



# BLOOM'S TAXONOMY & THE ATTENTION ECONOMY

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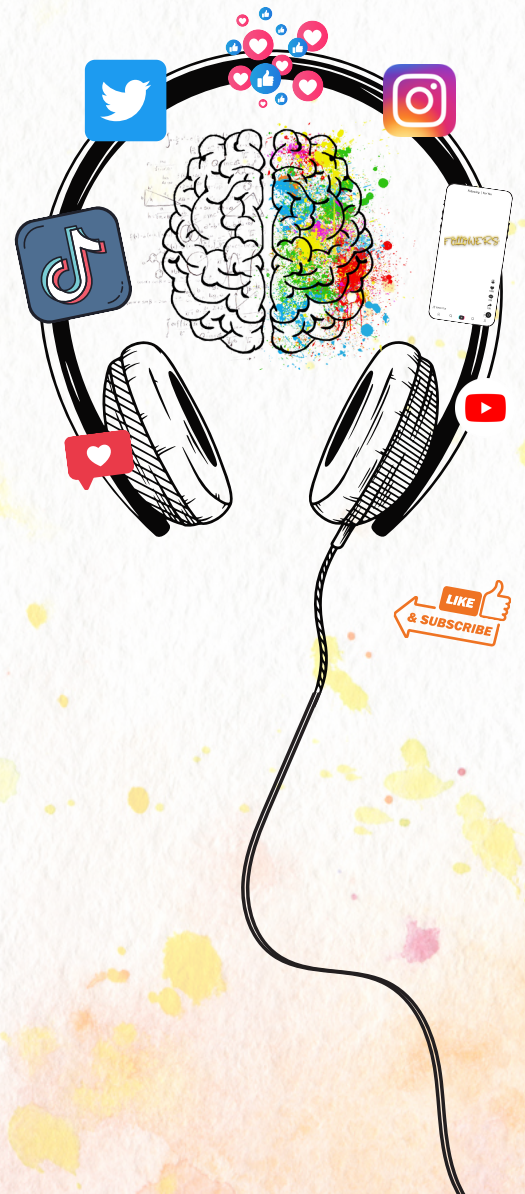
The frenzied competition to monetize our attention is actively undermining our students' opportunities to practice high-level cognition and meaning-making in the classroom. More importantly, it's demanding that we build a new mental image of what "learning" really looks like.

1 Examining the Impact of the Attention Economy on Learners

2 The Cognitive Cost: Bloom's Taxonomy

3 The Social-Emotional Cost: Meaningless Material

4 What Does Learning Really Look Like?



# 1

## Examining the Impact of the Attention Economy on Learners

When was the last time you felt bored? In recent years, something curious has happened — boredom has been quietly squeezed out of our lives by magical rectangles (phones) and an incomprehensibly dense network of people and information (the internet). Riding in an elevator? Jump into your Twitter timeline! Taking a break during work? YouTube has the perfect recommendation for you. Lull in a conversation? You can probably find something more interesting on Facebook!

At this point, it's not an exaggeration to say that the alluring, drug-like Siren song of our mobile devices and online platforms is a design feature, not a bug. The “attention economy” is very real, an entire industry built on the ability of tech companies to capture your attention, and deliver it to the highest-bidding advertiser. If it sounds dystopian... well, it is. And if you're skeptical, the alarm bells are being sounded by the very people who built these platforms.

We average more than 3 hours a day on our screens, and interrupt ourselves 58 times a day to check our phones. That's alarming, but not so much that we should advocate for a return to the pre-industrial world. The “information age” has still been profoundly positive: people are better connected to each other, information has become more decentralized and democratized, and powerful tools abound for creativity, innovation, and self-expression. In fact, it's precisely because our magical rectangles and virtual networks have utopia-creating potential that we need to take a long, hard look into our self-facing cameras and consider if we're headed in the right direction with them.

Lots has already been written about the impact of algorithms, technology addiction, and social media on the minds and brains of young people. That is a public health crisis in its own right, undoubtedly. But I believe the attention economy is causing quiet damage to our students' education as well. There is a growing body of evide-

1

## Examining the Impact of the Attention Economy on Learners (cont.)

-nce to suggest that the high attentional demands placed on young people by smartphones and social media platforms are changing the way they interact with the world.

Dr. Mary Helen Immordino-Yang, a neuroscientist at the USC Brain & Creativity Institute and a thoughtful expert on the relationship between emotion and learning, suggests that a frenetic digital landscape might be inadvertently encouraging students to focus on “the concrete, physical, and immediate aspects of situations and self, with less inclination toward considering the abstract, longer term, moral, and emotional implications of theirs and others’ actions”. In light of this, I propose two specific ways the “attention economy” might be damaging our students’ learning — cognitively, by limiting their opportunities to practice complex cognitive skills, and socio-emotionally, by discouraging the deep meaning-making processes that create robust, transferable learning.

*Keep reading below!* →

2

The Cognitive Cost:  
Bloom's Taxonomy



## The Cognitive Cost: Bloom's Taxonomy

To understand the seriousness of this problem, it's important to remind ourselves of a few simple ideas.

Firstly, **we only have one brain**. We use the same pinkish-gray blob to drive a car, send an email, and scroll through Instagram; different networks might be active during different activities, but they are all part of the same brain.

Secondly, **the brain (and body) have evolved to prepare to survive future situations based on past experiences** — at a fundamental level, this is what we call “learning”. If a child grows up experiencing abuse, their brain will wire itself in a way that enables survival in future situations characterized by abuse. This often manifests as a form of trauma: hypersensitivity to threats, aggression, and other environmental cues associated with their past experiences of abuse (such as darkness, eye contact, etc.). Similarly, ADHD results from the mismatch between a brain that expects a very highly-stimulating environment (based on a mixture of past experiences and neural dispositions), and a reality that disappoints that expectation. Autism can be thought of as the opposite situation. The point is that at every instant, the brain is using past experiences to inform its expectations of what the future will be like, and how to effectively navigate it.

You could imagine then, that regularly using our singular brains in an environment characterized by short-term gratification, dopamine saturation, and rapid, extreme emotional responses would likely have an effect on the way we use our brain to do other things. In other words, the intensity and abundance of information we take in via social media platforms and our mobile devices are training our brains in a specific way — and not a good one. They are being trained to rapidly and automatically categorize information based on low-level heuristics and biases. They are being trained to make snap judgments on emotionally resonant issues. They are being trained to expect information and perspectives that unflinchingly reinforce our current beliefs, and to rarely deal with ideas that contradict our understanding of the world.

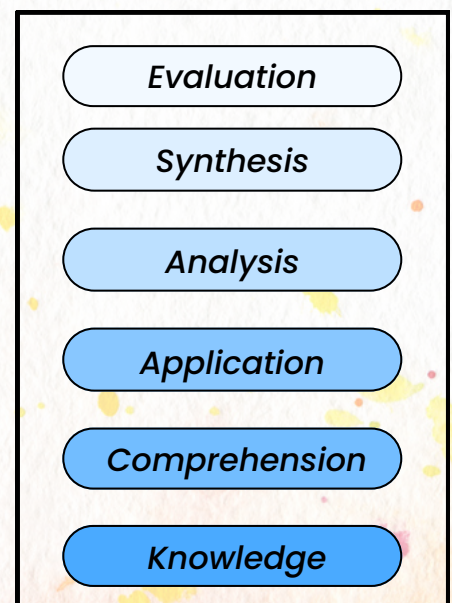
## The Cognitive Cost: Bloom's Taxonomy (cont.)

All this is happening, simply because that kind of a digital environment is what captures our attention most effectively. So when a student's brain (and body) arrives at school after being trained this way (for an average of 7h 22m a day) and they are tasked with sustaining their attention on a single, complex situation in order to thoughtfully analyze and critically respond to it — can you see the contradiction?

These platforms, as they currently exist, are encouraging our students to develop habits of mind that directly contradict and undermine the habits of mind we want to help students develop. We want them to think deeply about nuanced situations, to analyze multiple perspectives, to regulate their emotions, to view conflict through a lens of empathy, to recognize and overcome their biases, to use evidence to inform thoughtful opinions — these are the skills and traits that will lead them to success in the classroom, the workplace, and most importantly, the real world. And yet, the efforts of students and educators alike are being sabotaged by this attention economy.

To identify more precisely the habits of mind that are important for academic success, and why they might be under siege, it's helpful to view the situation through the lens of Bloom's Taxonomy. Bloom's Taxonomy is a framework that categorizes educational goals and cognitive skills along a continuum of simple to complex, or concrete to abstract. There is no inherent hierarchy between skills, however. Just as tools in a toolbox cannot be organized hierarchically by value, the cognitive skills in Bloom's Taxonomy are all crucially important in different situations. "Recall" and "understanding" might be appropriate in situations where "analysis" or "evaluation" are not.

### BLOOM'S TAXONOMY



## The Cognitive Cost: Bloom's Taxonomy (cont.)

In fact, **it is the deft and dexterous application of skills that are appropriate to a situation that we might consider a definition of “intelligence”**, both within the classroom and beyond. Viewed through this lens, the high attentional demands being placed on our young people as a result of this attention economy might be “programming” them to rely on lower-level cognitive skills. Again, in a digital environment characterized by high volumes of information and a ubiquity of short-term gratification, students are likely training their brains to focus on the most immediate aspects of a situation. Transferred to the classroom, this kind of training would predispose students to rely on lower-level skills like “memorizing”, “labeling”, or “defining” when faced with complex learning experiences, rather than engaging in higher-level skills like “evaluation”, “analysis”, or “composition”. If our students are being biased toward some skills and away from others, they simply have less tools at their disposal with which to become independent learners, innovative workers, and critically conscious citizens.

This is an issue of educational equity, as well. At reDesign, we believe unequivocally that ALL students are capable of developing higher-order thinking skills, and therefore deserve the opportunities to do so. We know that for students from marginalized communities, higher-order thinking skills are often neglected in favor of “mastering the basics first”. This so-called “pedagogy of poverty” often serves to reinforce existing achievement gaps, by making it more difficult for students from particular backgrounds to become independent learners. If these same students are then subject to the additional effects of platforms and devices that are constantly competing for their attention, they may be further biased away from practicing and developing higher-order skills. As a result, the attention economy is likely to affect students from marginalized communities disproportionately.

2

## The Cognitive Cost: Bloom's Taxonomy (cont.)

If we are serious about preparing our young people, especially those from marginalized communities, with opportunities to practice the high-level cognition they need to succeed in the future, this should be a red flag. Many of the platforms and devices that have become woven into the social fabric of the world are in direct opposition with the goals of an empowering and equitable education — and that will hurt us all in the long run.

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3

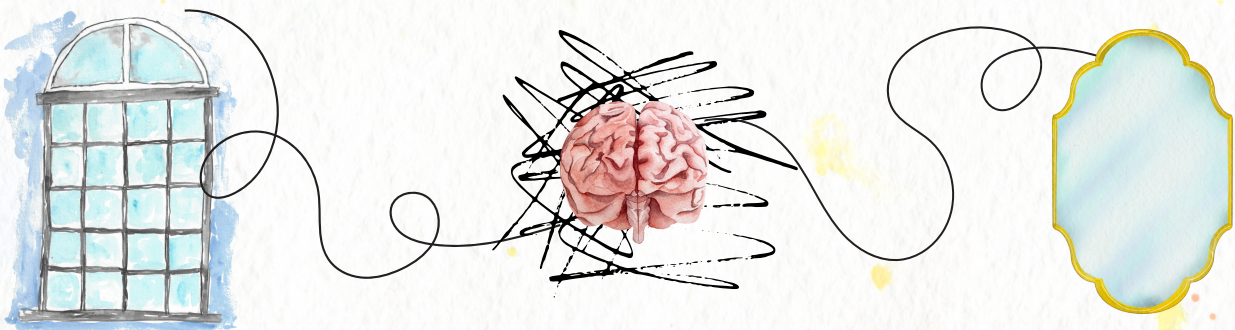
The Social-Emotional Cost:  
Meaningless Material



## The Social-Emotional Cost: Meaningless Material

Beyond its impact on the opportunities students have to practice and develop complex, higher-order cognitive skills, the high attentional demands of social media platforms and mobile devices are also making it more difficult for students to practice the social and emotional processing of information that allows them to consider the abstract, longer-term, moral, and personal implications of their experiences. In short, the attention economy is likely undermining students' opportunities to engage in deep, meaningful, authentic learning. To demonstrate how this might be happening, let's consider what happens to the brain of a person subjected to constant environmental demands on their attention.

To start, we should acknowledge that neuroscience of attention is a vast and complex field in itself, and what follows is a greatly simplified explanation of a very complicated dynamic between multiple networks and brain functions. So, as we go about our lives, our brains are constantly activating one of two networks related to attention. Dr. Immordino-Yang offers the helpful labels of “Looking Out” and “Looking In” to describe them.



The first is engaged while you are attending to your external environment, or “**Looking Out**” — when you’re having a conversation, watching a movie, writing an email, etc. The second is activated in the spaces between, when you’re not doing a task or attending to anything specific — maybe during a long bus ride, or while you’re waiting for something.



## The Social-Emotional Cost: Meaningless Material (cont.)

In the neuroscience literature, this second network is referred to as the “Default Mode Network” because it’s our default mode of brain activity. However, describing this second state as “**Looking In**” is perhaps more illustrative. Without a task to focus on, our minds don’t simply turn off or stand idly by — they wander, reflecting on memories, imagining future scenarios, building narratives, and replaying social interactions. This kind of “constructive internal reflection”, as Dr. Immordino-Yang describes it, allows us to synthesize new information, reflect on its meaning, and understand its relevance to our life. In other words, “Looking In” supports our ability to process the personal, social, and emotional implications of our experiences.

Returning to the classroom, we know that deep, meaningful, authentic learning depends on these same processes of meaning-making, synthesis, and reflection that are supported while we are “**Looking In**”. It is precisely the connection that learners make between a learning experience and their identity, beliefs, and cultural values that renders the new knowledge and skills meaningful, and therefore useful. As Dr. Immordino-Yang writes, “*knowledge and reasoning divorced from emotional implications and learning lack meaning and motivation and are of little use in the real world*”. This means that opportunities for students to activate their “**Looking In**” networks are crucial for the social and emotional processing that leads to robust, transferable learning.

Here’s the problem: our “Looking In” and “Looking Out” networks have a delicate relationship. They are anti-correlated — when one is activated, the other is deactivated... you might picture a see-saw here. As mentioned previously, our “Looking In” network is active by default, which means our “Looking Out” network is deactivated by default. However, as soon as something grabs your attention, like a phone notification — the see-saw shifts. Suddenly, your “Looking In” network is deactivated, and you begin “Looking Out”, perceiving and responding to the stimulus in your environment. The networks exist in a kind of balance, allowing you to pay attention when necessary, and engage in that “constructive internal reflection” process in your down-time.

3

## The Social-Emotional Cost: Meaningless Material (cont.)

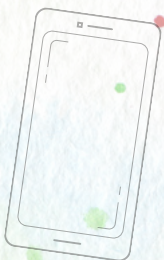
Sounds great, right? **But what happens when we are placed in an environment that constantly demands our attention?** To put it simply, our “Looking Out” network begins a tyrannical reign, leaving less and less time for “Looking In”. Opportunities for mind-wandering, internal reflection, and the social and emotional processing that helps us make sense of their lives get squeezed out, usually by the magical rectangles in their pockets. Break between classes? Grab your phone. Elevator ride? Grab your phone. Walking across a busy street with vehicles whizzing past you? You guessed it — grab your phone! Thanks to an array of devices and platforms designed to capture and monetize our attention, we have less and less opportunities to process the personal, social, and emotional implications of our experiences. Instead, we are more inclined to interpret the world around us through its surface features.

While this is alarming in general, it may be downright catastrophic when we think about the effects of this phenomenon in the classroom. If we know that deeply processing the personal, social, and emotional implications of new information is what leads to meaningful, useful learning, and the attention economy is quietly eradicating moment-to-moment opportunities to engage in that very process, then it’s possible that our students are being biased towards learning new skills and knowledge in a way that inherently will be difficult to transfer and apply outside of the classroom. In other words, **the attention economy could be affecting students at a neural level in a way that undermines their opportunities to engage in deep, meaningful, authentic learning.** If we are committed to preparing ALL students to be successful, ensuring that their learning is transferable and applicable to the real world should be among our top priorities — which means this current trend should be among our top concerns.

*Keep reading below!*

4

What Does Learning Really Look Like?



## What Does Learning Really Look Like?

The path forward in addressing this problem is likely long, and certainly complicated. There is crucial work to be done at every level. We must think deeply about the technology we create, and work to reduce its harms and bolster its benefits; to do nothing and simply accept things as they are would be a travesty, but to turn our backs entirely and reject everything electronic would be an unnecessary waste of potential (if even possible). For better or worse, our magical rectangles and the platforms and networks they spawned are here to stay; our current predicament demands we be more careful, thoughtful, and intentional about how we use these technologies, both inside and outside the classroom.

Beyond the walls of the classroom, this issue must be addressed in the public sphere. As a society of concerned democratic citizens, **we must lobby for more ethically designed technologies.** Organizations like the [Center for Humane Technology](#) are leading this effort, both by spreading awareness and taking action, but the voice of the masses has an important role to play as well. We can demand platforms and devices that encourage well-being instead of low-level cognition and mental health crises.

We must also resist the illusion that individual boycotts, or singular sweeping declarations will bring Facebook or Twitter under control; speaking up and advocating for humane technology informed by neuroscience will be a long, slow fight against some very powerful players.

In the shorter-term, we must also deal with these crises by **helping our young people develop healthier relationships with their mobile devices and online platforms.** For many of us who were born in more recent decades, these technologies are part of the way we navigate the world. Our smartphones are bodily extensions; social media platforms are where we connect to our communities; the internet is our playground.

## What Does Learning Really Look Like? (cont.)

Most importantly though, our habits and ways of interacting with these technologies have arisen organically, without planning and without caution — a dangerous approach to products designed to exploit human vulnerabilities. We ought to be transparent, honest, and realistic with young people about these issues; a top-down enforced abstention from social media is akin to digital solitary confinement if no alternatives for social connection are presented. Developing healthy and intentional technological habits not only promotes the development of higher-order cognitive skills, but also better sleep habits, fewer mental health struggles, and stronger attention regulation abilities, but it need not come at the cost of connectedness. After all, if Silicon Valley can do it, we can do it.

Luckily, the attention economy has not yet slithered its tentacles into our classrooms the way it has invaded (and colonized) other public arenas. But as technology plays more of a central role in education, such as during a global pandemic, it's of utmost importance that we be aware and honest about the positive and negative potential that technology can unleash depending on how we use it.

For years now, technology has been expanding opportunities (albeit unevenly) for students to learn in new, unbelievable ways. The pandemic has only kicked that trend into overdrive. Students with internet access can connect with peers around the globe, access the entirety of human knowledge, create and innovate using powerful user-friendly tools, and so much more. Technology can, and should, continue to amplify the best parts about humanity. Learner-centered environments can harness technology to supercharge collaboration, creativity, and democratization. New tools can help us radically reimagine what it means for learning to become “personalized”. But without careful implementation, technology can also undermine the very same educational goals by biasing our students away from complex cognitive skills, and preventing them from processing the social and emotional significance of what they learn.

## What Does Learning Really Look Like? (cont.)

Beyond caution in the classroom and societal indignation, this is an opportunity for a deeper, more meaningful response from us all. We can, and we must, **change our mental image of what “learning” really looks like.**

Students, parents, and educators alike must understand that breaks to go outside, quiet reflection at the end of a lesson, or peer discussions in between classes — that’s not frivolity. That’s not separate from the process of deep learning. That is real, crucial work right there; that’s what makes learning last, what makes learning meaningful, what sticks with students and makes their education real to them. The fact that these opportunities arise informally, squeezing through the tiny cracks in a rock-solid daily schedule should tell us something. Perhaps they’re not weeds, but flowers that will make the path more beautiful and nourishing, if given room to grow.

It’s easy, especially in the era of Zoom-school, to slip into a mindset of “constant engagement”. Learning through video calls is already far more draining for students, both physically and emotionally, and parents’ anxiety about “falling behind” and college readiness are fueling a panicked frenzy to inundate students with even more tasks and content. We must consider the drawbacks of constant, external, task-oriented attention on our students’ learning; if our goal is for students to engage in the deep, meaningful learning that we know leads to long-term retention of skills and content-knowledge, we should make sure we aren’t shooting ourselves in the foot. Our good intentions might actually be draining their attentional resources.

For educators in particular, this means a fundamental shift in the way we design and conceptualize learning experiences. If students have a biological need for time and space to constructively reflect on new learning — why not design for that?

reDesign’s Learning Cycle Framework can be a really useful tool here, as opportunities for meaning-making and synthesis/reflection are baked right into it.

## What Does Learning Really Look Like? (cont.)

In fact, we contend that each of those processes deserves explicit time and space dedicated to it within a larger project or lesson. If “constructive internal reflection” relies on a brain network that is naturally deactivated while students investigate new content, then expecting them to synthesize and reflect while new content is being presented is like pitting their brain networks against each other! Instead, we should be giving students explicit opportunities to connect new information to prior schema at the outset, to synthesize new ideas in their own words, and to pause and reflect on their own learning process; the Learning Cycle Framework can help you design to do just that.

Most importantly, we must help students to develop a metacognitive awareness of these processes, so that they feel capable and empowered to make their learning meaningful. Once they are aware that it’s not only natural, but necessary to engage in “constructive internal reflection”, they can begin to consciously practice effective learning habits.

Building in opportunities for students to connect their learning to its abstract social, emotional, and moral implications not only allows them to engage in deep learning, but helps them develop an awareness of that part of the learning process. It’s time we all — teachers, students, and society more largely — built a new mental image of what learning looks like, one that values “Looking Out” and “Looking In” equally and in complement. Our students (and their brains) will certainly appreciate it.

