Theme Two: What Are the Universal Foundational Skills for the Fourth Industrial Age?

If education, in its current form leaves us deficient in anything but rote memorization and the regurgitation of data — that can be easily found, but maybe not trusted, by querying Google, Siri or Alexa — how does a future iteration of Cs (4 or 5) need to be considered to enable us to learn AND process using the growing number of digital and real world tools at our disposal?

In a State of Abundance All You Have is Philosophy

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Education gets its merit from sense; It is through different types of education that we are able to make sense of the world, take action to live and thrive. As humans we all need to understand the historical information available, then take what we have and continue to learn so that we can develop inferences to prepare and plan for the future. Plans need to be completed and mentally executed through the deployment of a discrete set of skills.

The classic view is that education helps us make sense of the past, prepare for the future, and develop the skills to navigate that future.

This pursuit is well-intentioned, but its foundation is a reliance on a monolithic view of the world. It is deterministic in knowledge and allows for little true diversity. It puts blinders on the existence of individual experience and the range of possible futures.

It is under this frame that the epistemic idea of disabilities came to reality, with its moral and creative cost, where all this time, a complexity lens would frame it as co-abilities (People-Centered Economy, Cert, Nordfors). When we define an ability, we also define a disability, and those definitions both illuminate a path and close off other paths that could have merit. A more expansive view, one of possibilities rather than abilities, without limiting ourselves to deterministic definitions, allows us to embrace the complex nature of our environment.

We are currently living through a collective wake up call, understanding the limits of planning and the open-ended nature of our connected reality. We see the price of forgoing our epistemic humility. The cost of drawing maps of the past as a future view is generations of people reminding themselves to be

creative later in life, spending time and resources to unlearn linear, artifact-based thinking.

The pandemic and global economy turned the light on our interconnectedness, yet our education is one of artifact-based thinking. It seeks efficiency, but we forget that linear, efficient thinking operates within the world of limited material. If I were an artisan, I had limited material; using that material wisely would have a material effect on my studio. But the modern knowledge worker lives in a world of abundance. And in abundance, it is context, masked as a question, an inquiry, or ways of thinking, which is scarce.

How can we negotiate with this epistemological and ontological openness? We need to redefine concepts of creativity, the price of knowing, and our sense of epistemic comfort. This could be the true calling of education today.

Learning should be a joy and full of excitement. It is life's greatest adventure; it is an illustrated excursion into the minds of the noble and the learned. Taylor Caldwell 1900 — 1985

Creativity is an act of unknowing.

Creativity is a state of thinking, being, and unknowing. It is not a state of production. One of the legacies we carry with us from engineering is measuring creativity based on output.

And by doing that, we conflate creating with producing.

If I give you a cup in the middle of the desert and ask you to fill it with water, it will be a significant effort. You will need to go and find water, with no taps; it is a challenge. You might succeed or fail, and you will need to think of new ways on how to produce water in the process.

But what if I make the problem even more creative? You see me, you see the desert. I do not give you a cup and I do not ask you to bring water.

Creatively, you can infer that without water, we will die. You can infer that you need a vessel to carry the water. Through your own inferences, you can understand that your task is to find a vessel (which could be a cup), to find water, to fill the vessel, and to transport the water back.
The water is, of course, analogous to ideas and inspiration. Our cup is stationary (in states of knowing and being). It is a fixed context, a mental model. It is known.

When someone asks us to fill the cup, we know we need water, but we don't know where to look. We can call this production; a known model, an unknown process.

The latter example is entirely a creative process where both the process and the thinking models are unknown.

The Price of knowing

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Knowing comes with a price. It asks us to freeze reality, write scripts, roles, and goals for ourselves, and the spaces we meet, learn, and work. When we know something and we encounter a problem, we focus on solutions, we design solutions to be put in place, that stay in our original understanding or framework, incrementally adapting for externalities. When we do not know, we open up to more possibilities, we explore and orient before moving to a solution stage.

In this current moment of remote learning, it is tempting to look for solutions perpetually. When reflecting on our fatigue and lack of creativity in online discourse, we might identify problems; for example, the Zoom grid we find ourselves in is symmetrical, where our identities are not.

At this point, there are two avenues to explore: the technological or the humanistic. The technological one might look for new digital means to break that, for example, Microsoft's shared background in video calls, to create a shared sense of space. The thinking might be that we are more creative when we share the same space, and so by creating a digital version of a shared space, we will be more creative. But that is, a pseudo-space: and in fact, a pseudo-reality. Solutionism relies on simulation.

The psychological, humanistic approach will accept reality for what it is and ask for additional thoughtfulness and reflection from those in the grid. People are tired, people are not being creative, the humanistic approach deals directly with the people.

I intentionally use the term grid and avoid the term matrix, which came up in a recent conversation. The matrix, being a fictional, pseudo concept, is in itself a form of mediation. When we operate in pseudo-spaces, we compromise for pseudo-identities and mediation of creativity.

Solutionism comes with a cost: more technology creates more mediation, adds friction to communication, and makes it harder for individuals to wholly show-up, and develop a space of co-creation and thirdness.

Epistemic comfort

Abundance asks for creativity more than knowledge. There is no point to building towers of expertise; AI is drowning out such domains. Once a field is processed and cemented, the efficiency machine, algorithms, status quo, and single-minded humans who accept both, can process it.

Generous design does not need to climb to the top of a tower. There are too many towers to climb, and by the time you go to the top of one, there is a taller one built right next to it.

It understands that in a world of artificial intelligence (AI), cause-and-effect

Describe a moment in your life when you experienced the joy of learning

During the Covid-19 pandemic, when I saw the Earth reviving itself, I understood the damage done by us humans could be minimized.

Harshita Verma
Educator, India

thinking is not enough. Fully wrapping our arms around a system is a luxury we no longer have.

The interconnectedness of our lives makes order impossible. So, rather than writing up maps, we should carry a compass.

So much of our lives is about navigating the unknown; unknowing is a human state. The life-long learner accepts the liminal, open-ended universe. They are strong through intellectual vulnerability and adaptability. All rigidness crushes under the weight of change.

Great design is not a beautifully designed object put on a pedestal. It is the shining of different lights on that object. It is not the war of language, but the dance of opinions.

Being territorial about knowledge is as futile as trying to catch air. It is about walking in the dark, instead of waiting for someone to turn on the light, moving from the meta meaning to the lived experience and back.

The old trajectory of a monolithic self, acquiring knowledge in return for a career, leads to unemployment rather than retirement.

To engage generously across disciplines, to learn and teach, and to have a capacity to show up in ambiguity is the secret to a life of reinvention that binds our inter-relational experience.

Artifact thinking to process thinking

Traditional artifact thinking is driven by industrial ideas of efficiency and a narrow definition of collaboration. One that asks for people to stay in their lane and produce. The protagonist of the future is in intellectual movement; it is the learning to learn, instead of learning anything specific.

The ability to navigate oscillations and to author their context is what beats the efficiency machine. Process thinking asks for conviction and executive function, which is the ability to negotiate externalities with our creative surplus.

Creative surplus is the creativity that no one is asking for (yet). In the second water example, no one asked for water, yet provisioning for water will prove essential.

Is the job of a software engineer to devise a way to accomplish some operation (utilizing creative surplus), or is it to create X lines of workable code a day? Without care and attention creative surplus will disseminate as the background of one's work, or worse yet, as professional resentment. The continued development of the creative surplus, especially in collaboration with others, is a life-long process, and requires us to rethink how we educate and learn.

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This is not to denigrate solution or efficient thinking. Efficient thinking is essential. It is what gets our cars on roads and medicine in our stomachs. But it is not all there is.

Process thinking tolerates limited knowledge and does not need authority.

As an abundance of tools and answers shelters more of our creative lives, the questions' context matters. The authoring, borrowing, and integration of these contexts will give us the capacity to learn and navigate profoundly unknown situations with resilience and creativity.

From math to analytical thinking

The shift from matter (words, numbers, code) to meta (connection, models, systems) does not skip quantitative science. If you are a knowledge worker and not a scientist working to discover fundamental mathematical principles, there is little need to study how numbers add, subtract, and multiply. There is, however, material value in understanding why and how they do. Rather than memorizing multiplication, we should be teaching K-12 the history of Numerics and the value of the decimal point. Instead of looking for efficiency with the quant space, we should spend our time teaching students the importance of complexity, the limit (and usefulness) of Bayesian thinking, and how to draw their models. Biased algorithms show us the shortcomings of the field of AI not collaborating with the model directly. AI can algorithmically determine that I have queried about cameras and so can show me advertisements of cameras, but it cannot determine what I really want and serve up something that can actually help me.

A future driven by self-optimizing code will ask for conversation in the context (meta), over that done in numbers and code lines. The ability to thrive in the meta is the realm of the actualized human being.

Linking empathy in design thinking, the need to become human centered problem solvers is key.

From Reading to Writing

Counterintuitively, the writer asks questions, not provides answers.

The writer negotiates ideas and language; they marry what they know with inspiration to take a different shape in their reader's mind.

When writing from an intellectually dim position, they narrate the journey to invite criticality. Productive writing does not communicate facts, but the process of arriving at thoughts.

Reading without writing is what machines do. Reading as a form to amass knowledge is diminishing in value in the 21st century. As the previous paragraphs deposit, there is no point in memorizing; but there is great importance in oscillating, navigating, and contextualizing.

From job titles to self-authorship

Job titles are a shorthand for the world to understand you. They are useful and necessary because we lack the incentives to understand everyone we encounter fully. When we acknowledge the reductive language of job titles, mainly, if placed next to our inner world's rattling complexity, a chasm appears. We are a moving river of contexts, history, life experience, inspiration, and guesses about the future. The actualized lifelong learner can self-author their narrative: to go through cycles of imagination, curiosity, articulation, and integration of their creative surplus. That process asks for conviction and mixes with vulnerability, it is about living according to one's manifesto, even if not written.

Education, complexity, and creativity

As we are living in complex times, the role of education needs to be to prepare us to thrive in these times. Traditionally, education has prepared us with an algorithmic, knowledge-based path. These are still useful skills in context, but where the context is shifting and amorphous, education can better prepare us for the unknown unknowns, to be writers rather than readers, to be meta thinkers, to exploit whatever we find with creative surplus, and to shed our epistemic comforts to embrace the excitement of the unknown.

References

Brian Arthur writes (The Nature of Technology, W. Brian Arthur) a general articulation of technology as a (1) phenomenon packaged in a (2) useful frame.

Focusing on one of those is an act of production ('known unknown creativity'). Asking for both is ('unknown unknown') creativity.

If I give you a cup and ask for water, I have given you a useful frame. If you have to infer the need for water and also the phenomena needed to carry it out, you are creating within an unknown unknown.

What needs to be taught to be productive members of society in the 21st Century?

Students should be taught to look at the world feelingly and made to realize that we will only be safe if the planet is safe. The only way to sustain life on this planet is sustain relationships with all the stakeholders.

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