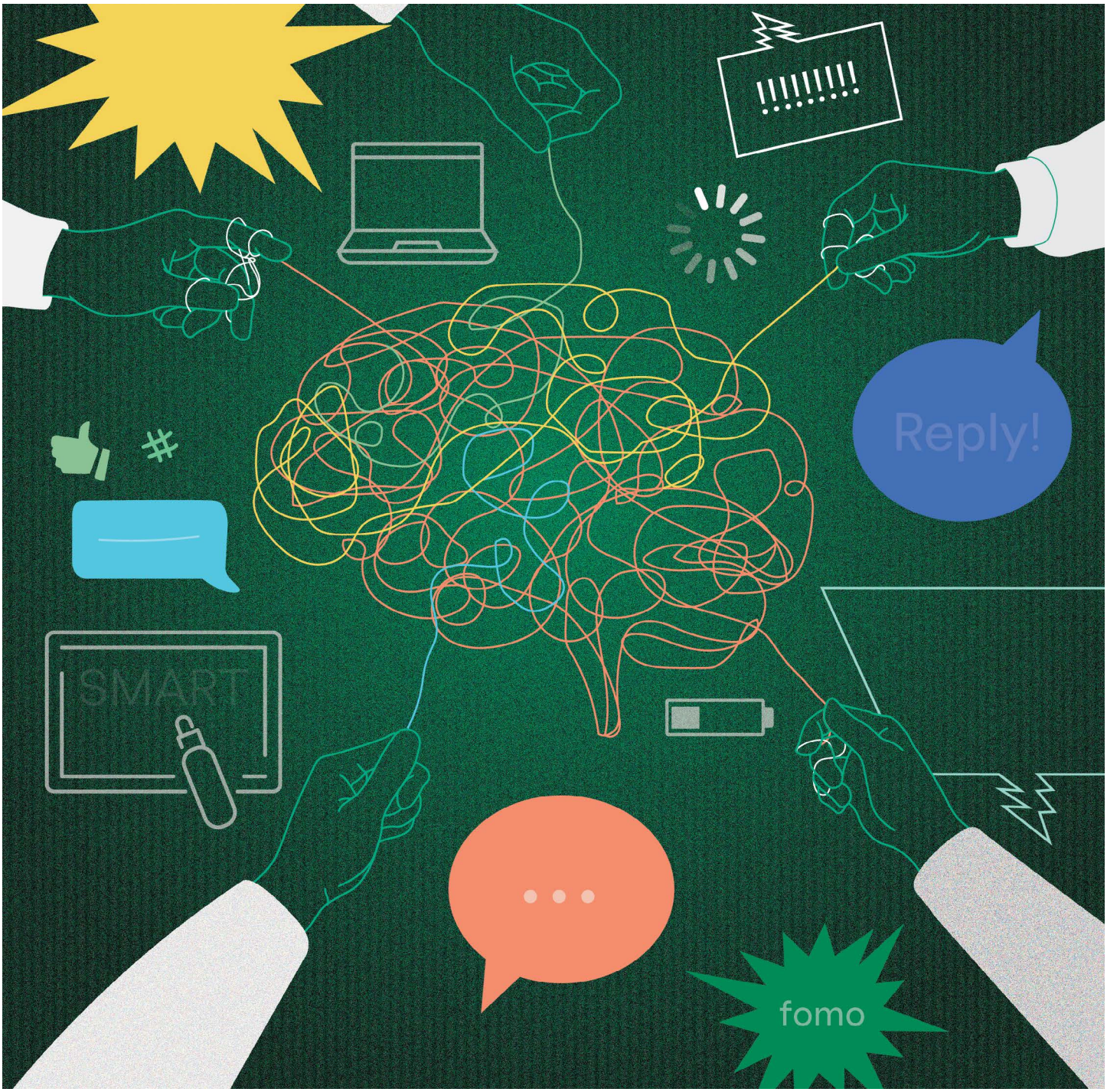
HCM

HELPING STUDENTS THRIVE IN A CHANGING WORLD

BY ADELE WILLSON, AIA, LEED AP, ALEP AND ERIKA ASHAUER, ALEP, EDAC



PART 1 OF 4

Designing Spaces for the Anxious Generation

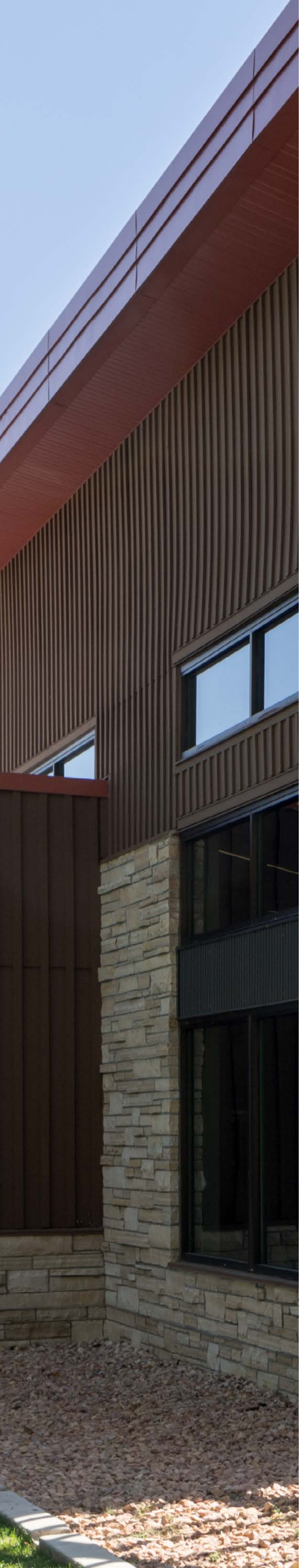


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01 INTRODUCTION



School buildings shape the sensory conditions, attentional demands, movement opportunities, routines, and social possibilities of the students within them for hours each day over many years of development.

That influence is constant and sits at the core of the conditions that make learning and development successful. Today's children are growing up in a reality that looks different from what school environments have been designed to support. Over the course of designing and researching educational environments, we have seen school buildings become increasingly optimized for efficiency, flexibility, and technology integration while the wellbeing of the students who occupy them has measurably declined. While this is a multi-layered problem, the built environment is a powerful and often underused lever for supporting children's regulation, social belonging, and cognitive function.

Students in PK-12 schools are experiencing a documented rise in mental health impacts, attentional fragmentation, and social development, and their learning environments can play a role in improving wellbeing. Our *Designing Spaces for the Anxious Generation* series explores how those conditions develop, what they do to students neurobiologically, and what architecture can and cannot do in response.

The series proceeds in four installments. Following this introductory paper, three installments focus on distinct developmental phases:

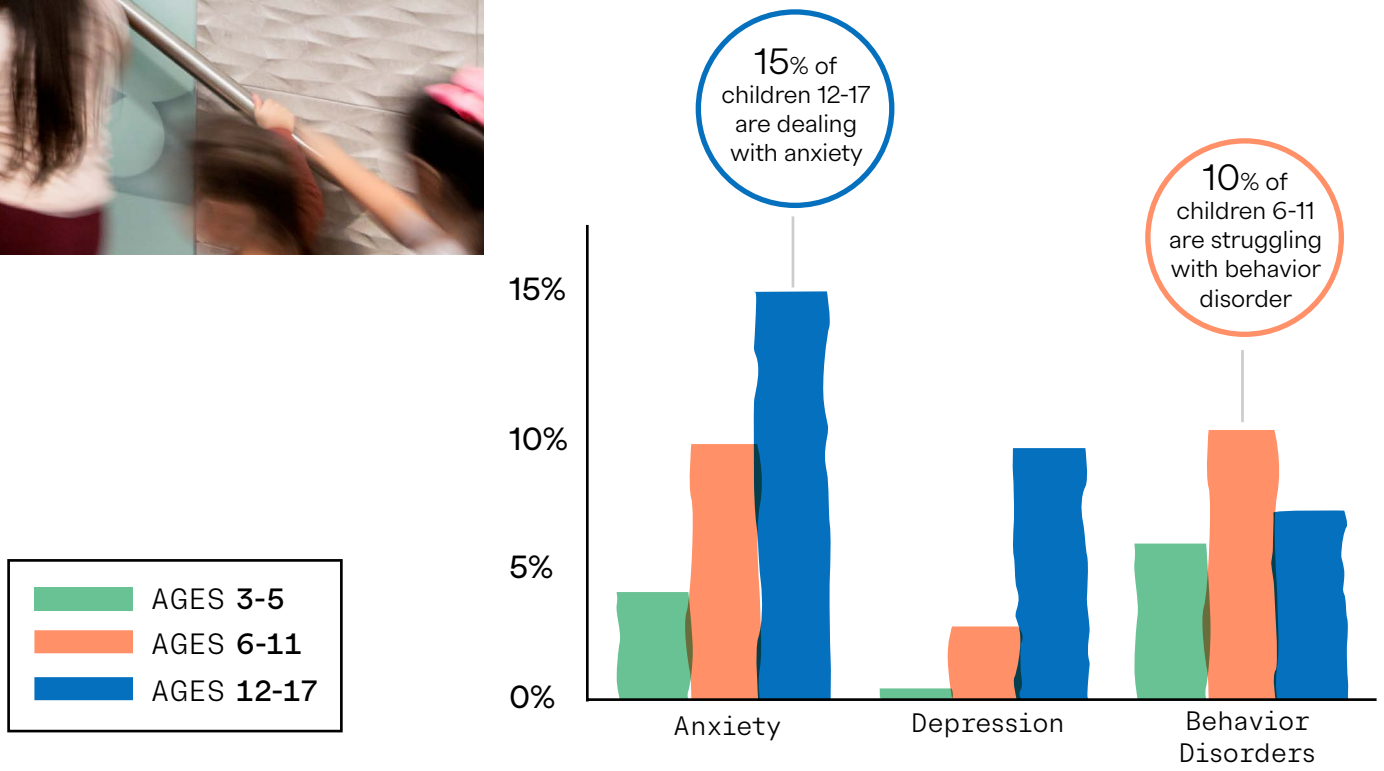
1. Early Childhood/ PK-5
2. Middle School
3. High School



In this introduction, we outline who this generation is, how the realities of their childhood differ from prior cohorts, and what those differences ask of the built environment.

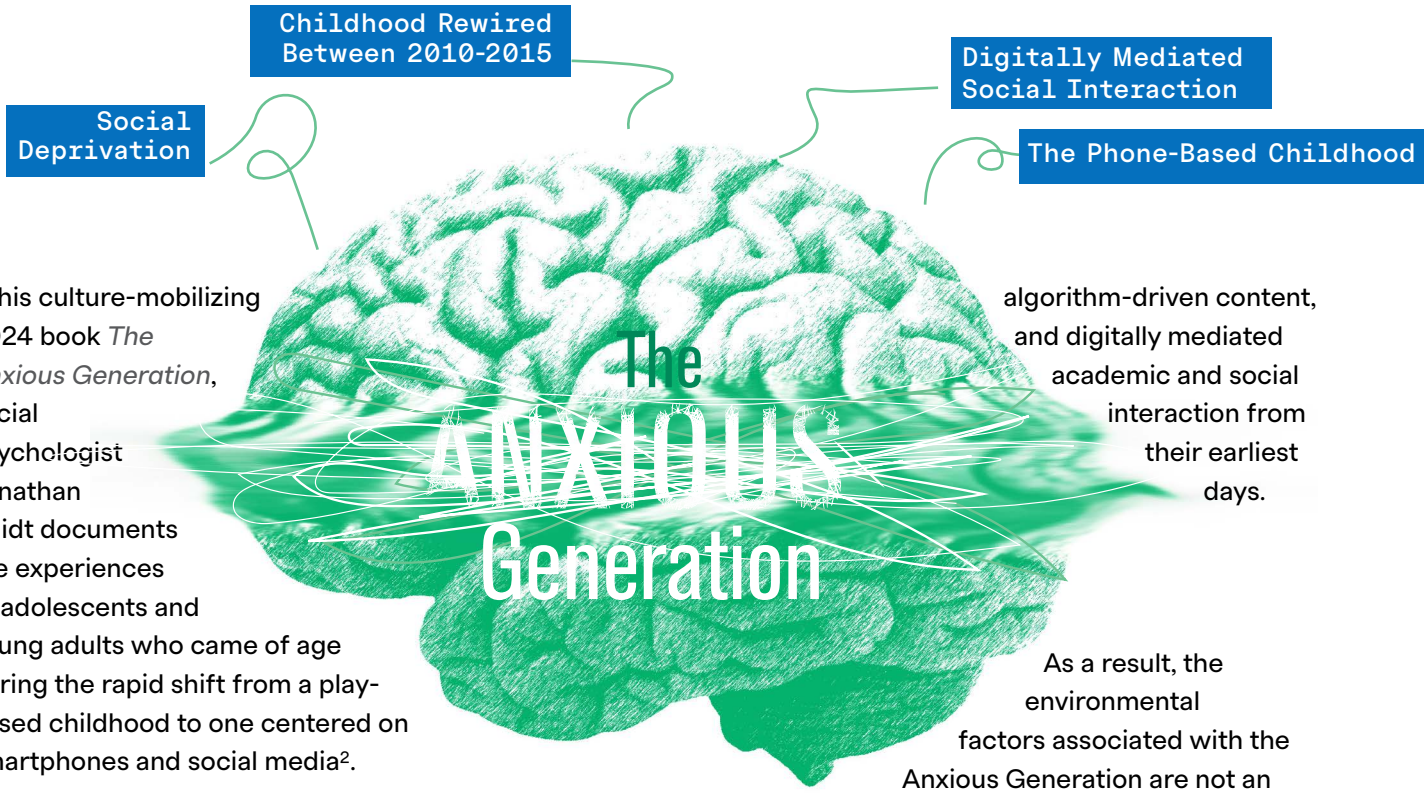
We respond to those demands through our Embodied Learning Environments (ELE) framework, a diagnostic structure evaluating whether a space actively supports regulation, competence development, and social connection, as well as for identifying the levers available to strengthen that support.

The challenges facing school-aged children today require meaningful responses at every level—policy, family, clinical, and community—with design contributing meaningfully in a broader system of support. School buildings shape the sensory conditions, attentional demands, movement opportunities, routines, and social possibilities of the students within them for hours each day over many years of development. That influence is constant and sits at the core of the conditions that make learning and development successful. The design lever is only as effective as our intentionality, empathy, and clarity in defining who and what we are designing for.



Anxiety, behavior disorders, and depression are the most commonly diagnosed mental disorders in children[1].

02 WHO IS THE ANXIOUS GENERATION?



In his culture-mobilizing 2024 book *The Anxious Generation*, social psychologist Jonathan Haidt documents the experiences of adolescents and young adults who came of age during the rapid shift from a play-based childhood to one centered on smartphones and social media[2].

This shift began in the early 2010s and coincided with a marked rise in anxiety, depression, self-harm, and related mental-health challenges among multiple Western countries.

For this cohort*, this shift was abrupt and disruptive, rapidly altering the conditions of childhood while development was already underway. The children currently moving through PK-12 schools were born into these conditions, encountering smartphones, algorithm-driven content, and digitally mediated academic and social interaction from their earliest days.

As a result, the environmental factors associated with the Anxious Generation are not an interruption in development for the current cohort, but the baseline context in which their cognitive, social, and emotional development is taking place.

For todays students, online spaces can be genuine sites of friendship, identity, and belonging. Whether smartphones and social media are the primary driver or a contributor among many is actively debated, the mental health indicators over the past decades have a measurable decline alongside unsupervised, embodied, real-world experiences.

*Defining generations is not an exact science and has no true consensus. We are defining "The Anxious Generation" as a cultural label grouping between Gen Z children (born between 1997-2012) and Gen Alpha (born between 2010-2025). Because this span covers markedly different developmental stages, this series treats 'The Anxious Generation' as a shared cultural and environmental condition rather than a single developmental cohort.

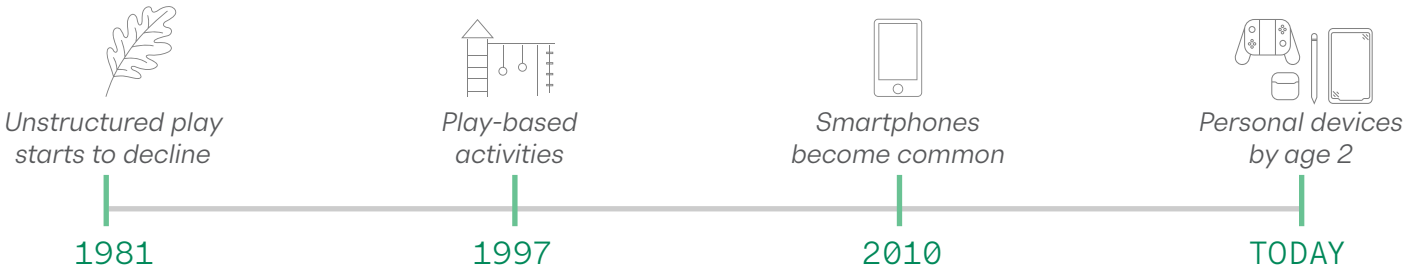


This raises a critical question:

What kind of cognitive, regulatory, and social architecture is being built in a child whose development is shaped by screen-mediated experiences from the earliest years?

03 CONDITIONS OF CONTEMPORARY CHILDHOOD

The conditions shaping this generation of students developed over time and through cultural shifts. Research on children's time use documents a 25% reduction in unstructured, play-based activities among children aged six to eight between 1981 and 1997, a decline that precedes smartphones by more than a decade[3].



The shift that took hold in the early 2010s acted as an accelerant, intensifying an already underway departure from embodied, self-directed experiences like unstructured play, physical exploration, and in-person interaction.

Digital immersion now begins in infancy. Today, 40% of children have their own personal tablet by age two and nearly one in four eight-year-olds owns a cell phone[4]. Beyond just device access, these numbers describe the sensory and attentional environment in which young children's nervous systems are developing—the inputs shaping their perceptual systems from the earliest years.

Over the past two decades, the widespread adoption of educational technology (edtech) has integrated screens into the school day as an instructional strategy. While the adoption of edtech is well-intentioned and often well-designed, it operates through the same attentional mechanisms as consumer screens. Apart from the content delivered through these devices, dosage, modality, and continuous recruitment of the brain's automatic orienting response shape how children experience screens throughout their day, both at home and at school.

EXPOSURE

40%

of children have their own personal device by age 2.
Common Sense Media, 2025

28%

of 8-year olds have their own cellphone.
Common Sense Media, 2025

98min

is the average minutes spent on school issued devices in grades 1-12 in USA.
NYT, 2025

DISPLACEMENT

23%

of high schoolers get the recommended 8 hours of sleep on school nights.
CDC YRBS, 2023

4-7min

average time American children spend in unstructured, outdoor play.
NRPA, 2021

15-30min

average time of recess most school-aged children receive in daily school schedule.
Patchen et al., 2024

IMPACT

33%

of 8th graders "below basic" reading skills.
NAEP, 2024

40%

of 4th graders "below basic" reading skills.
NAEP, 2024

2013

Year student achievement began declining in the U.S.
Malkus/AEI, 2025

93%

of school health workers reported an increase in student anxiety.
Edweek Research Center, 2019

40%

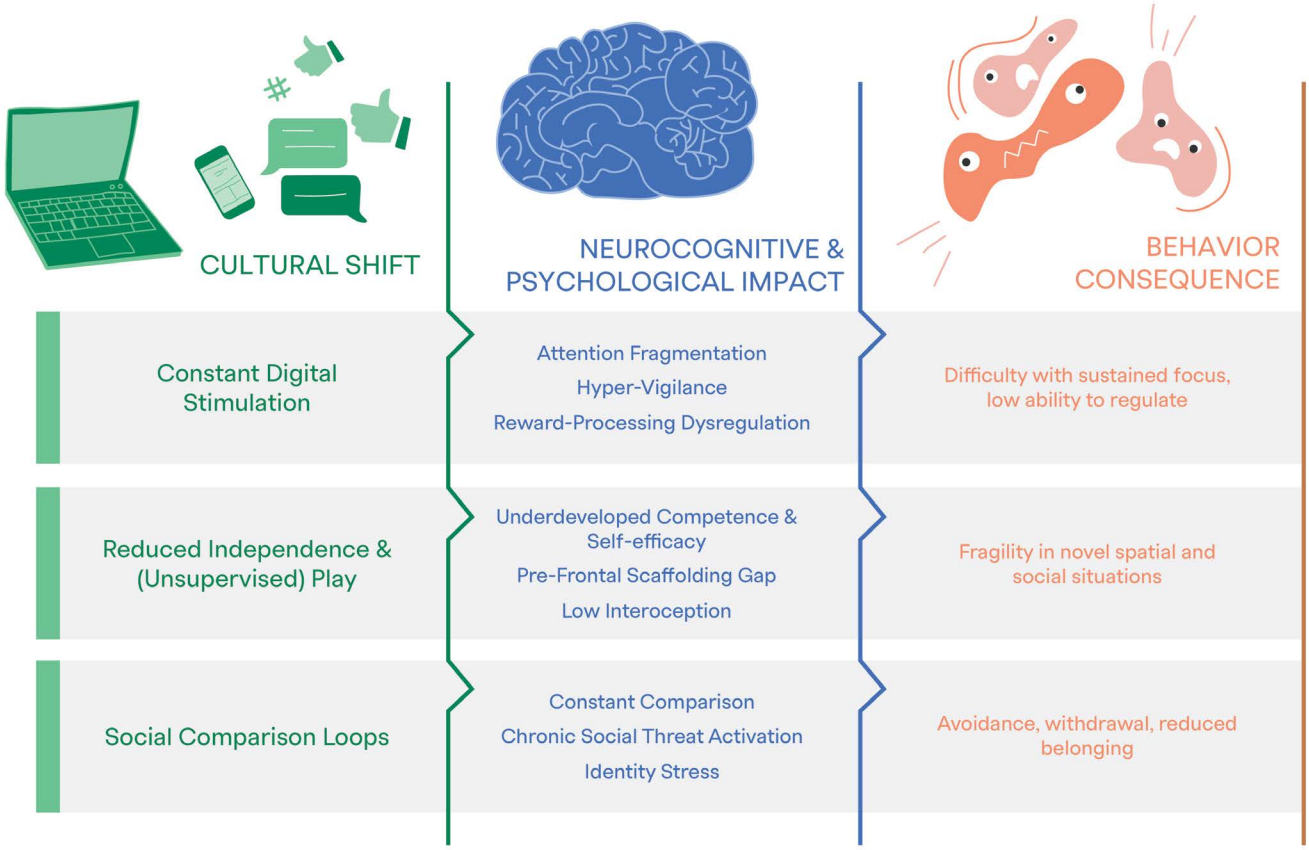
of high school students reported persistent feelings of sadness or hopelessness.
GDG YRBS, 2023

The effects of increased digital stimulation are observable in school populations. Since 2019, 93% of school health professionals—including nurses, psychologists, social workers, and health teachers—report an increase in student anxiety[5]. Clinical population-level data corroborates practitioner observations: a 2024 cohort study of approximately 1.7 million children and young adults found that diagnosed depression increased 60% between 2017 and 2021, with anxiety diagnosis rising by over 31% in the same period[6].

This data suggests that what we are seeing is not a passing trend but a system-wide shift in student well-being evident in emotional, behavioral, social, and clinical outcomes.

More recently, a new layer has been added to this landscape by way of Artificial Intelligence (AI). Where the smartphone and social media captured attention and displaced time, companion AI tools are increasingly designed to be responsive, personalized, and continuous. Unlike typical virtual assistants like Siri or Alexa, AI companions are designed to understand emotions and offer connection. Surveys indicate that 72% of adolescents have used AI companions, with 52% qualifying as regular users[7]. Notably, one third report choosing AI companions over humans for serious conversations[8]. Research on companion AI suggests that children are particularly susceptible to forming emotional attachments to responsive digital systems[9]. This creates the conditions for not only the displacement of attention, but also for the displacement of relationships.





Taken together, these trends illustrate a broad shift in the conditions of childhood, through which children have historically developed three fundamental capacities:

1. The ability to direct and sustain attention
2. The social belonging and skills that emerge from in-person interaction
3. The competence built through embodied challenge and recoverable failure

These capacities are not just behavioral; each is supported by underlying neurobiological systems. Chronic recruitment of the brain's automatic orienting response erodes the ability to sustain attention. Reduced exposure to physical, uncertain experiences limits the self-regulatory development that comes from challenge and recovery. Digitally mediated social interaction disrupts the feedback loops that build genuine social competence and a sense of belonging.

The aggregate effects of these shifts result in a nervous system that cannot complete the cycle of arousal and resolution required for healthy development. When the nervous system remains in a sustained state of arousal, without the resolution provided by physical activity, social repair, and environmental regulation, the neurobiological conditions for anxiety, and other mental and behavioral conditions are created. Understanding the specific pathways through which contemporary childhood produces these states is essential to understanding what the built environment can do to better support healthy development.

04 PATHWAYS TO ANXIETY

The conditions outlined above give rise to anxiety through specific, traceable neurobiological pathways. While each pathway can be activated independently, they are often engaged in combination through environmental, cultural, and operational conditions, and their effects are cumulative. Because digital systems are engineered to fragment attention, sustained attentional demand increasingly draws on and depletes downstream capacities like social regulation, self-awareness, and competence building.

These dynamics are expressed through three interrelated pathways: Attention Depletion, Competence Deficit and Social Threat.

Attention Depletion

The human brain operates on two distinct attentional systems.

1. Directed attention is voluntary, effortful, and finite; it is the system students use to read, solve complex problems, and navigate unfamiliar social situations.

2. Involuntary attention is automatic and effortless, triggered by stimuli the brain finds inherently compelling, such as movement, novelty, and unpredictability.

Under typical conditions, these two systems interact in a cycle. Sustained use of directed attention leads to fatigue, while attentional capacity is restored when the brain engages effortlessly with mildly interesting stimuli, such as natural landscapes, unstructured movement, or quiet reflection[10].

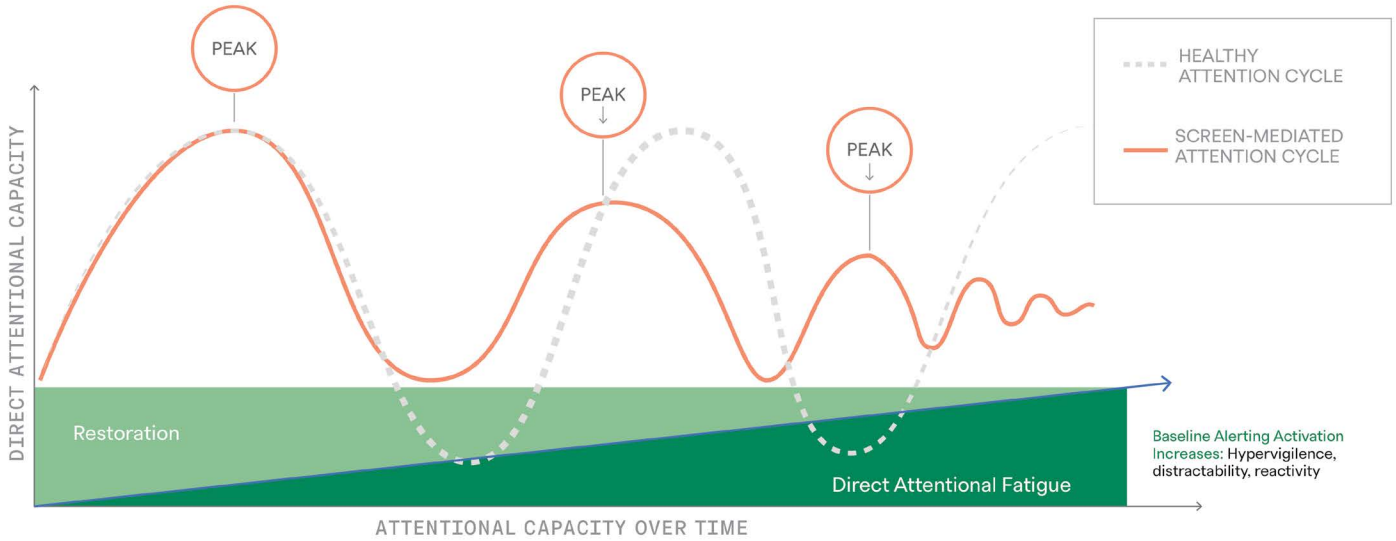
Digital environments, however, are deliberately designed to recruit involuntary attention. Variable reward schedules, continuous motion, notifications, and social unpredictability repeatedly trigger the brain's orienting response. Each trigger produces a brief automatic arousal response that interrupts the recovery cycle that directed attention requires.

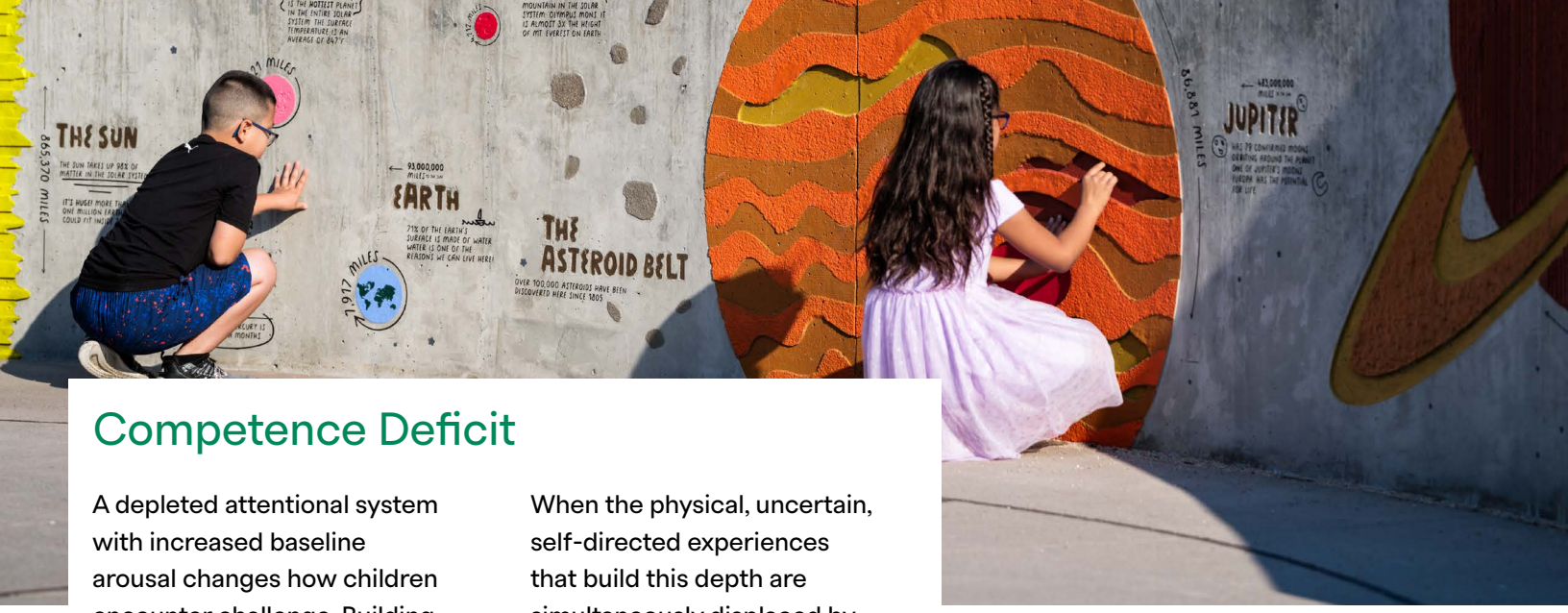
In environments where the orienting response is continuously recruited, such as school days saturated with screens, directed attention rarely gets the chance to complete its restoration cycle. Over time, chronic arousal from screen environments elevates baseline alertness, impairs sustained focus[11], and increases vulnerability to anxiety by keeping the nervous system in a prolonged state of readiness rather than resolution[12].



"Like young trees exposed to wind, children routinely exposed to small risks grow up to become adults who can handle much larger risks without panicking."

JONATHAN HAIDT, THE ANXIOUS GENERATION

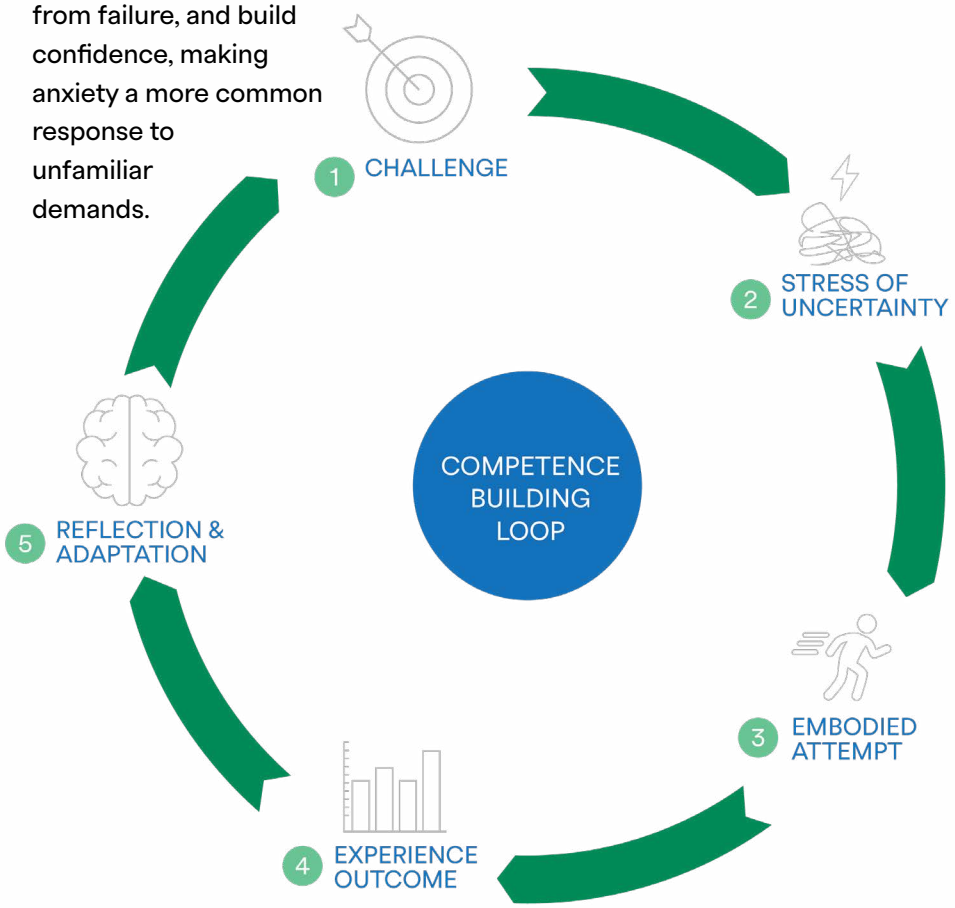


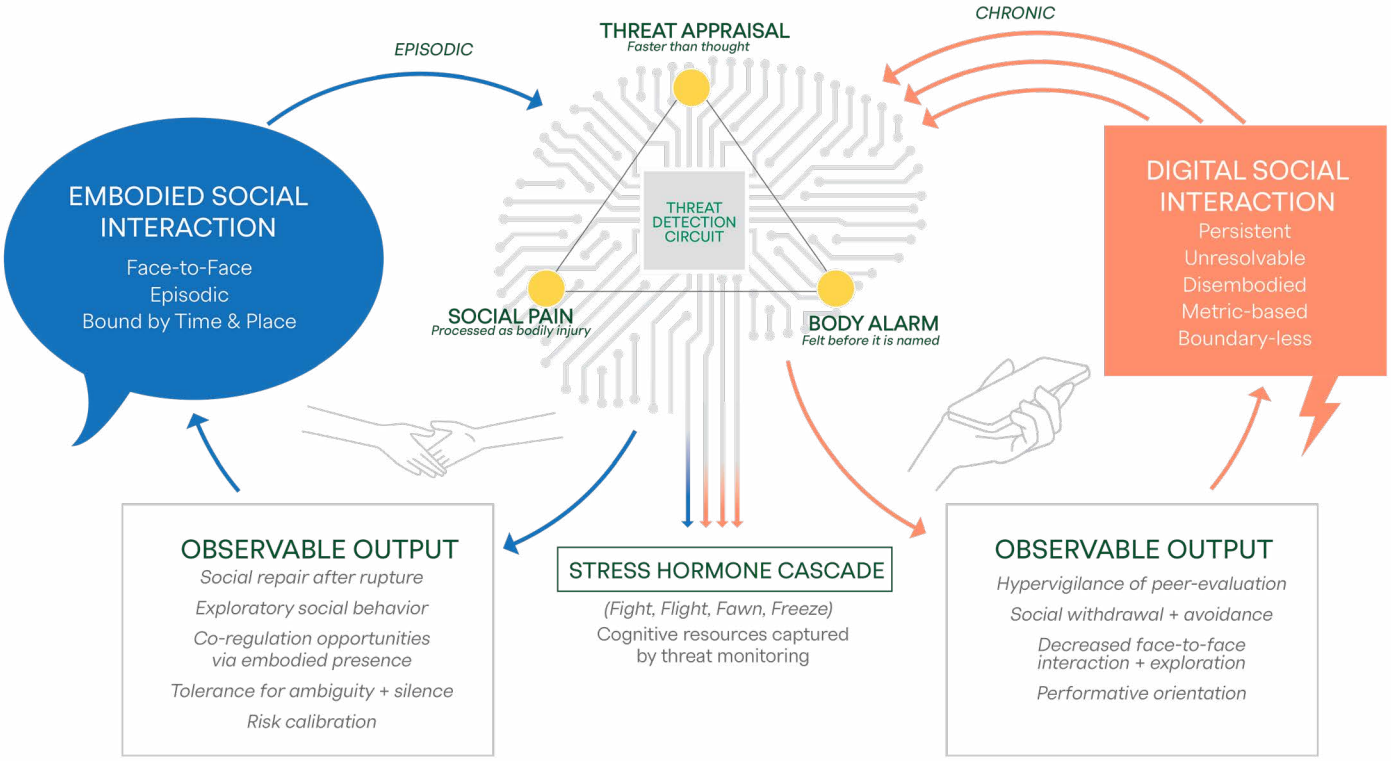


Competence Deficit

A depleted attentional system with increased baseline arousal changes how children encounter challenge. Building competence—an embodied sense of being capable in the world—depends on a specific set of developmental conditions, including voluntary engagement with uncertain, physical situations where failure is possible and recovery is required[13]. These experiences are foundational to regulatory development. Through repeated cycles of activation, effort, and recovery, the nervous system learns that difficulty is navigable and that effort can lead to resolution. Over time, this embodied learning supports self-efficacy, emotional regulation, and resilience. When directed attention is chronically depleted, children arrive at challenging situations already over-resourced in arousal and under-resourced in the voluntary capacity needed to engage. A nervous system without sufficient regulatory depth is less likely to respond to unfamiliar demands with curiosity, and more likely to respond with avoidance or anxiety.

When the physical, uncertain, self-directed experiences that build this depth are simultaneously displaced by screen-mediated activity, the effect compounds. The attentional system is depleted, and the developmental contexts through which resilience is built are increasingly absent. As opportunities for embodied learning diminish, children have fewer chances to test themselves, recover from failure, and build confidence, making anxiety a more common response to unfamiliar demands.





Social Threat

Social development and a sense of belonging are fundamental to humanity. Our social evaluation systems evolved in small, stable groups where most interactions occurred face-to-face and social missteps could be repaired over time through continued relationships. Social threat operates at the intersection of competence and attention. Social competence is having the capacity to navigate belonging, manage peer evaluation, and recover from social rupture which develops through embodied, in-person interaction[14]. This process requires the full bandwidth of human social communication, including facial expression, vocal tone, body language, spatial proximity, and the continuity of real relationships where social mistakes can be repaired over time and boundaries established through self-awareness. Digitally mediated social interaction strips away many of these channels. What remains is often quantified social feedback delivered to large, often anonymous audiences. For a nervous system already depleted in attention and lacking the regulatory depth built through embodied challenge, this detached landscape is registered as actively threatening. The digital environment creates a consequence on inputs and needs. This mismatch is especially consequential during adolescence, when neurological development heightens sensitivity to peer evaluation and social belonging[15]. Under these conditions, the social threat pathway not only increases anxiety in social situations but also creates a progressive withdrawal from in-person interaction that would, over time, build the competence to navigate it.

05 THE EMBODIED LEARNING ENVIRONMENTS FRAMEWORK

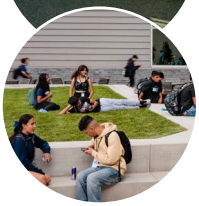
Each pathway points to a category of experience that the built environment can either support or deny.



ATTENTION DEPLETION is addressed through spaces that offer aerobic activity, meaningful connection to nature, spaces for restoration, and sensory flow.



COMPETENCE DEFICIT is addressed through spaces that offer embodied challenge, agency, and graduated difficulty.



SOCIAL THREAT is addressed through spaces that sustain genuine, in-person social interaction and belonging.

These design responses are founded on the premise that cognition, emotion, and regulation are enacted through a body's ongoing exchange with its environment, and it is that exchange that contemporary conditions are eroding. HCM's Embodied Learning Environments Framework is built on this premise and the developmental gap it can support.

Cognition and emotional regulation are not processes that occur solely inside a brain housed within a body that happens to be in a space. They are enacted through the body's ongoing interaction with the environment.

This is consistent with research on the neurobiology of learning, showing that emotion and cognition are not separable systems but are integrated at the neural level, such that the body's emotional state is a condition of cognitive engagement[16].

Space is not a container for learning but a participant in it[17]. Every school building is already doing something to the students inside it—shaping attentional conditions, enabling or foreclosing movement, supporting or undermining social connection—whether by intention or through happenstance.

This reality became especially evident during a full-day professional observation at an urban elementary school serving a predominantly English Language Learning population, largely composed of children from immigrant families. Earlier in the year, immigration enforcement activity in the surrounding neighborhood had caused a significant drop in attendance. At the time of the observation, approximately half of the fifth-grade cohort that began the year remained enrolled and a high portion of students met criteria for homelessness or housing instability.



These were children carrying substantial allostatic load—the cumulative "wear and tear" caused by chronic exposure to stress—before they arrived at school each morning.

The environment did not change the students. It changed the conditions under which students regulated themselves.

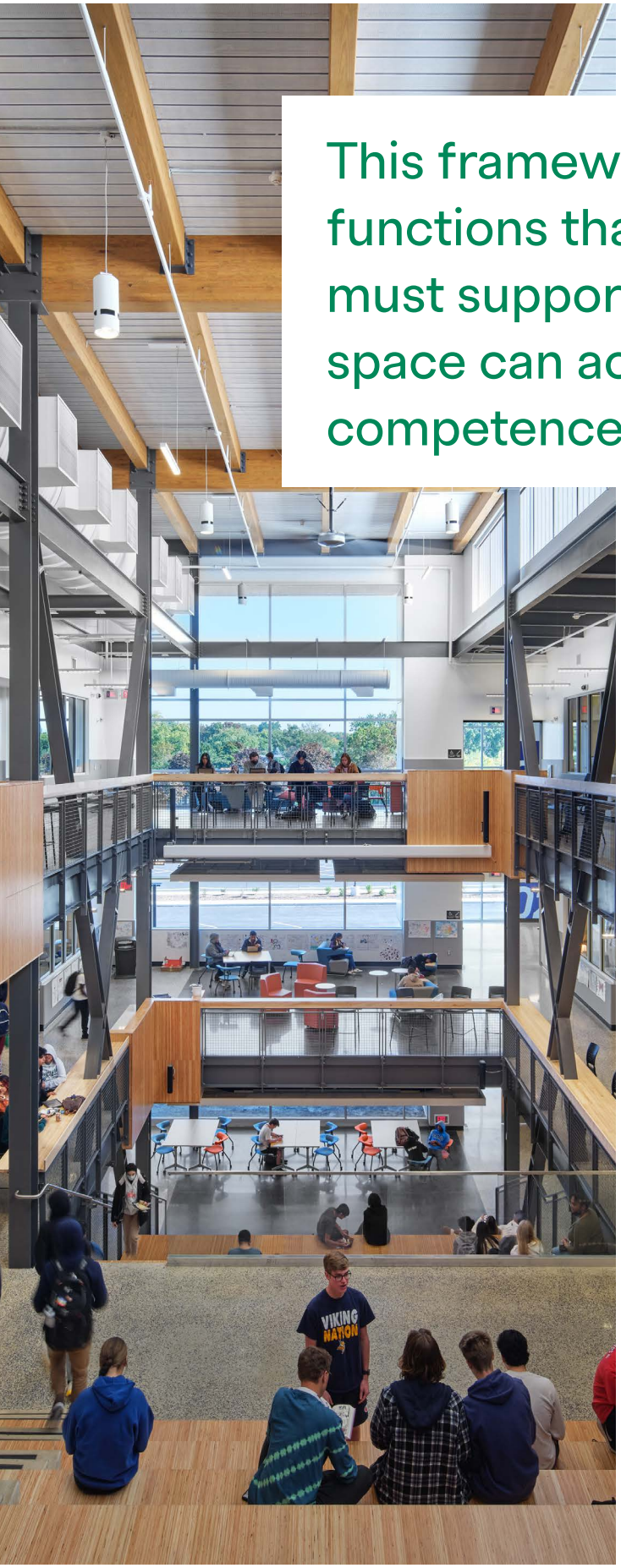
What the building did with that load, whether it compounded it or helped them set it down, is exactly the question the Embodied Learning Environments Framework is designed to ask.

A significant finding of the day emerged from a direct comparison between classrooms. In one room, referred to here as C1, a teacher had made deliberate, low-cost decisions about the physical environment. Overhead fluorescent lights were off, replaced by natural light and a small number of task lights. Two windows were open, allowing fresh air to circulate the room. Surfaces were visually calm. Students had a genuine choice in where and how to work: a high-top table, a low coffee table with floor seating, grouped desks, and a small table positioned facing the wall for students needing to reduce visual distraction. At points during the day, students had the option to go outside—an option not observed in other classrooms. Tracked across a full day, students in C1 remained notably more regulated, demonstrating sustained focus, presence, and the ability to reengage following transitions.

In other classrooms, conditions were markedly different. Blinds were drawn, overhead fluorescent lights were fully on, the air was stale, visual clutter accumulated at the surfaces of the room. After lunch, students were visibly dysregulated—fidgety, disengaged, and in at least one documented instance, frustrated enough to throw a workbook.

In the early afternoon, at the lowest-regulation point of the day, a fire drill interrupted the school day. Students filed outside, walked around, and breathed different air. The sensory rhythm of the day broke and when they returned, something had measurably shifted: They were calmer and more focused. The fire drill was not intended as a regulation intervention. It was a bureaucratic interruption that happened to move bodies through space and air. Yet it recalibrated some students—if only temporarily—more effectively than the environments where they had spent the majority of their day. Across nearly every classroom observed, students were on laptops for most of the academic day, reflecting a pattern broadly representative of how educational technology has been deployed across PK-12 environments since the pandemic. C1 was the exception, not by rejecting technology, but by ensuring it was one option among several, alongside genuine non-screen alternatives and outdoor access.

The gap between what those students' bodies needed and what most of the building provided is the gap the Embodied Learning Environments framework is designed to address.

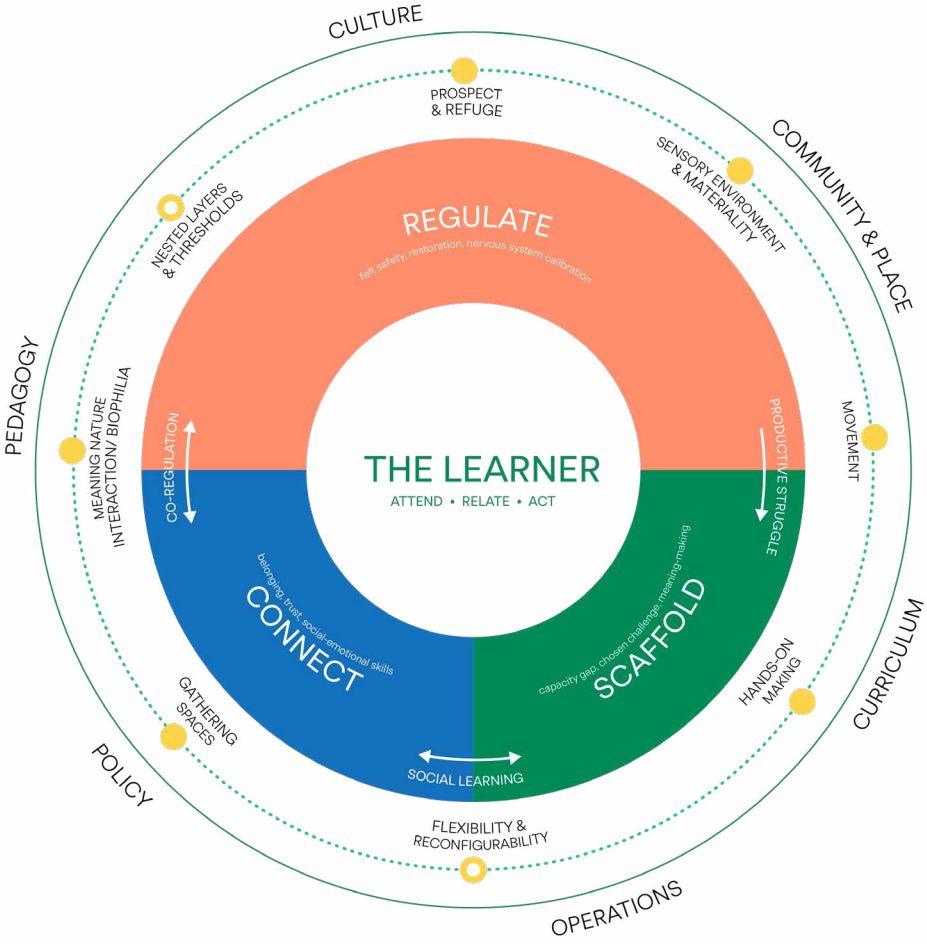


This framework identifies three core functions that the built environment must support to address how physical space can actively shape attention, competence, and belonging.

Each of the three functions of the framework describes not a feature of space but a relationship between space and a body – what the environment makes possible and what it forecloses[18].

Spaces that regulate offer attentional variety, access to natural elements, acoustic modulation, and sensory relief — conditions that allow the directed attentional system to restore rather than remain in sustained arousal. Translated into design terms, the Embodied Learning Environments Framework calls on us to ask a set of foundational questions that reveal whether a space is supporting or denying healthy development. The answers to these questions can inform interconnected design intentions, in which regulation enables connection — and connection creates the conditions for scaffolded challenge.

The framework functions as a diagnostic tool for evaluating whether a given space is aligned with developmental conditions needed for healthy development and counterbalance for digital immersion by identifying where and how design decisions can close the gap, and finding alignment with the surrounding systems. In future installments of our *Designing Spaces for the Anxious Generation series*, we apply this framework across development stages, translating it into architectural strategies appropriate for early childhood/PK5, middle school, and high school environments.



LEGEND

- The Built Environment
- Systems Context
- Strong Evidence
- Emergent/ Reasoned Extension
- Enacted Reciprocity

REGULATE

Does this space restore attentional capacity and nervous system equilibrium?

Spaces that regulate address the attention depletion pathway by offering conditions that allow the directed attentional system to recover:

- Offers attentional variety
- Promotes cognitive, physical, and emotional restoration.
- Provides the ability to modulate sensory environment

CONNECT

Does this space sustain human-to-human belonging and social competence?

Spaces that connect address the social threat pathway by creating the conditions for real, in-person interaction:

- Creates conditions for real social interaction
- Provides space that offers a sense of belonging
- Rewards face-to-face connection

SCAFFOLD

Does this space build competence and resilience through graduated challenge and agency?

Spaces that scaffold address the competence deficit pathway by offering hands-on engagement, low-stakes failure, and genuine agency:

- Offers graduated challenge
- Supports hands-on learning
- Encourages experimentation and trial-and-error
- Allows for meaning of the outcome, through reflection or reattempt

06 THE DESIGN OPPORTUNITY

School buildings actively influence how students direct their attention, build competence, and develop meaningful social connections. They can either strengthen or weaken the foundational capacities that support healthy development.

The conditions of contemporary childhood have produced a generation of students arriving at school with nervous systems marked by attentional depletion, reduced regulatory capacity, and heightened social fragility—conditions that most school buildings, in their current form, were largely not designed to address, and often unintentionally compound. Recognizing how these conditions develop and why they matter changes what we are designing for.

School buildings are not neutral containers; they are ecosystems that either support or undermine the ability to direct and sustain attention, the competence built through embodied challenge, and the social regulation that emerges from genuine human connection.

The Embodied Learning Environments framework—Regulate, Connect, Scaffold—provides a structure for evaluating whether a given design decision supports or undermines each of these capacities at every scale, from a classroom window to a campus master plan.

In the installments that follow, we apply this framework to the students who occupy the buildings we design, including early childhood/PK-5, middle school, and high school. Across all four papers, we translate developmental science into architectural strategies aligned with who students are and what their bodies and nervous systems need to healthfully do the work of learning and becoming.



School buildings are not neutral containers. They are active participants in child development.



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