

HKS

**Designing Enriched Environments to Support
Social and Emotional Learning**





Renae Mantooth _Senior Design Researcher @ **HKS** Raleigh



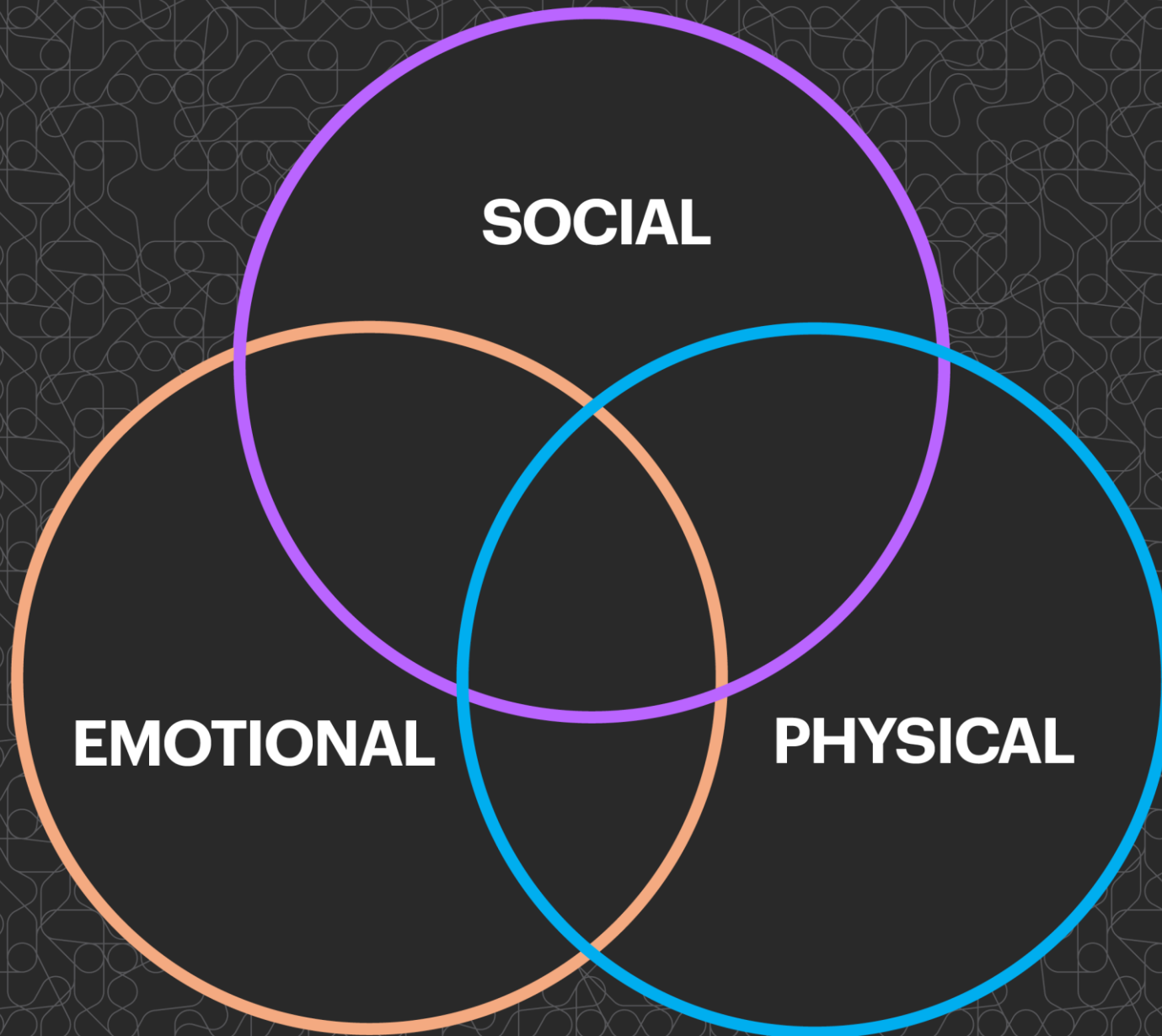
Diletta Vignali _Senior Education Architect @ **HKS** London



Designing Enriched Environments to Support Social and Emotional Learning

1. The Challenge
2. The Framework
3. The Evidence
4. The Guide
5. Application

Safety Triad



Enriched Environments to Support Social and Emotional Learning:

A Visual Design Guide



CADRE

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INTERIOR
DESIGNERS
FOUNDATION

HKS

A Visual Design Guide by

CADRE

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Sponsored by



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- **Upali Nanda, PhD**, HKS, Co-Principal Investigator
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- **Daniela Aguirre Alfaro** | HKS, Design Research
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- **Avril El-Amin, PhD** | Uplift, Social + Emotional Learning
- **Kyle Sellers** | HKS, Research Communication



1

The Challenge

1 in 4

children and adolescents have received mental health services during the past year ^[14]

persistent sadness and hopelessness, along with suicidal thoughts and behaviors increased by about

40%

among children and adolescents in the USA in the ten years leading up to the pandemic ^[2]

90%

of teachers surveyed indicate that **burnout** is a serious or very serious issue ^[47]

A shortage of mental health providers has led education institutions to invest in and provide wrap-around services that enhance the well-being of children, adolescents, and educators.

Crowded, noisy, dim, and stuffy schools have **consistent negative impacts** on children and adolescents ^[62]

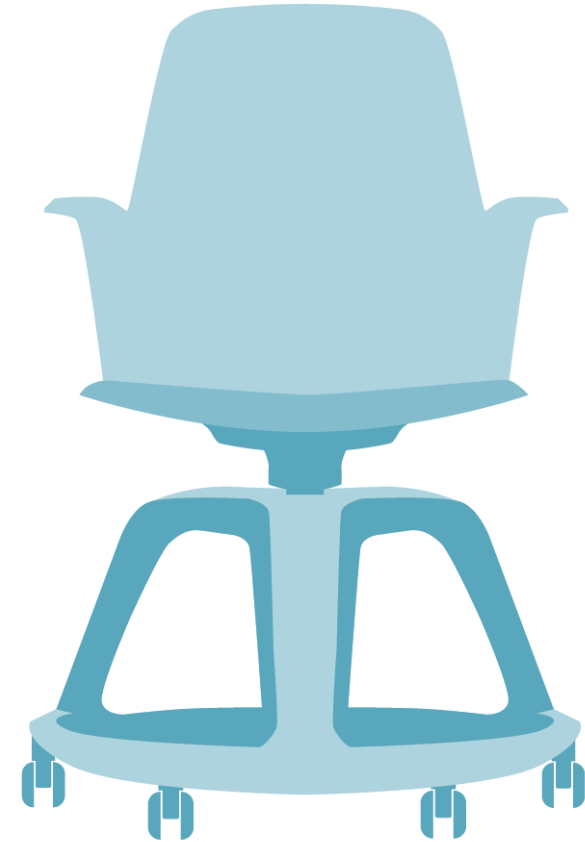
[14] Bitsko et al., 2022; [2] Abrams, 2023; [47] Jotkoff, 2022; [62] Maxwell, 2018

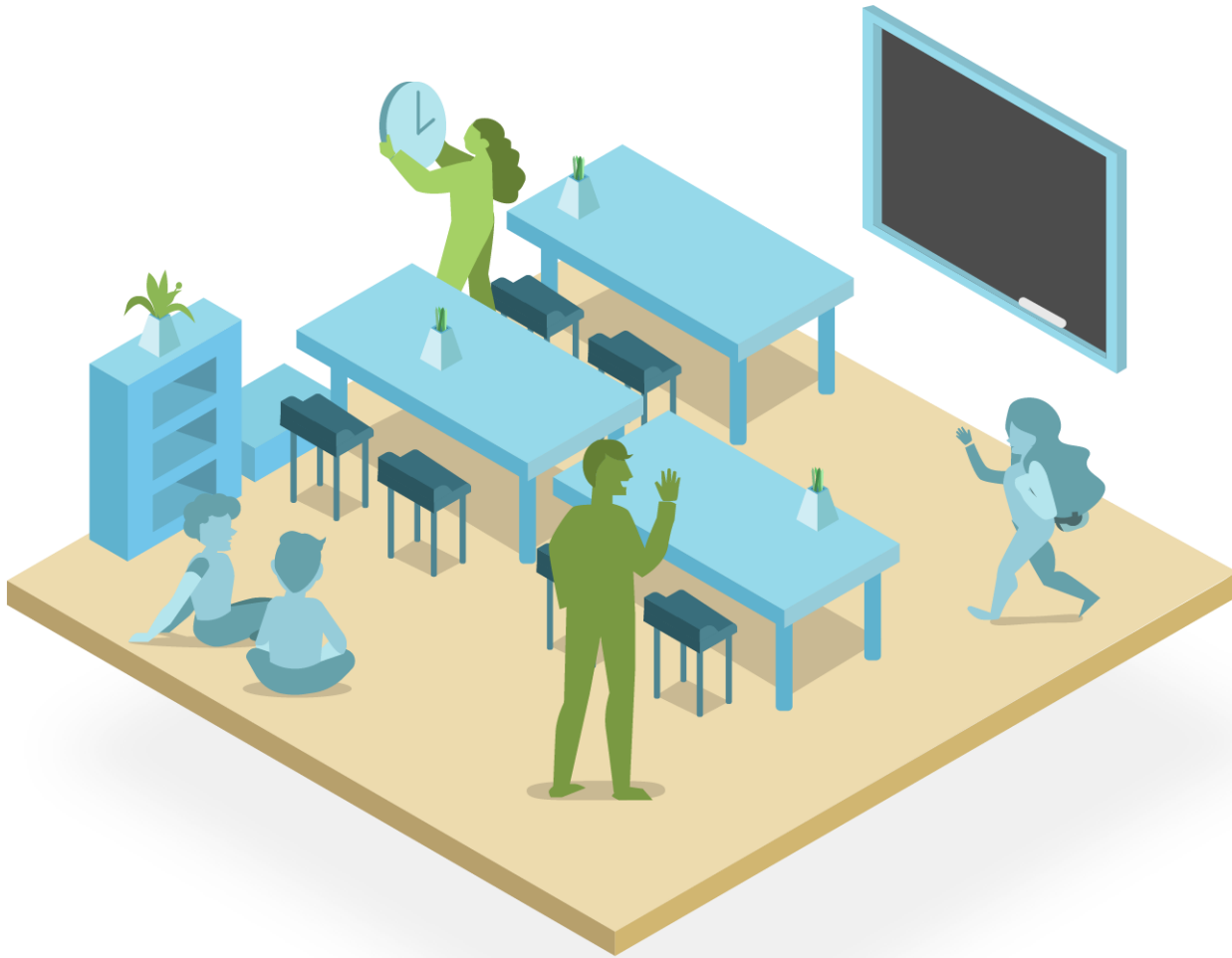


What is Social and Emotional Learning?

Social and emotional learning (SEL) is an approach to education that helps children gain skills outside of typical school subjects like math, reading, and comprehension.

Physical aspects of the school environment can be used as a tool to support instruction and positively impact outcomes associated with the *whole student*.





Formal SEL strategies involve a curriculum, lesson plans, and assessments in a structured format to enhance students' knowledge of SEL.

Informal SEL strategies are purposeful instructional activities that teachers use to shape a caring and supportive classroom environment.

Provide a **warm welcome** to create
a supportive atmosphere...

... that impacts students' ability to **solve
problems** because they are seen and heard.

I see you. I hear you. I am
glad you're here.



How can I respectfully
communicate about what
I need and want?



Conduct an **emotion check-in...**

... to bring students awareness to help them **manage emotions.**



Provide opportunities for **structured movement** throughout the school day...

... that give students opportunities to **maintain healthy relationships** with their teachers and peers.



Conduct **SEL lessons** and provide opportunities for practice of the concepts alone and with others...

... that demonstrates to students how to **have empathy** through lessons and group work.



Give an **optimistic closing**...

... that provides opportunities for reflection to **make responsible decisions**.

I am grateful for today's accomplishments. I look forward to what tomorrow brings!

How can I make decisions that ensure I have a better future?





2

The Framework

Enriched Environments for Social and Emotional Learning

This research provides an approach to the designing of learning spaces (**enriched environments**) to positively improve outcomes (**social and emotional learning**).

Design  Outcome

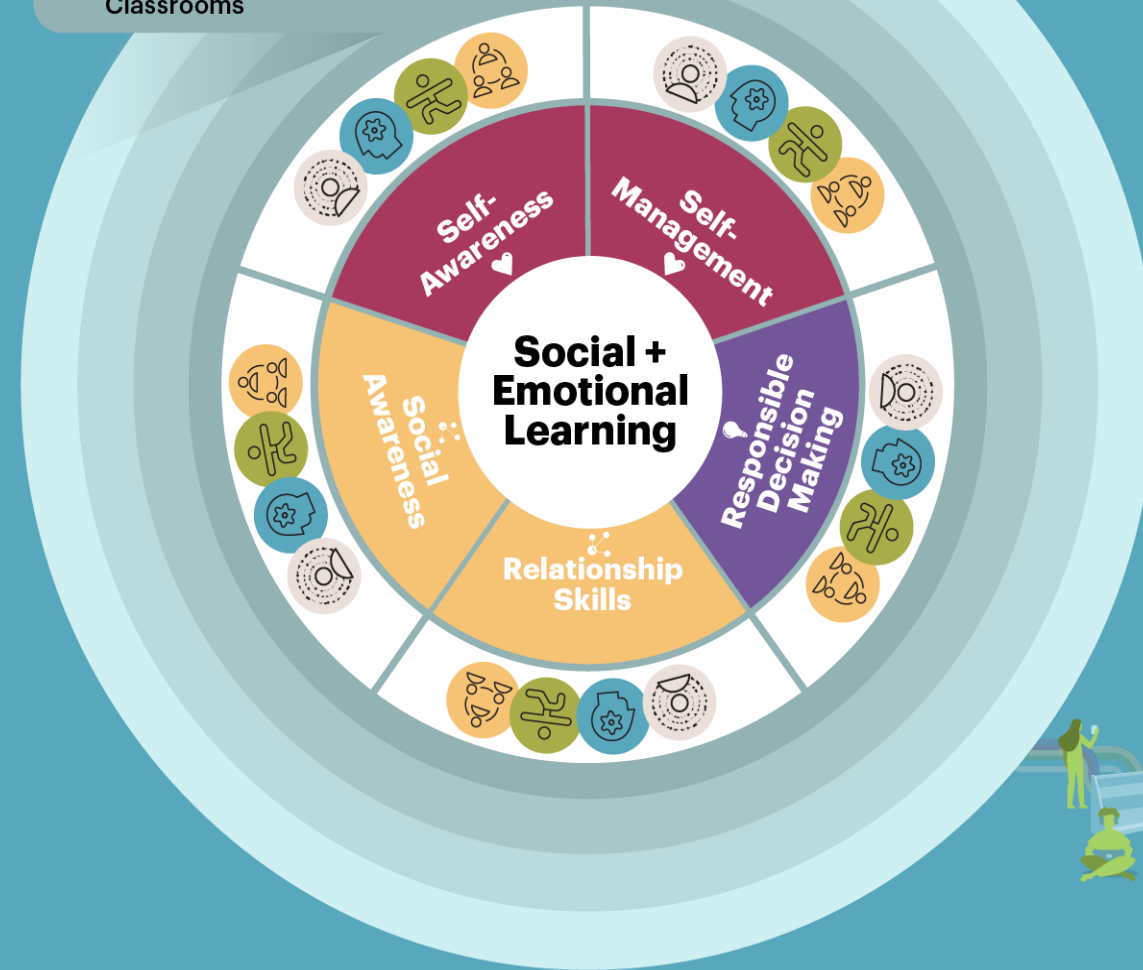


Communities

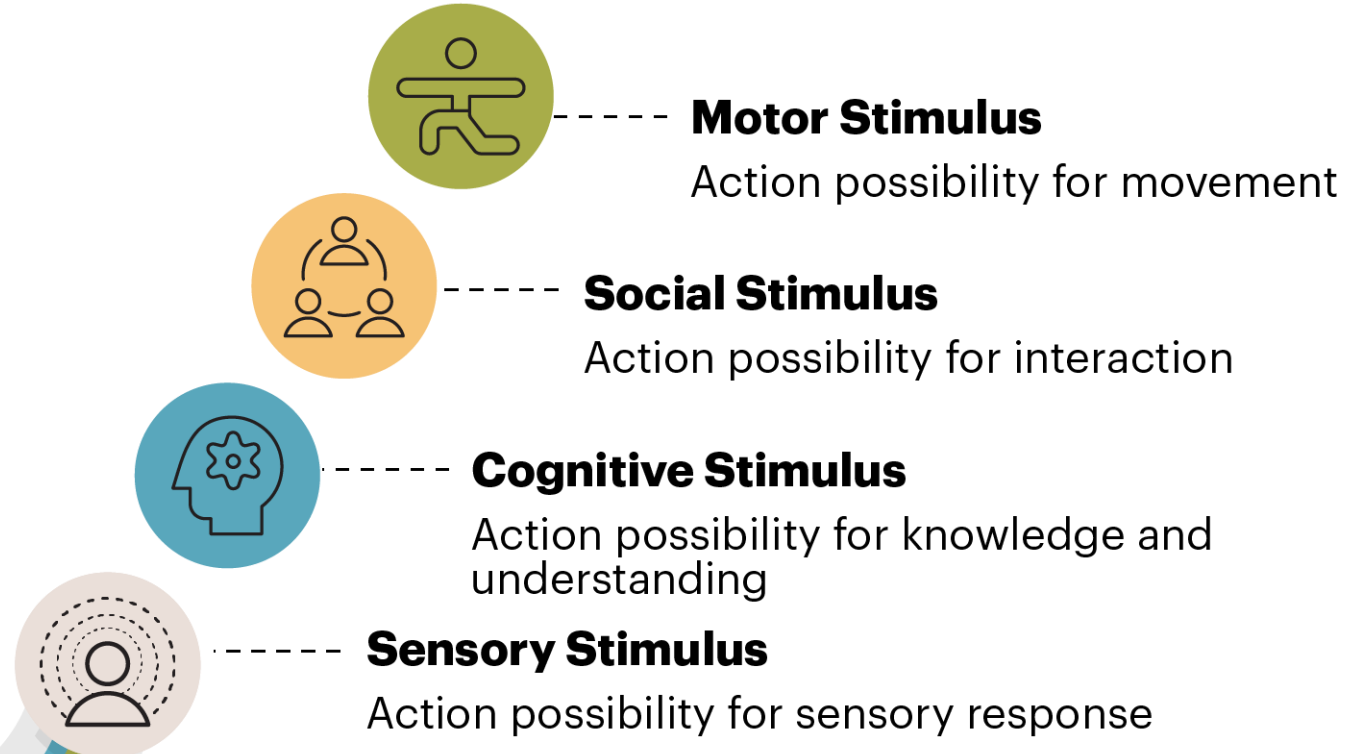
Families + Caregivers

Schools

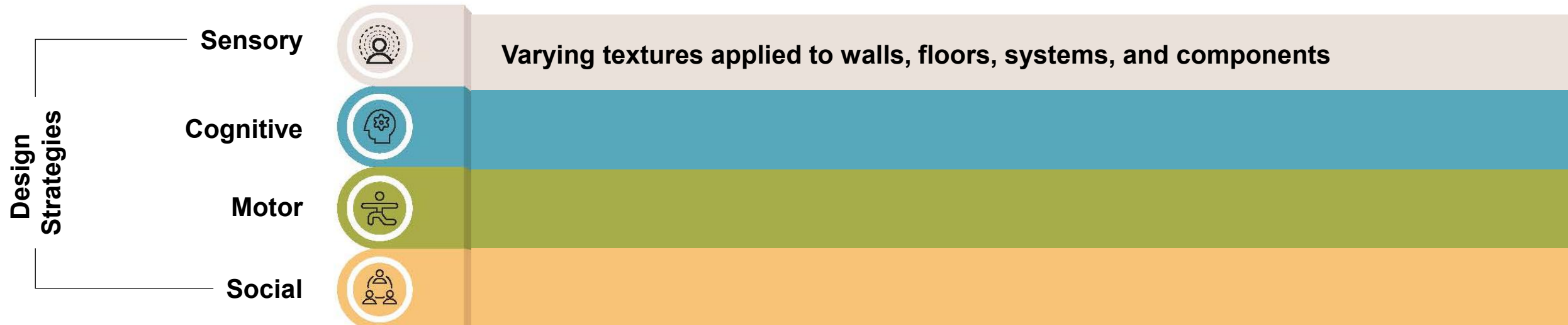
Classrooms



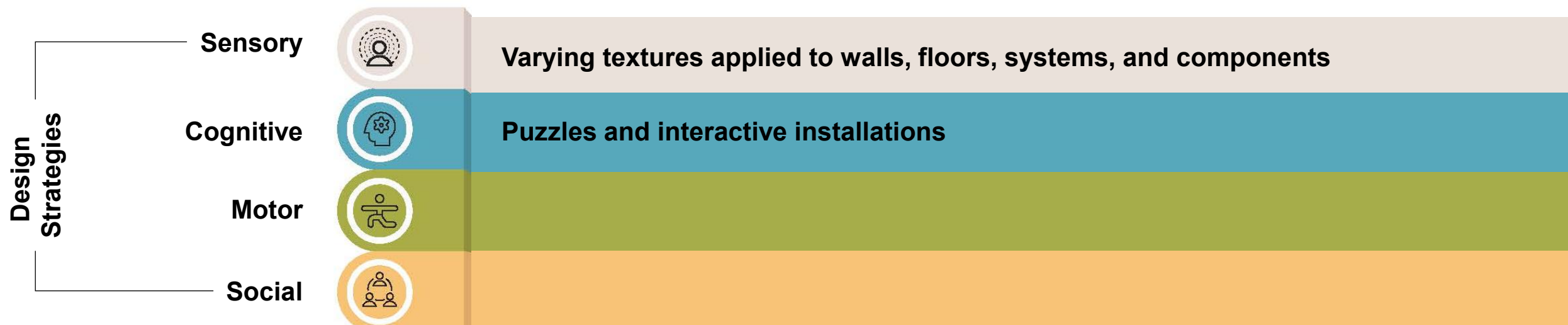
Enriched Environments: Design Strategies



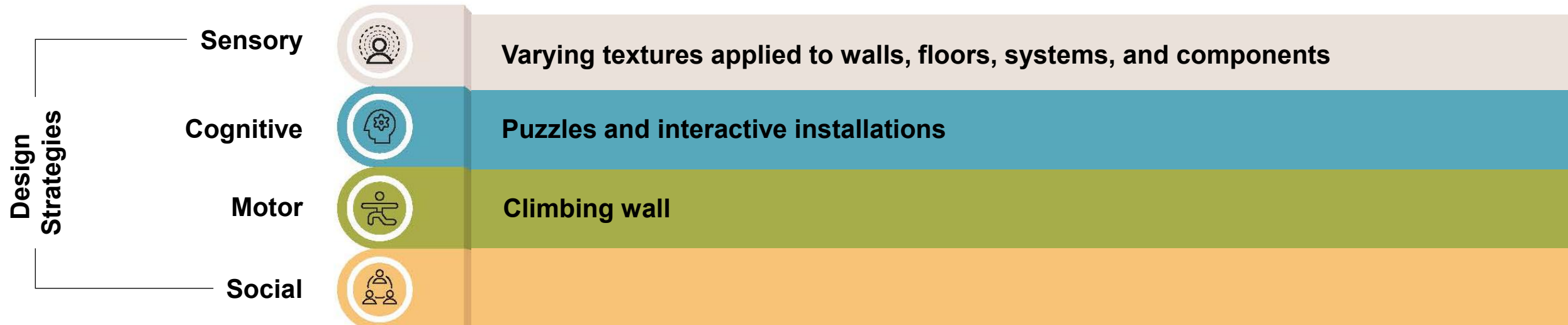
Enriched Environments for Social and Emotional Learning



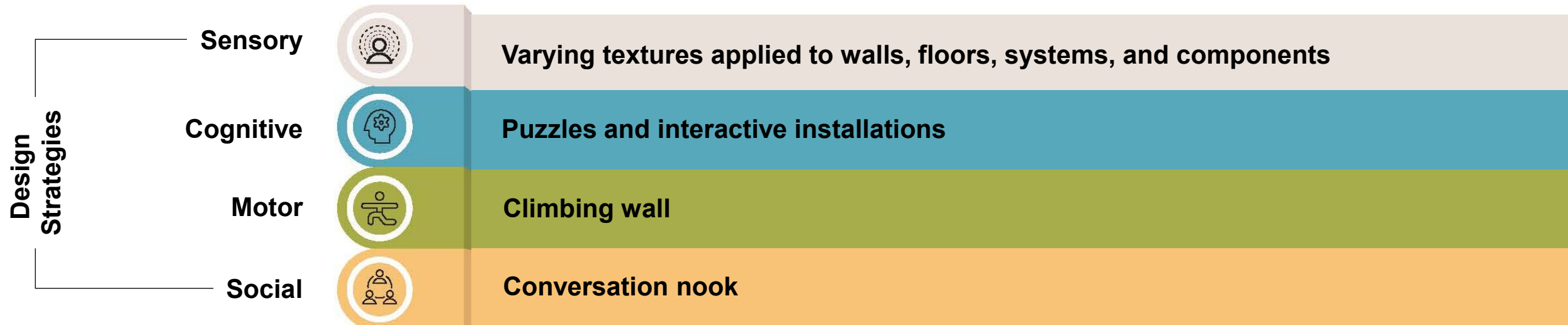
Enriched Environments for Social and Emotional Learning



Enriched Environments for Social and Emotional Learning



Enriched Environments for Social and Emotional Learning



Social and Emotional Learning: Student Outcomes

Communities

Aligned Learning Opportunities

Families + Caregivers

Authentic Partnerships

Schools

Schoolwide Culture, Practices + Policies

Classrooms

SEL Instruction+ Classroom Climate

Social + Emotional Learning



Self-Awareness

Self-Management



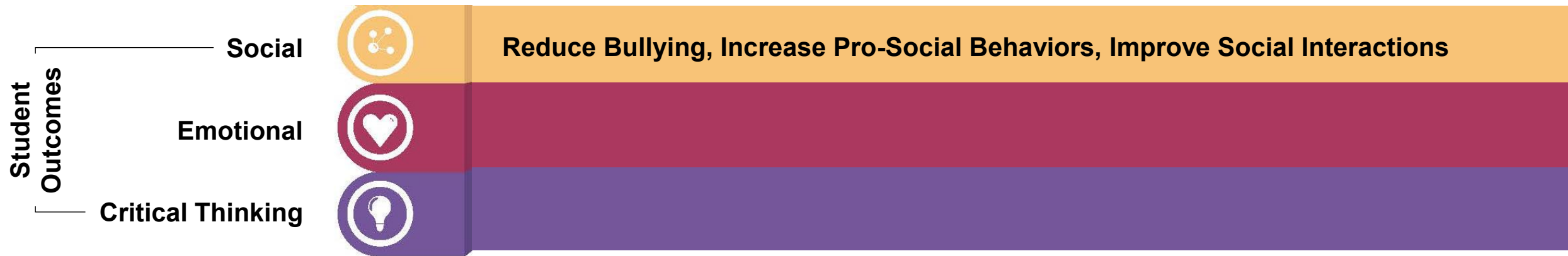
Responsible
Decision-Making



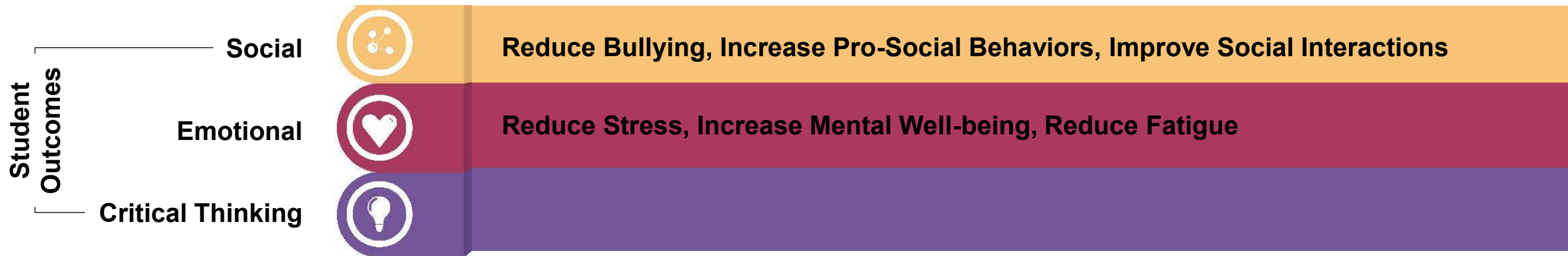
Social Awareness

Relationship Skills

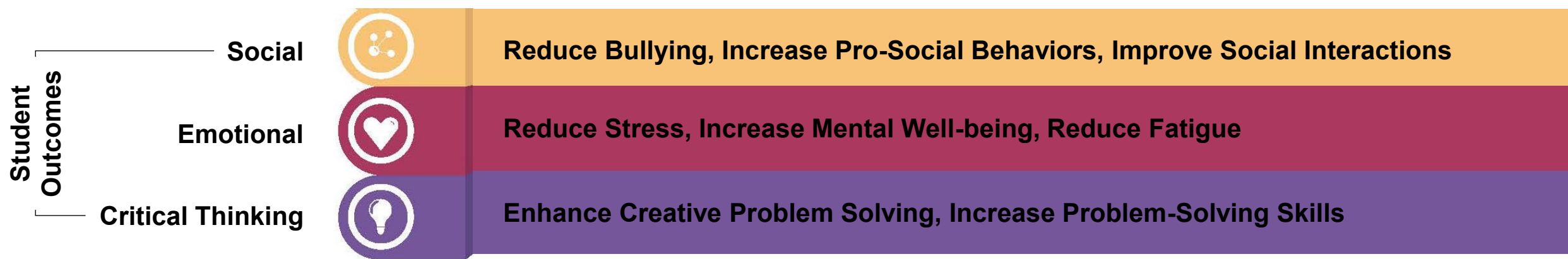
Enriched Environments for Social and Emotional Learning



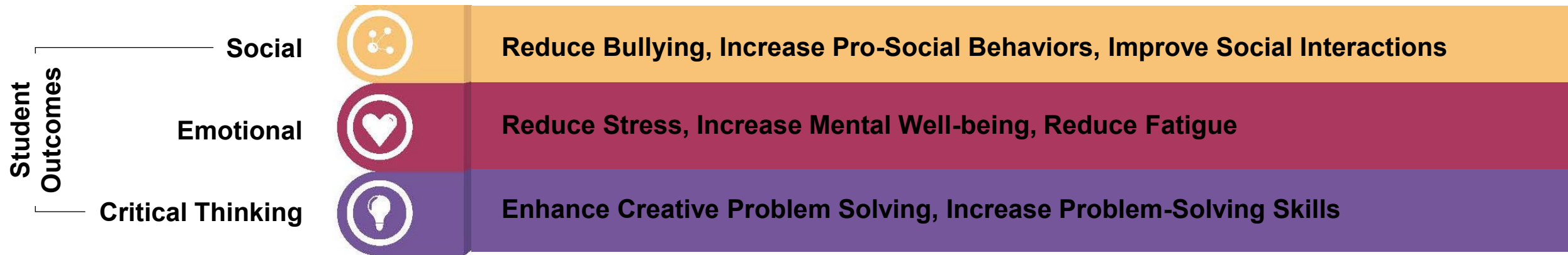
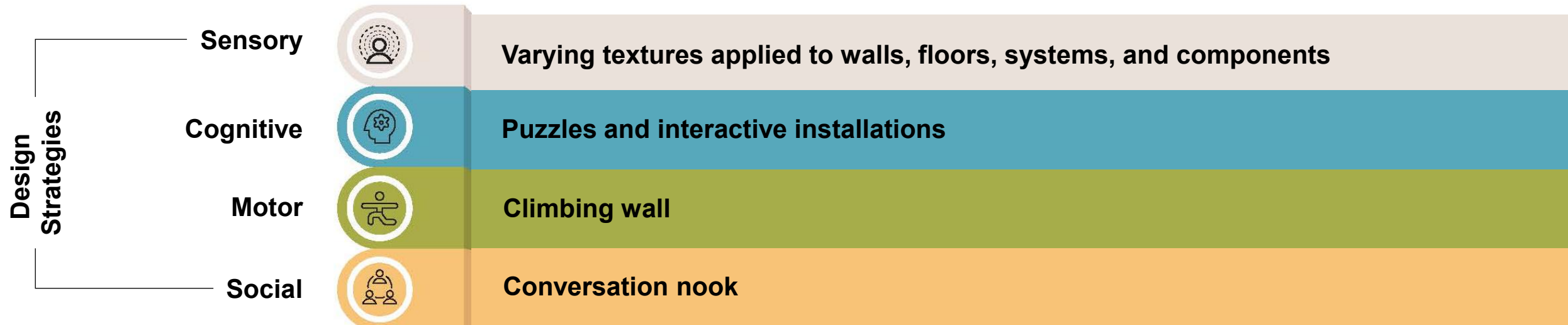
Enriched Environments for Social and Emotional Learning



Enriched Environments for Social and Emotional Learning



Enriched Environments for Social and Emotional Learning



Enriched Environments for Social and Emotional Learning

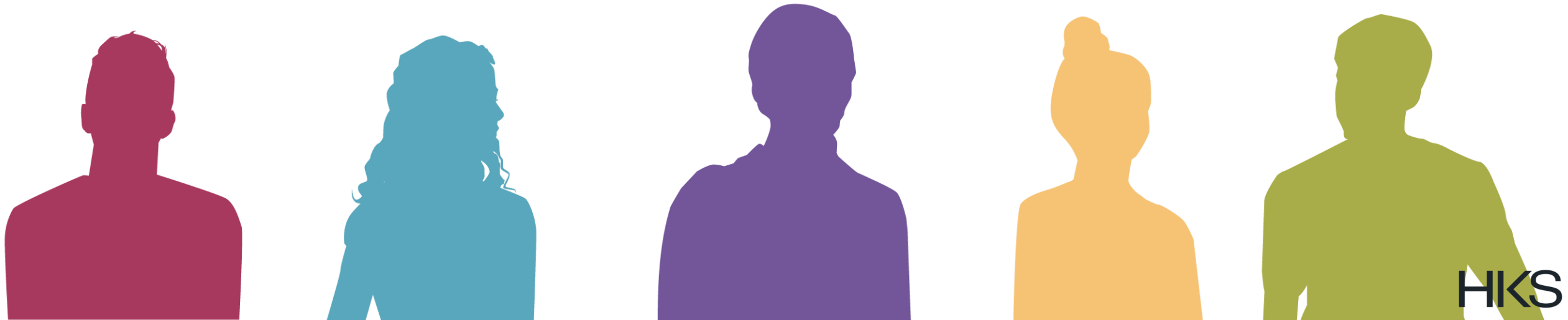




3

The Evidence

How do attributes of the interior learning environment contribute to or inhibit social and emotional learning?



Teacher Interviews



Comprehensive Literature Review

3. Primary
3. Middle
3. High
9

School
Teachers

100+

Empirical Articles
Reviewed

Evidence Based Design Strategies

Outcomes

	Access to Green Spaces	Accessible Wide Corridors	Air Quality	Availability of Tech, Tools & Supplies	Cultural Spaces	Daylighting	Ergonomic Work Sattions	Legibility & Wayfinding	Natural Materials and Finsihes	Quality Acoustics	Quality Artificial Lighting	Sensory Control	Sensory Well-Being Hub	Social and Functional Adjacencies	Variety of Flexible Furnishings	Views to Nature	Visual Complexity	Welcoming Entry
Stimulus																		
Social																		
Emotional																		
Learning																		
Page	55.	55.	57.	57.	59.	59.	61.	61.	63.	63.	65.	65.	67.	67.	69.	69.	71.	71.
Citation	5. 23. 26. 53. 58. 61. 65. 83. 89.	33. 35. 75. 85.	5. 12. 13. 30. 84. 97. 100.	40. 52. 55. 90. 96.	24. 99.	1. 3. 4. 5. 9. 13. 17. 43. 54.	22. 26. 29. 48. 73. 88.	15. 34. 42. 46. 107. 108.	5. 13. 16. 38. 56. 83. 89. 93. 103. 104.	37. 41. 50. 76. 77. 80. 87. 105.	4. 11. 12. 20. 45. 51. 72. 94. 98. 102.	5. 28. 69. 91. 100. 106.	36. 74. 78. 67. 71. 95.	6. 35. 62. 49. 60. 61. 66. 92.	8. 19. 32. 57. 60. 61. 66. 92.	5. 13. 56. 57. 61. 66. 79.	5. 12. 31. 44. 66. 68. 82.	64. 81. 90.

	Citation	Considerations	What Do We Know?	
1.	Abdou, O. A. (1997). Effects of Luminous Environment on Worker Productivity in Building Spaces. Journal of Architectural Engineering, 3(3), 124-132.	Light Exposure, Physical Activity, SedIndoor Lighting Conditions, Productivity, Energy Consumptionary Behavior	Indoor lighting factors of spectral distribution, color rendition, glare, and daylighting versus artificial lighting influences worker productivity.	
2.	Abrams, Z. (2023). Kids' Mental Health is in Crisis. Here's What Psychologists are Doing to Help. American Psychological Association 2023 Trends Report. Retrieved January 5, 2023, from https://www.apa.org/monitor/2023/01/trends-improving-youth-mental-health	Mental Health Crisis, Sources of Stress, Building Capacity, Expanding Mental Health Workforce	Trends report on research that is focused on child and teen mental health, exploring why they are struggling and what can be done to help them. Identifying sources of stress, building capacity, and expanding mental health workforce are examples of ways to address the wicked problem.	
3.	Aggio, D., Smith, L., Fisher, A., & Hamer, M. (2015). Association of Light Exposure on Physical Activity and Sedentary Time in Young People. International Journal of Environmental Research and Public Health, 12(3), Article 3. https://doi.org/10.3390/ijerph120302941	Light Exposure, Physical Activity, Sedentary Behavior	Increasing daylight exposure may be a useful intervention strategy for promoting physical activity and reducing sedentary time.	
6.	Allen, T. J. & Henn, G.W. (2007). The Organization and Architecture of Innovation: Managing the Flow of Technology. New York, NY: Taylor & Francis. https://doi.org/10.4324/9780080545370	Allen Curve, Architecture, Innovation, Communication Networks, Knowledge Transfer	The case study presentation explores the innovation from two directions: organizational structure and physical space.	
15.	Brittin, J., Sorensen, D., Trowbridge, M., Lee, K. K., Breithecker, D., Frerichs, L., & Huang, T. (2015). Physical Activity Design Guidelines for School Architecture. PLOS ONE, 10(7), e0132597. https://doi.org/10.1371/journal.pone.0132597	Design Guidelines, School Buildings, Physical Activity	A review of the literature compiling evidence-based design strategies that promote physical activity within school settings. Design guidelines are categorized as: School Siting and Community Connectivity, Building Massing and Programming, Smart Fitness Facilities, Active Classrooms, Outdoor Learning Areas, Active Play and Leisure Areas, Active Navigation Areas, Signage and Wayfinding, Furniture Specifications, and Mobile Technologies and Virtual Designed Environments.	
36.	Gaines, K. S., Curry, Z., Shroyer, J., Amor, C., & Lock, R. H. (2014). The Perceived Effects of Visual Design and Features on Students with Autism Spectrum Disorder. Journal of Architectural and Planning Research, 31(4), 282-298.	Sensory Processing, Visual Triggers, Learning Spaces, Autism Spectrum Disorder	Sensory triggers have a negative impact on the behavior of students with autism spectrum disorder. Primary triggers were visual, including visual changes in the environment/distraction, undefined space, and sources of light. Keeping the classroom neat and orderly and reducing moving stimuli reduced behavioral problems.	
62.	Maxwell, L. (2018). The Role of the Physical Environment in Education. In Environmental Psychology and Human Well-being: Effects of Built and Natural Settings (pp. 135-166). Elsevier Academic Press.	Learning Environments, Environmental Psychology, Well-being, Built Environment	Book chapter reviewing the literature on the connection between the physical environment and well-being of learners.	
75.	Pasalar C. (2003). The Effects of Spatial Layouts on Students' Interactions in Middle Schools : Multiple Case Analysis (Doctoral dissertation). https://repository.lib.ncsu.edu/handle/1840.16/5083	School Layout, Social Relationships, Interactions, Movement	School building layouts, with higher accessibility, shorter and direct walking distances, and highly visible public spaces, generated higher rates of incidental interactions among students. Better visual and physical access among the public areas affords more interactions between grades.	

Type of Literature



Book Chapter



Dissertation



Lit Review in
Peer-Reviewed
Journal Article



Peer-Reviewed
Journal Article



Scholarly Book



Scholarly Conference
Paper



Technical Report



White Paper



4

The Guide



Accessible Wide Corridors

Space Type: Interior

Multipurpose circulation spaces to support students' social development and teachers' social interaction.

Interior

Accessible Wide Corridors

Student Impact

- Increase number of **social relationships** ⁽¹⁾
- Reduce **bullying and harassment** ⁽²⁾
- Increase **student interactions** ⁽³⁾
- Increase **self-directed learning activities** ⁽⁴⁾

Teacher Impact

- Improves **social interaction** ⁽⁵⁾

From the Teacher's Desk

Circulation spaces without added width discourage lingering, socialization, and chance encounters.

Air Quality

Reduce indoor air pollution (contaminants, VOCs), to provide clean air.

Space Type: School

Interior

Cultural Spaces

Integrating the history, geography, and ecology of an area to celebrate the cultural experiences of the community.

Space Type: School

Interior

Availability of Technology, Tools and Supplies

Ease of access to technology, supplies, and other work tools needed to accomplish and augment teaching and learning tasks.

Space Type: Classroom

Product

Access to Green Spaces

Providing easy physical access to an exterior or landscape that is filled with natural elements, greenscapes, and playscapes.

Space Type: Landscape

Landscape

Air Quality

Student Impact

- Increase **academic process** ⁽¹⁾
- Decrease **absence** ⁽²⁾
- Increase **student health and academic performance** ⁽³⁾

Teacher Impact

- Decreases **health complications** ⁽⁴⁾
- Improves **productivity, comfort, and health** ⁽⁵⁾
- Improves **work performance** ⁽⁶⁾
- Improves **productivity and concentration** ⁽⁷⁾
- Decreases **stress and fatigue** ⁽⁸⁾

Cultural Spaces

Student Impact

- Reduce **exclusion and homelessness** ⁽¹⁾
- Enhance **feelings of belonging** ⁽²⁾
- Increase **opportunity to learn** ⁽³⁾
- Enhance **connection to the community** ⁽⁴⁾

From the Teacher's Desk

Commission students to learn and present.

Name of the EBD Strategy

Description of the EBD Strategy



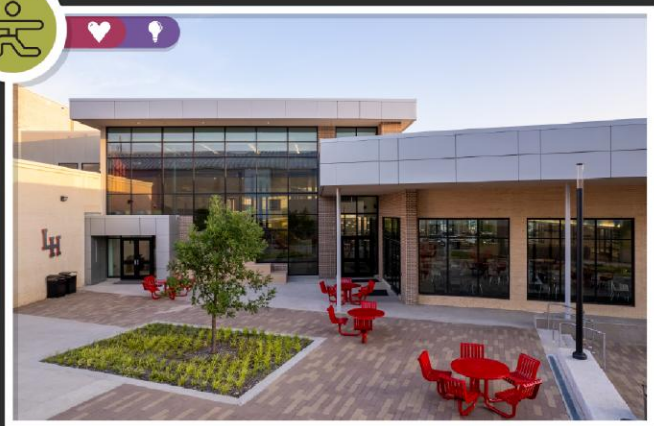


Image courtesy of HKS Inc.

● **Access to Green Spaces** Space Type: **Landscape**

Providing easy physical access to an exterior or landscape that is filled with natural elements, greenscapes, and playscapes.

Landscape





Access to Green Spaces

Student Impact

- Improve **standardized test scores, graduation rates, and planning to attend a four-year college** ^[x]
- Reduce occurrences of **criminal behavior**
- Increase **physical activity**
- ♥ Improve **mental well-being**

Teacher Impact

- ♥ Improve **mental well-being** ^[x]
- 💡 Improve **problem solving and innovation** ^[x]
- 💡 Increase **creative thinking** ^[x]
- Improve **cognitive**

- ^[x] **performance**
- ♥ Improve **health, well-being, stress reduction, and motivation** ^[x]
- ♥ Improve **happiness** ^[x]

[x] Matsuoka, (2010), [x] McCormick, (2017), [x] Dymont, & Bell, (2007), [x] Klotz, et al. (2022), [x] Colley, et al. (2016) [x] Loder, (2014), [x] Sadick, & Karmardeen, (2020), [x] Stenfors, et al. (2019), [x] Al Horr, et al. (2016)

From the Teacher's Desk

+

Access to large, open outdoor spaces can enhance geometry instruction and promote active movement during math class.

As a place to escape, to take a breath of fresh air, access to the outdoors provides teachers with opportunities for respite and promotes physical activity to break up the day.

Description of the Spatial Typology

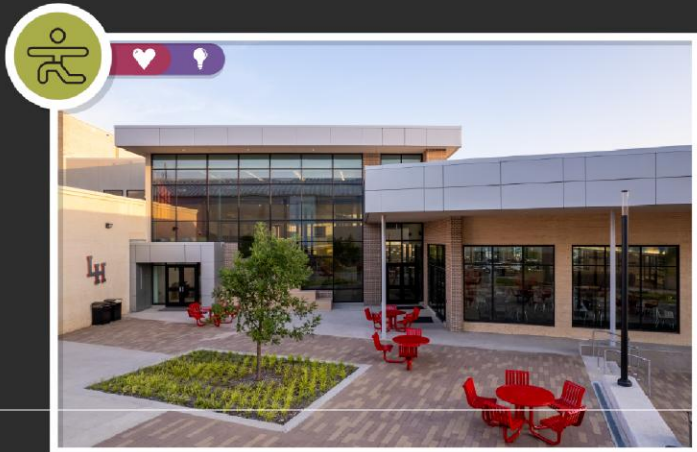


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Teacher Impact

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How to Use



Enriched Environments

Icons representing what the EBD strategy is stimulating: Social, Motor, Cognitive and Sensory.

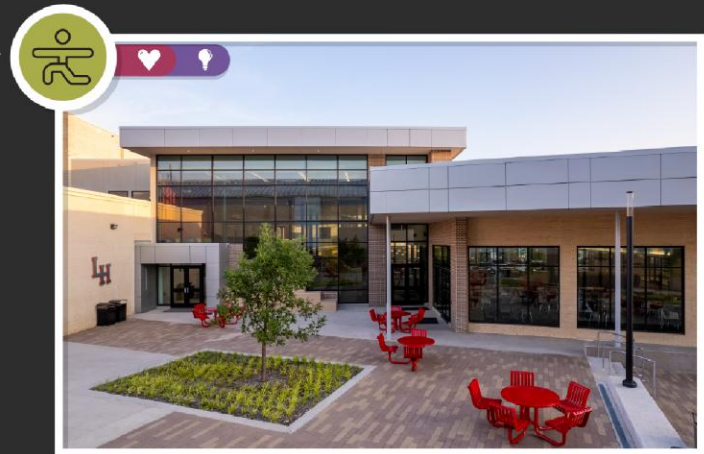


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How to Use



SEL Outcomes

Icons for outcomes that are associated with Social, Emotional, and Critical Thinking indicators



Image courtesy of HKS Inc.

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How to Use

Student and Teacher Impacts

A comprehensive bibliography of empirical research studies that have associated the EBD strategy with outcomes related to students and teachers

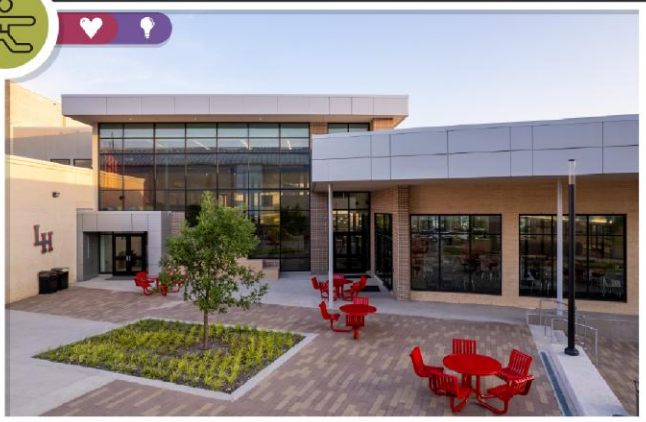
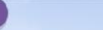


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From the Teacher's Desk

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How to Use

From the Teacher's Desk

Insights from in depth interviews with primary, middle, and high school teachers as additional considerations for the EBD strategy

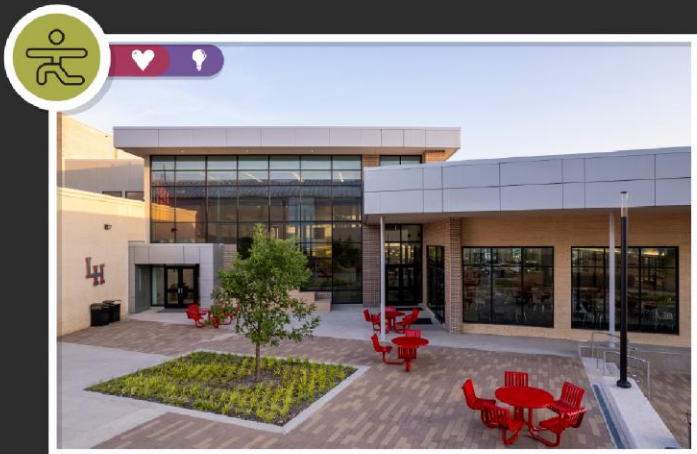


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From the Teacher's Desk

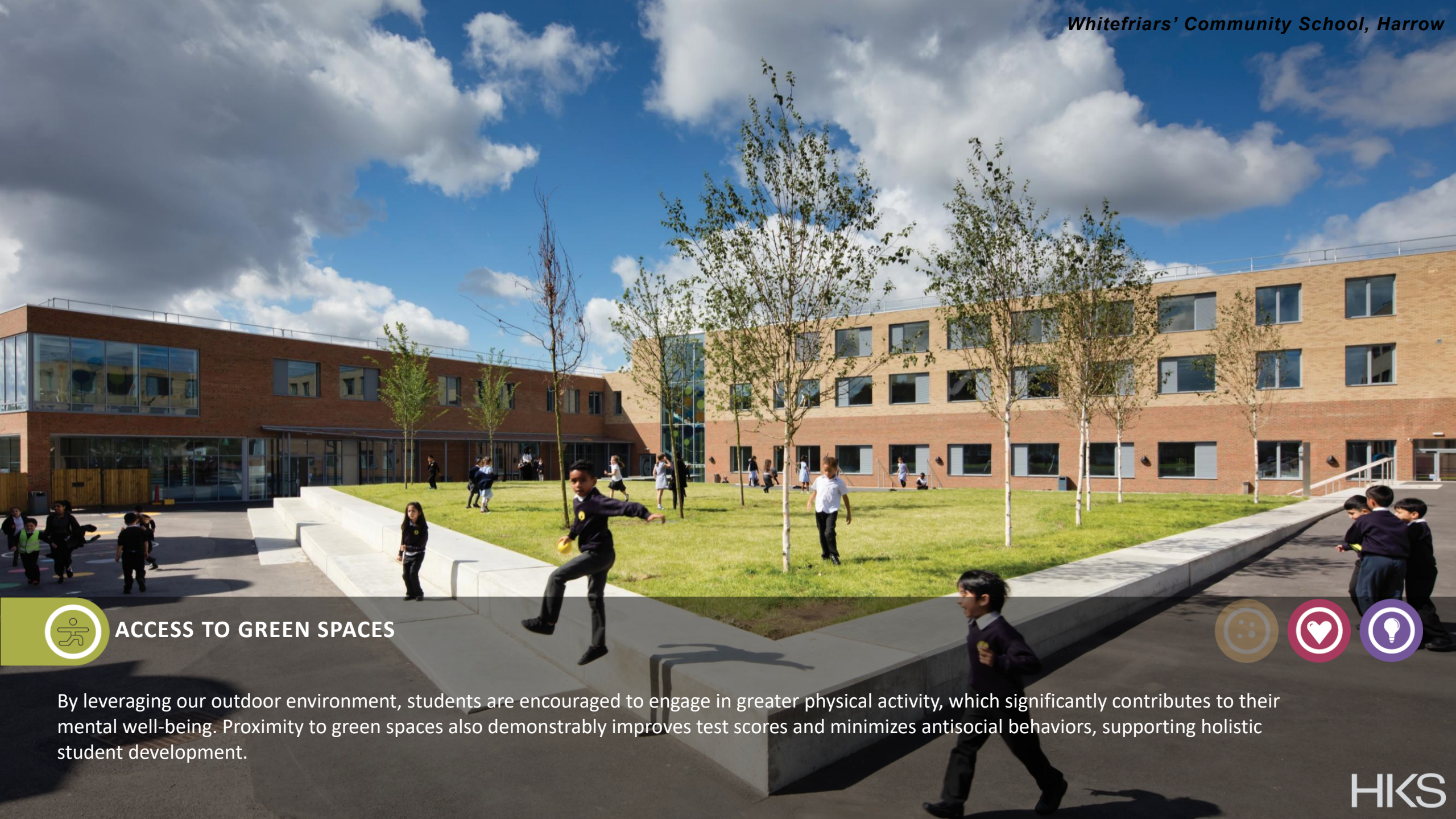
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5

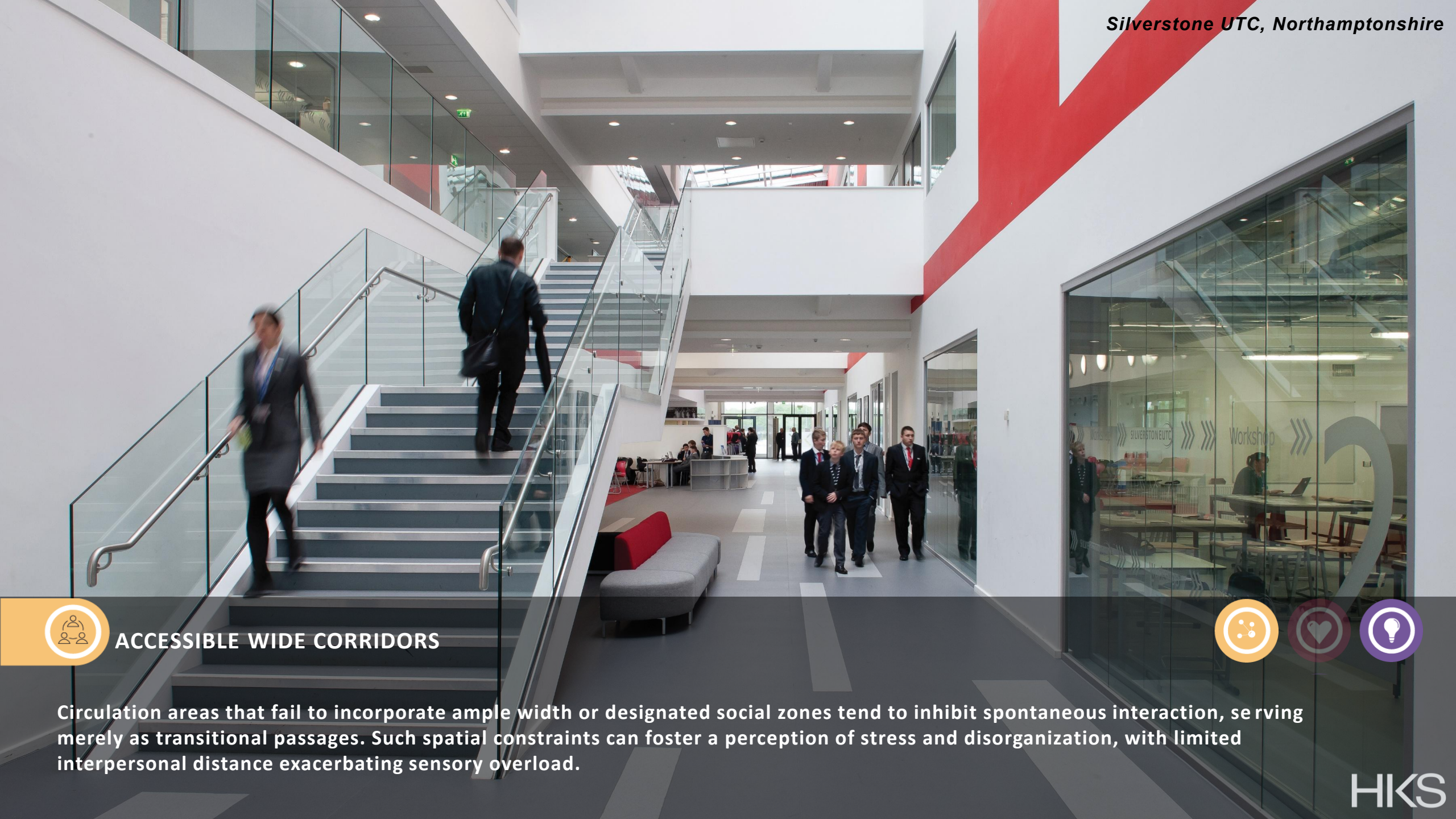
Application



ACCESS TO GREEN SPACES

By leveraging our outdoor environment, students are encouraged to engage in greater physical activity, which significantly contributes to their mental well-being. Proximity to green spaces also demonstrably improves test scores and minimizes antisocial behaviors, supporting holistic student development.

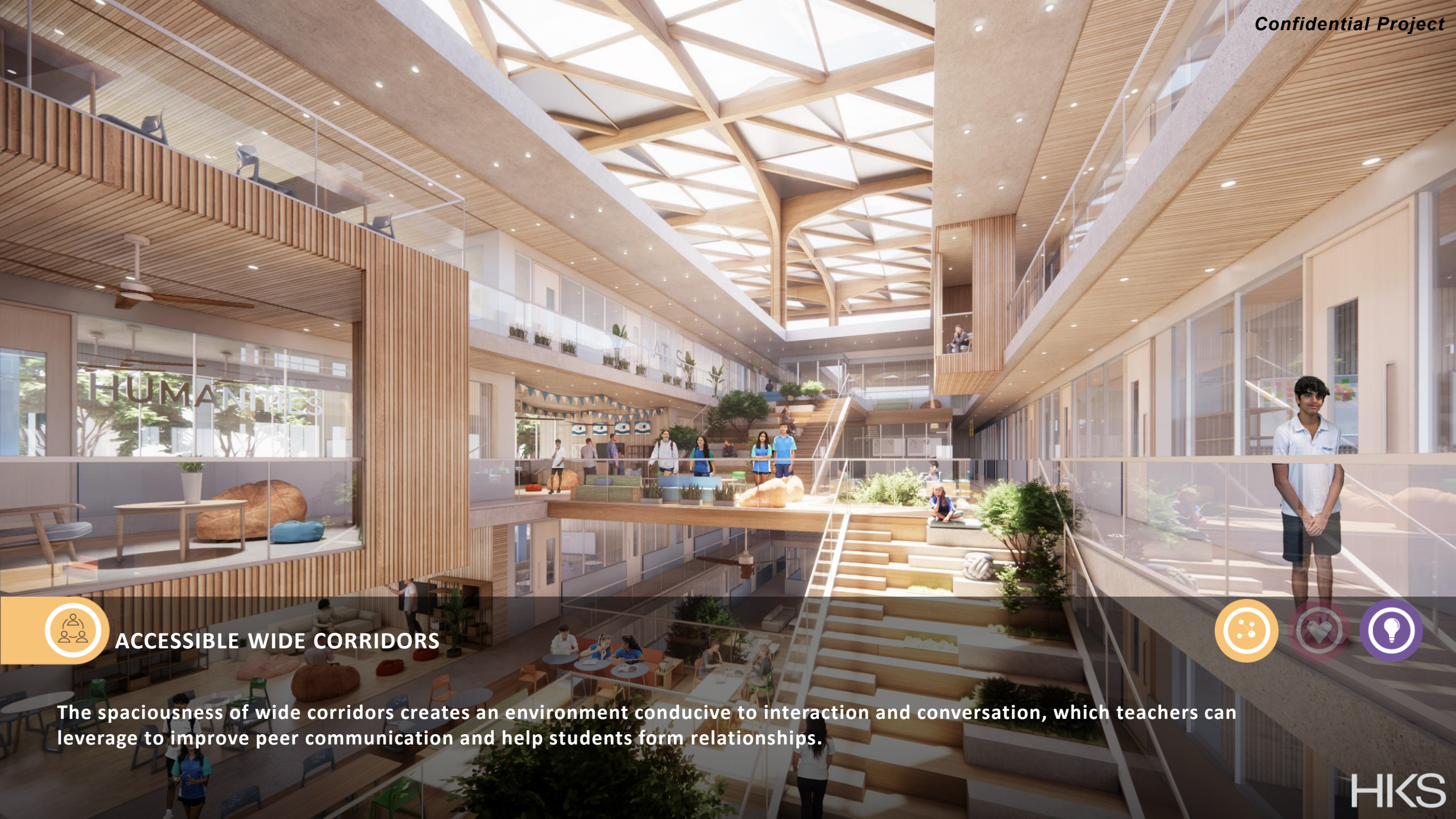




ACCESSIBLE WIDE CORRIDORS

Circulation areas that fail to incorporate ample width or designated social zones tend to inhibit spontaneous interaction, serving merely as transitional passages. Such spatial constraints can foster a perception of stress and disorganization, with limited interpersonal distance exacerbating sensory overload.

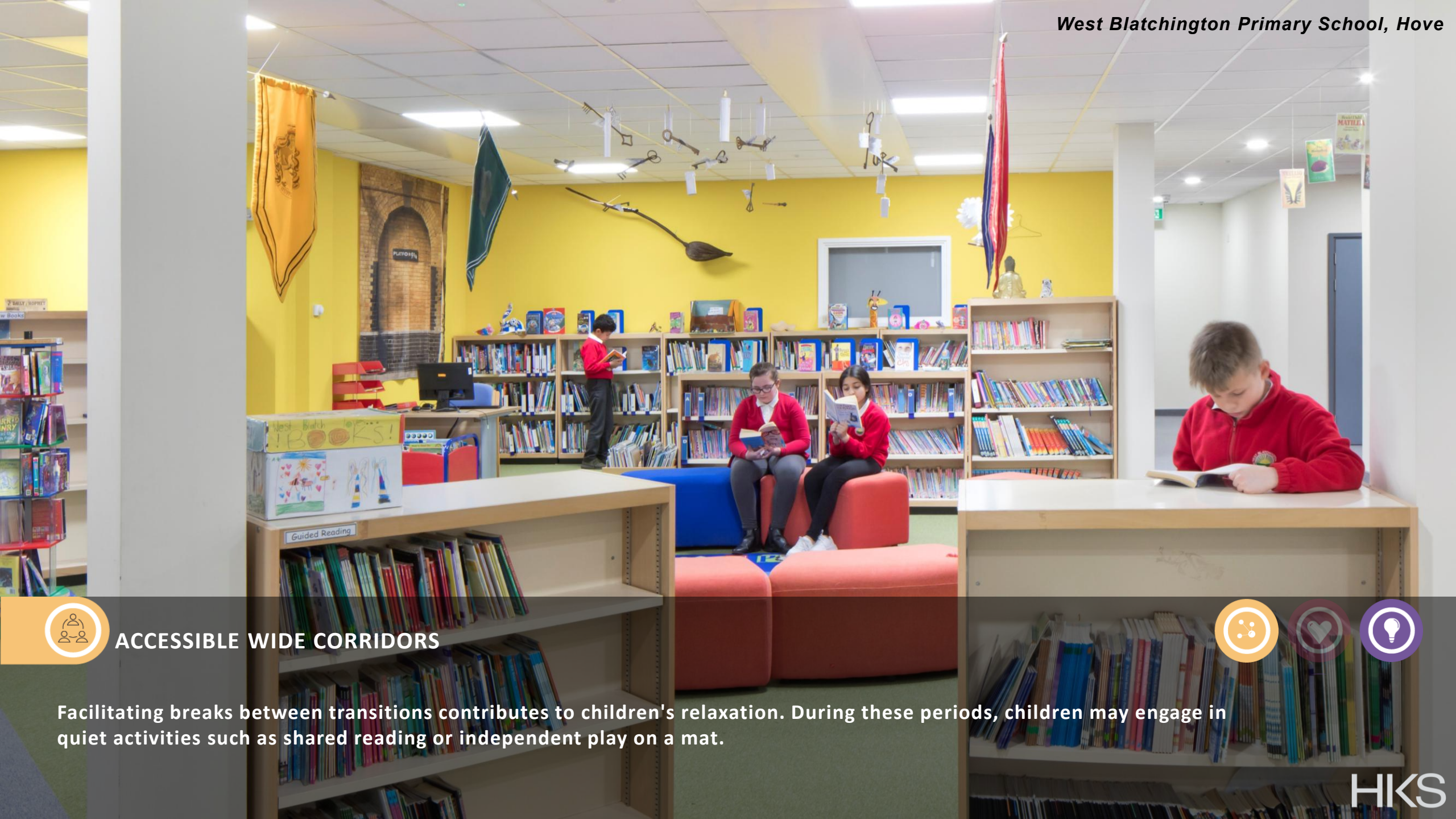




ACCESSIBLE WIDE CORRIDORS

The spaciousness of wide corridors creates an environment conducive to interaction and conversation, which teachers can leverage to improve peer communication and help students form relationships.





ACCESSIBLE WIDE CORRIDORS

Facilitating breaks between transitions contributes to children's relaxation. During these periods, children may engage in quiet activities such as shared reading or independent play on a mat.





AIR QUALITY

Carefully designed air quality systems in these environments are integral to improving student health and elevating academic performance. Furthermore, these systems contribute to increased productivity, enhanced comfort, and a decrease in stress and fatigue.





AVAILABILITY OF TECHNOLOGY, TOOLS AND SUPPLIES



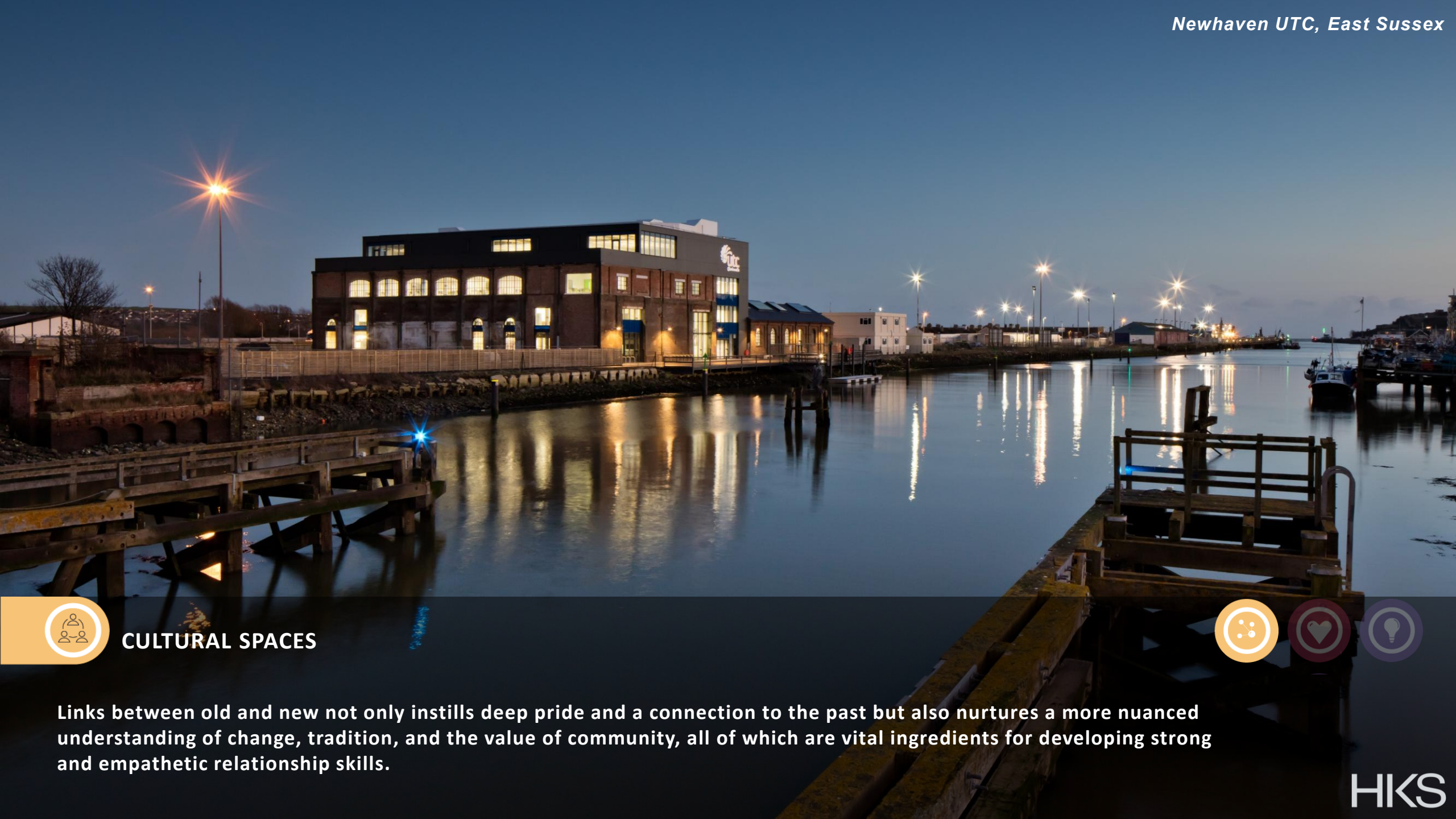
Students understand that digital literacy and technological skills are crucial for future careers. Having access to and experience with these tools makes them feel equipped and competitive, fostering a sense of readiness and pride in their school's vision.



CULTURAL SPACES

Connecting to existing buildings highlights the value of context and on-site precedents. This approach provides a deeper understanding of the history of the place, fostering a sense of connection and respect for the past.





CULTURAL SPACES

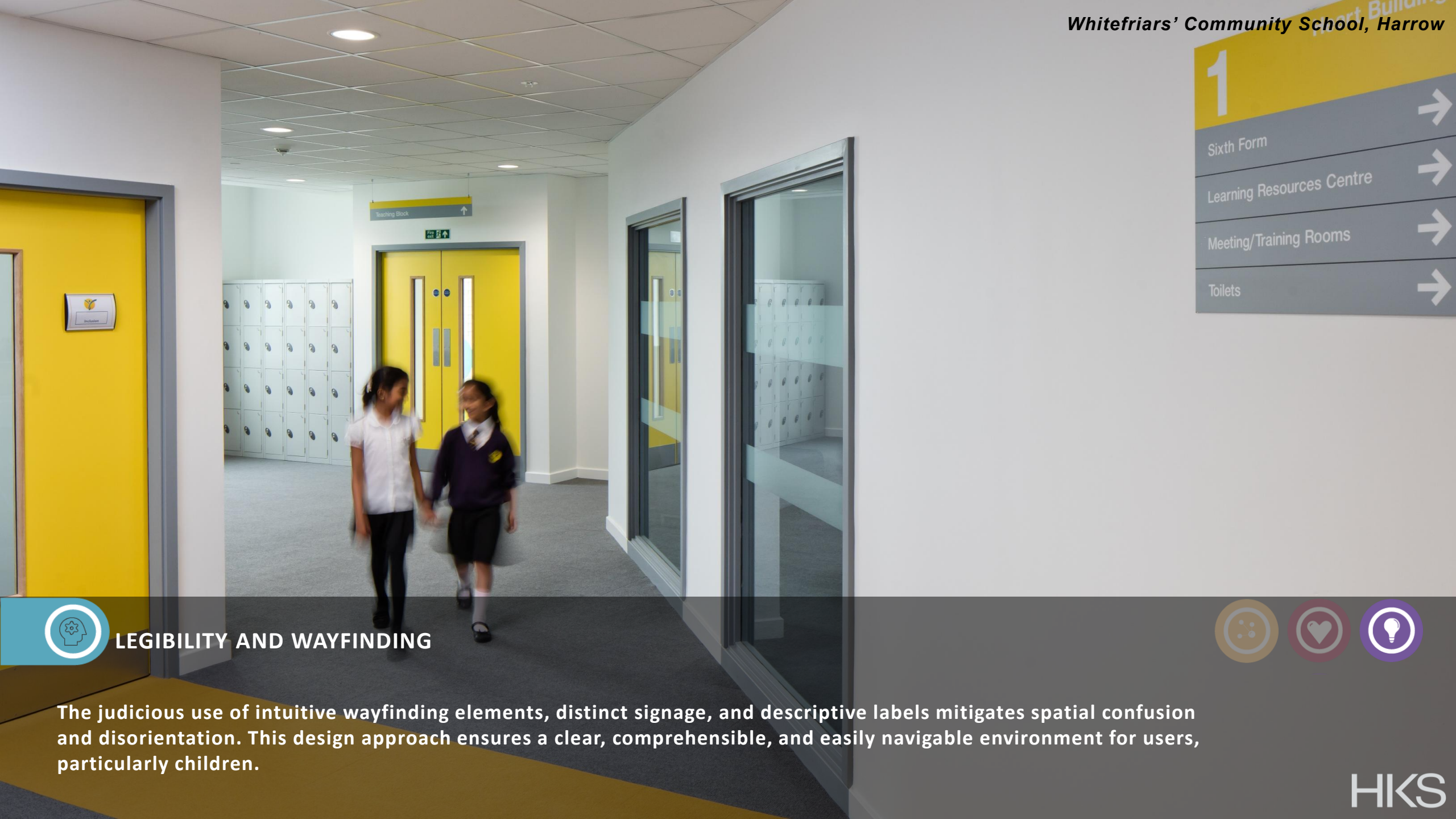
Links between old and new not only instills deep pride and a connection to the past but also nurtures a more nuanced understanding of change, tradition, and the value of community, all of which are vital ingredients for developing strong and empathetic relationship skills.





DAYLIGHTING

The presence of ample daylight contributes to a reduction in stress levels among children and teachers. This natural illumination also correlates with improved mathematics and reading performance, alongside an increase in both sleep duration and quality.



LEGIBILITY AND WAYFINDING

The judicious use of intuitive wayfinding elements, distinct signage, and descriptive labels mitigates spatial confusion and disorientation. This design approach ensures a clear, comprehensible, and easily navigable environment for users, particularly children.





NATURAL MATERIALS AND FINISHES

The integration of biophilic design principles, particularly natural patterns and color palettes, cultivates a more serene and restorative spatial experience. This considered approach contributes to a reduction in stress and anxiety, alongside an enhancement in cognitive attention and overall productivity.





NATURAL MATERIALS AND FINISHES

Colours and natural light are carefully chosen to bring harmony and a sense of relaxation to the space. This inherently positive atmosphere empowers students and staff to thrive, enabling easier learning, greater productivity, and preventing sensory overload.





QUALITY ACOUSTIC

Quality acoustics in a school environment are absolutely critical for effective learning, teaching, and overall well-being. It's not just about reducing noise; it's about creating an optimal sound environment where speech is intelligible, distractions are minimized, and a sense of calm can prevail.

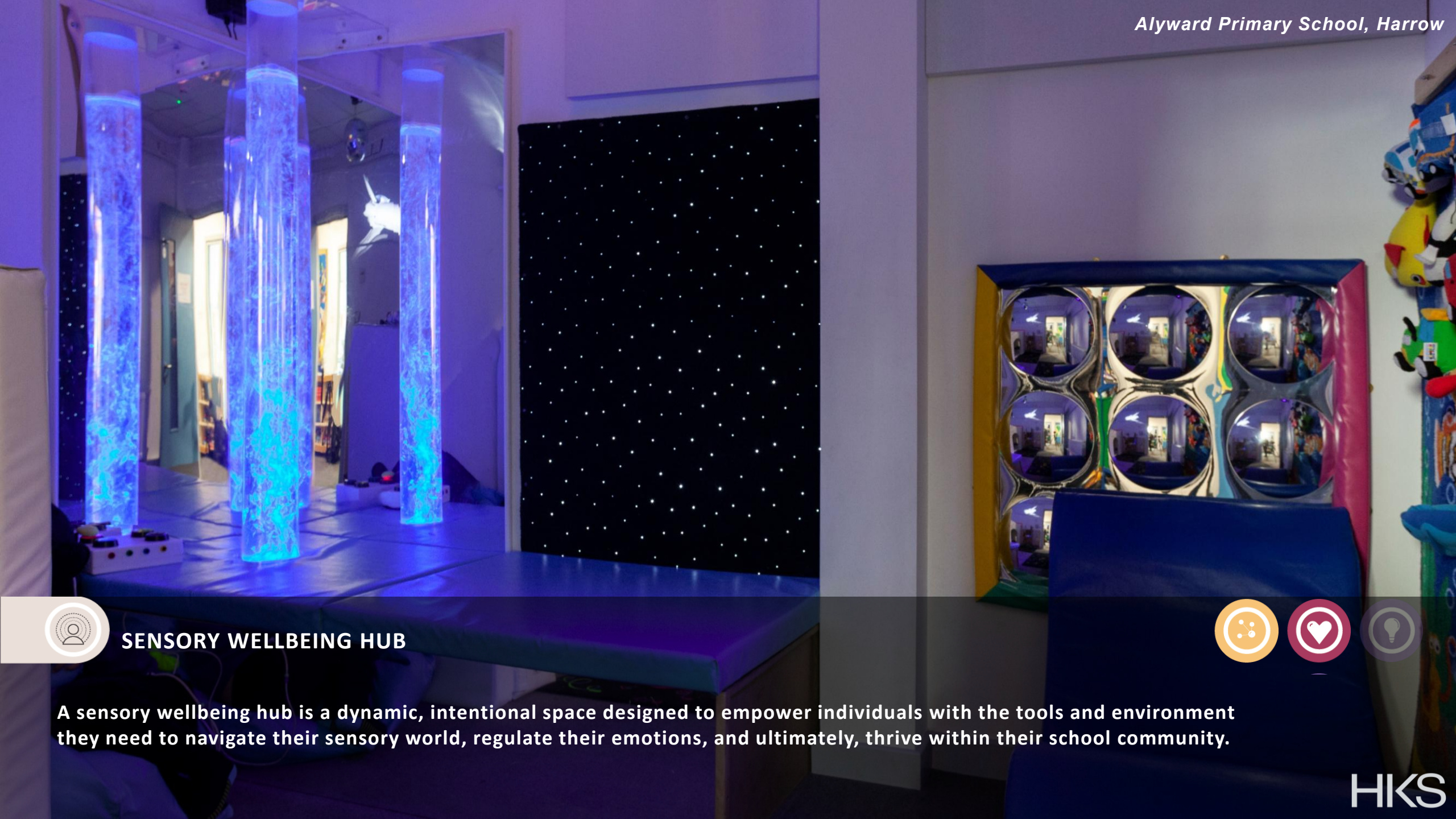




QUALITY OF ARTIFICIAL LIGHTING

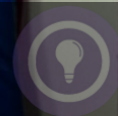


Artificial lighting in schools is not merely about illumination; it's a critical environmental factor that profoundly affects student health, comfort, behavior, and academic success. Investing in high-quality, thoughtfully designed lighting systems is an investment in the entire educational ecosystem.



SENSORY WELLBEING HUB

A sensory wellbeing hub is a dynamic, intentional space designed to empower individuals with the tools and environment they need to navigate their sensory world, regulate their emotions, and ultimately, thrive within their school community.





VARIETY OF FLEXIBLE FURNISHINGS

Utilizing different furniture and seating options creates dynamic, multi-functional zones that facilitate simultaneous, varied activities, thereby promoting a more student-directed and inclusive approach to learning.





VIEWS TO NATURE

Unlike urban or built environments that demand constant directed attention, natural views offer "soft fascination" – engaging the mind effortlessly, allowing cognitive resources to recover.





WELCOMING ENTRY

The entrance to the school is designed for optimal legibility, establishing a clear and intuitive connection to the teaching environment. This architectural consideration enhances the overall sense of place, contributing to a significant reduction in disorientation and stress.



A good school building has spaces for both **Learning and Working** and should include...

A welcoming atmosphere, where physical and psychological safety are provided.

Variety, where students have autonomy and choice for multimodal learning.

Instructional support, where spatial design complements pedagogical approach.

Balanced socialization, where students are connected and have opportunities for individualization.

Support for the whole person, where health and well-being are prioritized.

Opportunities for **privacy, movement, and sensory control for comfort**.

Flexibility, where a variety of working style preferences are supported.

Ubiquitous technology, to streamline daily tasks and augment teaching strategies.

Connectivity, where access and proximity to others is amplified.

Localization, where history, culture, nature, and the relationship between them is emphasized.



THANK YOU