

Design Principles for Schools: Putting the Science of Learning and Development Into Action

Executive Summary

Learning Policy Institute and Turnaround for Children

in partnership with the Forum for Youth Investment
and in association with the SoLD Alliance

Emerging science tells us an optimistic story about the potential of all learners. There is burgeoning knowledge about the biological systems that govern development, including deeper understandings of brain structure and wiring and their connections to other systems and the external world. This research tells us that brain development and life experiences are interdependent and malleable—that is, the settings and conditions individuals are exposed to and immersed in affect how they grow throughout their lives.

This knowledge about the brain and development, coupled with a growing knowledge base from educational research, provide us with an opportunity to design systems in which all individuals are able to take advantage of high-quality opportunities for transformative learning and development. The situation facing our country today—sharp and growing economic inequality, ongoing racial violence, the physical and psychological toll of the pandemic—underscores our need to enable societal and educational transformations that advance social justice and the opportunity to thrive for each and every young person.

The Guiding Principles for Equitable Whole Child Design

The Guiding Principles for Equitable Whole Child Design aims to seize this opportunity to advance change. The organizing framework to guide transformation of learning settings for children and adolescents is reflected in the five elements shown in Figure 1.1:

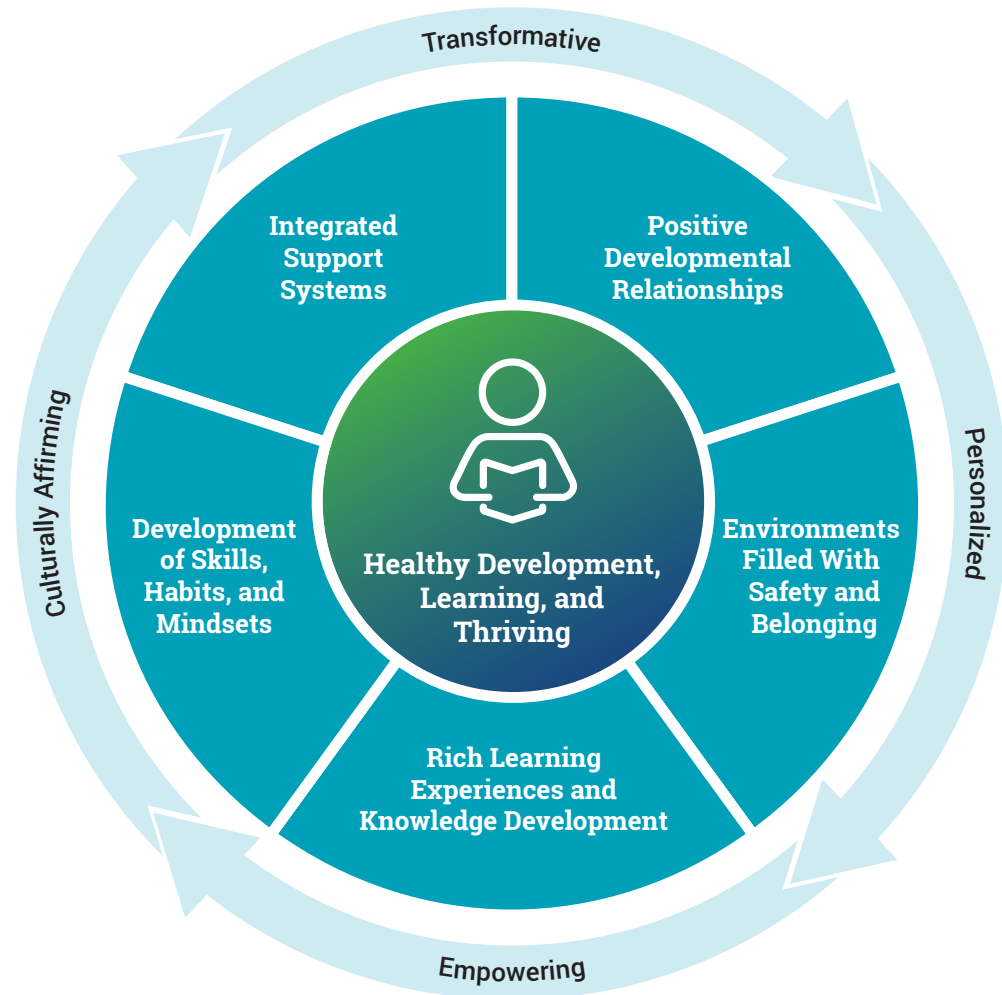
- Positive Developmental Relationships
- Environments Filled With Safety and Belonging
- Rich Learning Experiences and Knowledge Development
- Development of Skills, Habits, and Mindsets
- Integrated Support Systems

Although these elements resonate with most educators, they have not yet been widely used to develop and create learning settings, nor have they been engineered in fully integrated ways to yield healthy development, learning, and thriving. Progress has been impeded by both historical traditions and current policy built on dated assumptions about school design, accountability, assessment, and educator development. Current constraints do not support robust implementation, let alone integration of these practices. If, however, the purpose of education is the equitable, holistic development of each student, scientific knowledge from diverse fields can be used to redesign policies and practices to create settings that unleash the potential in each student.

Redesign around these core principles has implications for all levels of the ecosystem, from the classroom to the school, district, and larger macrosystems that must join together to produce an

intentionally integrated, comprehensive developmental enterprise committed to equity for all students, not just some. We separate and enumerate each component individually, but we believe the unique application of these components will be to use them in reinforcing and integrated ways to truly support learner needs, interest, talents, voice, and agency. The aim is a context for development that is greater than the sum of its parts and is transformative, personalized, empowering, and culturally affirming for each student.

Figure 1.1
Guiding Principles for Equitable Whole Child Design



Below is a brief description of this organizing framework, in which we describe how each of the Guiding Principles for Equitable Whole Child Design is associated with research from developmental and learning science. We also briefly describe how each element is associated with:

- structures that create the context for changed conditions, adult practice, and student learning and experiences; and

- practices that can be used within these structures to transform the quality of relationships and experiences among educators, children, and their families to promote engaged and productive learning.

Positive developmental relationships

That relationships are important is not new knowledge to educators, families, or researchers. Relationships engage children in ways that help them define who they are, what they can become, and how and why they are important to other people. However, not all relationships are developmentally supportive. In a developmental relationship, caring and attachment are joined with adult guidance that enables children to learn skills, grow in their competence and confidence, and become more able to perform tasks on their own and take on new challenges. Children increasingly use their own agency to develop their curiosity and capacities for self-direction. Looked at this way, developmental relationships can both buffer the impact of stress and provide a pathway to motivation, self-efficacy, learning, and further growth.

A strong web of relationships between and among students, peers, families, and educators, both in the school and in the community, represents a primary process through which all members of the community can thrive. Schools can be organized to foster positive developmental relationships through structures and practices that allow for effective caring and the building of community. These include at least the following:

- **Structures that enable the development of continuous, secure relationships** and allow teachers to know children well, as well as opportunities among adults for collaboration toward shared goals. These structures include:
 - small schools and small learning communities;
 - advisory systems that create small family units within schools;
 - looping that allows educators to be with the same children for more than one year;
 - time and protocols for home visits and other outreach that connects families and educators;
 - staff collaboration time and structures; and
 - opportunities for shared decision-making.
- **Practices that allow educators to engage in trust-building and collaboration** with students, families, and each other to achieve shared practice around a developmental approach to learning and development. These practices include:
 - behaviors that communicate respect, caring, and valuing of students and families;
 - pedagogies that allow educators to develop deep knowledge about their students, their talents and interests, their families, and their cultural contexts;
 - classroom and schoolwide strategies that counteract stereotype threat through cultural affirmation and reinforcement of students' capacities; and
 - collaboration skills for building productive relationships among staff and with families.

Environments filled with safety and belonging

The contexts for development, including schools and classrooms, influence learning. This is especially important because the cues from our social and physical world determine which of our 20,000 genes will be expressed and when. Over our lifetimes, fewer than 10% of our genes actually get expressed. When settings are designed in ways that support connection, safety, and agency, a positive context for development of potential is created.

The brain is a prediction machine that loves order; it is calm when things are orderly and gets unsettled when it does not know what is coming next. Learning communities that have shared values, routines, and high expectations—that demonstrate cultural sensitivity and communicate worth—create calm and ignite the other part of the brain that loves novelty and is curious. Children are more able to learn and take risks when they feel not only physically safe with consistent routines and order, but also emotionally and identity safe, such that they and their culture are a valued part of the community they are in.

In contrast, anxiety and toxic stress are created by negative stereotypes and biases, bullying or microaggressions, unfair discipline practices, and other exclusionary or shaming practices. These are impediments to learning because they preoccupy the brain with worry and fear. Instead, co-creating norms; enabling students to take agency in their learning and contribute to the community; and having predictable, fair, and consistent routines and expectations for all community members create a strong sense of belonging.

To achieve an environment in which belonging and safety are principal features, a school can consider the following:

- **Structures that foster safety and belonging, which include:**
 - shared values and norms framed as “do’s” that guide relationships (e.g., respect, responsibility, kindness) rather than “don’ts” that direct punishments (e.g., don’t talk, touch, or move); these are co-developed with students and translated into expectations for each community member’s actions and interactions;
 - consistent routines that support order and positive interactions (e.g., daily greetings, regular classroom meetings, shared classroom practices), building a foundation for a strong sense of community and belonging within the school;
 - restorative routines and settings that support reflection and build life skills (e.g., community circles, places where students can defuse and reflect, and processes for explicit conflict resolution); and
 - inclusive settings, including heterogeneous classrooms and socially supportive extracurriculars that are culturally affirming and communicate common expectations and opportunities.
- **Practices that build safe and caring learning communities, which include:**
 - educators’ regular and skillful use of co-developed norms, routines that enable responsibility and agency, de-escalation practices when situations become tense, and management of conflict through dialogue and reparation of harm;

- attention to signs of trauma, using a range of tools and resources to uncover and understand what children are experiencing, as well as healing-oriented practices, including mindfulness, counseling, and access to additional resources; and
- respect for students, coupled with instruction that builds upon students' cultures, identities, and experiences alongside efforts to reduce implicit and explicit bias in the classroom and school as a whole; these practices include affirmations that establish the value of each student, cultivate diversity as a resource, and encourage asset-based celebrations of accomplishments.

Rich learning experiences and knowledge development

To engage learners in rich learning experiences that develop brain architecture as well as formal knowledge and deep understanding, educators should provide meaningful and challenging work for all students within and across core disciplines, including the arts, music, and physical education. This includes opportunities for students to develop their knowledge in ways that build on their culture, prior knowledge, and experience and help learners discover what they can do and are capable of. Students learn best when they are engaged in authentic activities and are collaboratively working and learning with peers to deepen their understanding and to transfer knowledge and skills to new contexts and problems. They will be empowered to solve these problems through formal and informal feedback from peers and adults as they engage in activities.

Because learning processes are very individual, teachers need opportunities and tools to come to know students' experiences and thinking well, and educators should have flexibility to accommodate students' distinctive pathways to learning, as well as their areas of significant talent and interest. Approaches to curriculum design and instruction should recognize that learning will happen in fits and starts, which requires flexible scaffolding and supports, differentiated strategies to reach common goals, and methods to leverage learners' strengths to address areas for growth. A school can consider the following:

- **Structures that foster rich learning experiences, which include:**
 - curriculum and program offerings that support inquiry and problem-based learning around rich, relevant tasks that are culturally connected and collaboratively pursued;
 - performance assessments and rubrics focused on higher-order thinking skills and applications of knowledge that structure the teaching, tasks, feedback, and metacognitive reflections that guide learning; and
 - tools for learning about students' experiences, interests, strengths, and readiness that can be built upon to draw connections to the curriculum and foster learning (e.g., learning surveys, student reflections, observation protocols, formative assessments, and exit tickets).
- **Practices that develop competence and confidence in learners, which include:**
 - “two-way” pedagogies that provide knowledge of students as learners and individuals in order to enable explicit connections between students' prior knowledge and cultural experiences and the content under study;

- careful scaffolding and supports for students to undertake rich, engaging, authentic tasks, creating zones of proximal development for rich learning through active inquiry and strategic, explicit instruction;
- recognition of strengths and skills with opportunities to continue to develop them and share them with others, developing positive academic identities;
- cognitive supports that make tasks doable by structuring them well, reducing unnecessary cognitive load, and that use multiple modalities and tools for accessing information and expressing learning (as in Universal Design for Learning); and
- opportunities to develop mastery and metacognitive skills, including opportunities to access resources; collaborate; practice; give and receive useful feedback; and reflect, revise, and improve, so that students can ultimately manage their own learning toward mastery of content and deeper learning skills.

Development of skills, habits, and mindsets

Neuroscience advances show that parts of the brain are cross-wired and functionally interconnected. As a result, learning is integrated: There is not a math part of the brain that is separate from the self-regulation or social skills part of the brain. For students to become engaged, effective learners, educators need to develop students' content-specific knowledge alongside their cognitive, emotional, and social skills. These skills, including executive function, growth mindset, social awareness, resilience and perseverance, metacognition, and self-direction, can and should be taught, modeled, and practiced just like traditional academic skills and should be integrated across curriculum areas and across all settings in the school. To achieve these aims, schools can incorporate the following structures and practices:

- **Structures that integrate cognitive, social, and emotional development into learning, which include:**
 - curricula and dedicated time that enable students to explicitly learn and practice valued skills, habits, and mindsets (e.g., social and emotional learning or conflict resolution curricula);
 - opportunities and routines that reinforce skills, habits, and mindsets during everyday instruction and school activities;
 - scaffolds that support executive functions like planning, organizing, implementing, and reflecting on tasks; and
 - collaboration protocols and rubrics that support interpersonal skill development in the context of subject matter classes.
- **Practices that make learning and skill development visible and supported, which include:**
 - strategies that reinforce skill, habit, and mindset development; affirm students' abilities and assets; and provide appropriate scaffolds (e.g., using growth-oriented language and practices);
 - strategies that help students describe their thinking and feelings; build self-awareness; and develop strategies for calming, self-management, and problem-solving; and

- practices such as educator modeling, think-alouds, and metacognitive activities that make the development of cognitive, social, and emotional skills visible while conveying what is possible.

Integrated support systems

All children need support and opportunity. And all students have unique needs, interests, and assets to build upon, as well as areas of vulnerability to strengthen without stigma or shame. Thus, learning environments should be designed to include many more protective factors than they currently do, including health, mental health, and social service supports as well as opportunities to extend learning and build on interests and passions. Building comprehensive and integrated supports will tip the balance toward an environment where students feel safe, ready, and engaged.

To do this, opportunities for exploration, intervention, and growth must be plentiful, rich, and extensive to meet students where they are and help them discover their purpose and direction. Opportunities and supports nurture students' agency, help them discover what motivates them, inspire them, and help them advocate and contribute to changing suboptimal conditions they may experience.

In addition, all students will experience different needs at different times. It is therefore helpful to organize integrated supports as tiers. Universal supports (i.e., Tier 1) are those available in every classroom and include Universal Design for Learning, prioritization of relationships, fair and just discipline practices, and a culture of safety and belonging. Integrated supplemental supports (i.e., Tier 2) provide learners with additional support when needed and may include small group work with the teacher or a tutor on specific skills, or outreach from a counselor or social worker to support a current need. More individualized and intensive supports (i.e., Tier 3) are those that respond in a sensitive and timely manner to student readiness, wellness, and needs. To do so, Tier 3 interventions personalize supports and experiences in school, out of school, and with families through special education services; health or mental health services; or more intensive family assistance, including re-engaging disconnected learners.

Having comprehensive and integrated supports like these in place can allow schools to extend learning; enable safety and belonging; and address students' unique health, mental health, and social service needs. A school can consider the following:

- **Structures that incorporate universal and tiered supports, which include:**
 - assessments that help educators understand student wellness and progress and the supports students need;
 - availability of high-quality tutoring and mentoring, counseling, and student support teams;
 - additional before, during, and after-school time for expanding learning, along with summer programs or Acceleration Academies during intersessions; and
 - health, mental health, and community partnerships with social service providers, including community school models.

- **Practices that enable these structures to be effective, which include:**
 - strategies and practices that ensure collaboration, coordination, and shared developmental approaches across providers of services; and
 - approaches that are culturally competent, carefully integrated, and age appropriate, considering students holistically and with an assets-based lens.

Conclusion

Our framework for these principles is built on a theoretical foundation of how children learn and develop that is inherently optimistic and recognizes the power of educators, families, youth developers, and other practitioners from diverse disciplines to create conditions that:

- support the talents and agency of each child;
- respect the culture and assets of the community; and
- create personalized opportunities for growth.

Building better conditions for learning and development will yield the robust equity we all seek in our education systems. Today, education systems must be willing to embrace what we know about how children learn and develop. The core message from diverse sciences is clear: The range of students' academic skills and knowledge—and, ultimately, students' potential as human beings—can be significantly influenced through exposure to highly favorable conditions. These conditions include learning environments and experiences that are intentionally designed to optimize whole child development.

The playbook, *Design Principles for Schools: Putting the Science of Learning and Development into Action*, suggests how practitioners can create these kinds of learning settings and points to engineering principles that build on the knowledge we have today to nurture innovations, new models, and enabling policies that advance change. The full playbook [can be found online here](#).