as we make them. We can destroy the planet with pollution, greenhouse gasses, and nuclear weapons, or we can figure out how to be a deeply thriving species that is every bit a part of nature. We love to be selfish and destroy things for our own individual benefits, usually for money. Why are we so horrible? These are the very angsty questions that fuel my work, still. Why do we care so much about participating in destruction when creating a thriving planet is so much better for all of us? Are we incapable of core remediation once greed sets in? For crying out loud, Charles Dickens was writing about the greed of Ebenezer Scrooge over a hundred years ago. Does humanity need a bunch of ghosts to give us an existential crisis? I'm clearly careening off the cliff. Let me come back to science education and STEM." She took a breath.

"No, seeing the interconnections across the silos is what I see in your work. It really does inspire much thinking and critical questioning. It's humanizing, and you're right, it's outside of the performances of science education personas that are expected and normalized." The NEB also knew that the historical thinkers from its planet started with integrative thinking across contexts and content. They explored big concepts together rather than the usual recommendation of nearly every dissertation advisor to avoid broad topics. It was the joining of broad topics that helped generations redesign their thinking and practices. "If I had to guess, I would say that the angst and the integrative thinking that you do seems to work together as the background for the framework of thriving in science education?"

Her eyes seemed to light up a bit. "I don't know if I've ever put it quite that way, but that concise description definitely resonates with me."

"I've read about the framework many times, and each time I do, I have a whole new set of connections in my thoughts," the NEB was pulling from its own historical accounts on its planet and restating it here to see how true that might feel for the HSS professor, "but can you explain it in your words, now?" The idea with this question was to see if the HSS professor would continue to grow in her thinking about her framework.

"Well, sure. It's a good exercise for me to say it out loud from time to time." She chuckled. "First, science education as we teach it today is still very much a response to the Sputnik panic. Science education is taught mostly as form and function of the universe. It's nuts-and-bolts city. The

Sputnik panic created science as a character or a package for children that was essentially always right, had good motives, and advanced its society with disregard to its actual practices. It's nearly devoid of anything social except for the constant social desire to make science sound wonderful. There's a real problem with avoiding the social aspects of science. Science that ignores exploitative motives and values is sexist, classist, anthropocentric, and racist. How can I make that claim? Well, to ignore or tolerate racism is also racism. To ignore or tolerate exploitation is also exploitation. So, if science education is packaged in a way that ignores, omits, or tolerates exploitation, then it is exploitation, too. Science that is critically connected to its social aspects has a much greater potential for equity- and justice-oriented outcomes. The scientific process remains a very high bar for discovery and achievement, and I, like so many, am a fan, but I'm also nuanced. Science and STEM has been a terrible weapon (do I need to include eugenics?) and a destroyer of the planet as much as it has the ability to support life. That is the ground floor of the framework."

"Where we go from there is simply a comparison of science toward greed/exploitation or science towards thriving/undoing exploitation. If we are telling ourselves that STEM for corporate jobs is equity, that's straight up subjugation and propaganda. A science education and STEM education movement should absolutely be redesigned around sustainability, non-exploitative endeavors, and understanding the integrative conditions of thriving. We can use science, and, thus, teach science as a way to vastly improve life on the planet if we are doing so with social aspects at its side. The Sputnik panic design really needs to go away completely and be replaced by a framework that moves us towards creating sustainable societies. To make a long story short, science education (and science, itself) should be in service of creating thriving, sustainable, socially just societies, but it is currently doing the opposite by being in service to creating tech-based workers who are primarily there to funnel wealth to the already super wealthy." She described a fundamental shift in science education that became integral and foundational to all of education on the NEB's home planet many generations ago.

The NEB jumped in excitedly, "It's like if you lived your entire life on the Death Star from *Star Wars*. As a kid, you might think that becoming a Stormtrooper is a great entry-level job and that becoming a commanding officer, or better yet, a Sith Lord is a form of ultimate success, but all you're really doing is contributing to the operation of a weapon that destroys planets for the sake of the Empire. In the case of actual humans

on Earth, they are rising in the ranks of planet-killing corporations but focused on increasing their salaries and status. Yet, they call that social justice.”

“HA! Yes, that is such a great analogy!” The HSS professor laughed to the point of a small coughing fit. “People are really not seeing that, though. And, to be honest, they are not going to see it if it is just in the form of critical analysis, either. Some do, but the mainstream thinkers won’t. They will need to have an entire replacement paradigm up and ready to go in order to move them in that direction, and it will need to be ‘soft’ enough in its criticality so that it does not threaten them because that will prolong their transition from a greed paradigm to a thriving paradigm.” The NEB could hear much frustration in the HSS professor’s voice.

The HSS professor continued almost immediately, seemingly in order to avoid getting overly frustrated, “So, that means that we need to figure out what we mean by ‘sustainability’ and ‘thriving.’ Both are terms that have integrative meanings, which is to say that they are more than just one context. The most basic framework would mean that well-being (overall state of inner balance at the individual level) combined with sustainability (ecological, social/cultural, and economic conditions at the community and societal levels) lead to a state of thriving (beyond just surviving, a reciprocal state of healthy well-being and balanced community/society). These will probably always be moving targets to some degree, especially as we continue to learn more about them, but a redesigned science and STEM curricula will be important parts of this transition. Ultimately, we need to redirect our vision from creating STEM-based workers to creating thriving communities, and we need science and STEM education on board with that, now.”

“It seems so overly obvious that this should be the primary effort, and probably should have been decades ago,” said the NEB with exhaustion because that was its planet’s history of transition. “We should be moving from an outdated, outmoded Sputnik-era science education to a science experience that helps create sustainable, thriving societies. Why do you think that there is not a rapid shift in this direction, right now?” The NEB wondered why societies wait so long to shift, especially this one since, quite literally, this society already has everything that it needs to shift ... minus a replacement mainstream mindset focused on thriving together. Why was greed so important to hang on to as this society’s core ideology? Back on the NEB’s home planet, breaking that grip was crucial to remaking all aspects of living much more peacefully and sustainably.

The HSS professor answered immediately, “People project a preferred version of reality in front of themselves every minute of every day. That reality projector is fine tuned to their individual preferences and creates a narrative that aligns with those preferences. The more that their way of life is threatened, the more that they reinforce that version of reality to themselves until it shatters completely, leaving them to rebuild a version of reality for their reality projectors. The important point there is that the actors project a version of reality to themselves and live by it. They tend to double down on it many, many times before finally giving up, if they give up at all. It’s a real loss to be in a society so self-limiting and often so ready to defend its version of reality despite its very observable failings in real time. I am sure that the threat of not having money and status is a major insecurity for many, and it keeps them from opening up to other reality narratives. The question remains of what will make their reality narratives of selfishness, greed, and exploitation finally shatter so that they can be more open, vulnerable, and willing to care for others and nature. I think that is the primary question of our time. Will it be a plague? Will it be the collapse of ecosystems? Will it be an economic disaster? Will all of them occur together? It is pretty obvious to me that our society is heading down that combined disaster path, but wouldn’t it be lovely if we got out in front of that? Wouldn’t it be so much better if we started making changes now that could significantly mitigate that impending eco-social disaster that is highly probable? Wouldn’t it be great to teach about a science that is capable of being a major player in the mitigation and remediation of disaster, and, better yet, a science that moves us towards long-term thriving? Again, this seems obvious to me, probably you, and probably many, but why are so many more just sitting idly by and not putting pressure on the system to change? We are not powerless even in the current structure.”

“Agreed. Perhaps, we are searching for a different route than was taken in history?” The NEB knew quite well that on its planet, change occurred as the collective consciousness changed. In fact, the NEB is a faculty member in that department at its university: The Department of Collective, Integrative Consciousness. “Maybe, that is where long-term change always resides.”

“Maybe.” The HSS professor sighed.

“Well, thank you very much for your time. You’ve given me so much more to add to my thinking,” said the NEB.

“That’s the highest honor anyone can give me. Be well,” said the HSS professor.

“You, too,” said the NEB. That was the NEB’s last data collection effort for its study.

PART 3: THE FINDINGS

The NEB interviewed 217 HSS professors, teachers, and administrators and observed over 1000 of them in various settings (such as conferences, college classrooms, department meetings, and in calls, as well as over drinks at different hospitality establishments) over a three-(Earth) year period, but the HSS professor at the conference at the hotel lounge and the HSS professor on the last video call seemed to encapsulate and illustrate the range of the collective thinking among science education professors, administrators, and teachers. There was either a real attraction to sticking to the for-profit thinking of STEM education (reinforced by grants, awards, and recognition) or an almost aggressive pull away from the for-profit paradigm in favor of a more sustainable and thriving exploration of science and STEM. The humans of Earth were very much the cause of their own suffering, but they were seemingly (hopefully, temporarily) stuck in a moment of real tension: Do they still seek profit as a way to buffer the failures of their efforts, or do they address their failings head-on, which presented as a seemingly impossible task, in their hubristic eyes? Many humans spoke about themselves as a superior species, which always made the NEB chuckle, but unfortunately, as the NEB wrote in its initial report, “that was part of the problem because it prevented them from seeing themselves as a problematic, invasive species.” The NEB’s qualitative coding of data kept leading back to two ways of framing science education (and STEM education): Greed-oriented (individually oriented) or thriving-oriented (cooperatively oriented). There seemed to be a growing reluctance to stay with the current dominant frame of for-profit reasoning, but even as the core of it became wobbly over time, it was the direction that those with the most power chose unanimously. It seemed like there was a fear of letting go of the for-profit frame since it had been the foundation of science and eventually STEM education for six Earth decades (since Sputnik). Teachers, administrators, and professors of science and STEM education are a self-selecting group of HSSs. Most went into those positions initially thinking quite positively about science and STEM within the for-profit frame, but that collective confidence did seem to be

dwindling. In contrast, the second group of critical pushers were often frustrated emotionally and lost confidence in their colleagues despite their own willingness to keep pushing toward a replacement paradigm of cooperative thriving.

The NEB wrote as its conclusionary statement, “If Earth history parallels the history of [the NEB’s home planet], there will be the coinciding factors of an increasing collective, integrative consciousness coupled with an unfortunate set of circumstances that HSSs experience, which may change their levels of collective willingness to become more open to fundamental change. The more beneficial path would be to make changes prior to the catastrophic events, of course, but the current trends do not appear to arc strongly enough in that direction at this time.”

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