



Designing inclusive educational spaces

Principles and practices
for neurodiversity



Introduction

neurodiverse

adjective

The range of differences in individual brain function and behavioral traits, regarded as part of normal variation in the human population.

The design of educational spaces plays a critical role in shaping the learning experiences and outcomes of all students, including those who are neurodiverse.

Inclusive design principles are essential for creating environments that accommodate the diverse needs and preferences of learners. According to the CDC in 2022, 1 in 56 children in North American are diagnosed with autism.¹

Additionally, children with special education needs (SPED) are 50% more likely to struggle with school attendance, with 31% of autistic students persistently absent (*Office for National Statistics, 2021; Ambitious about Autism, 2022*).

This whitepaper explores the multifaceted challenges of designing inclusive educational spaces and highlights innovative solutions to address challenges effectively which includes building amazing spaces that foster learning and creativity.

1. Centers for Disease Control and Prevention. (2022, April 7). CDC releases first estimates of the number of adults living with ASD. <https://www.cdc.gov/ncbddd/autism/features/adults-living-with-autism-spectrum-disorder.html>

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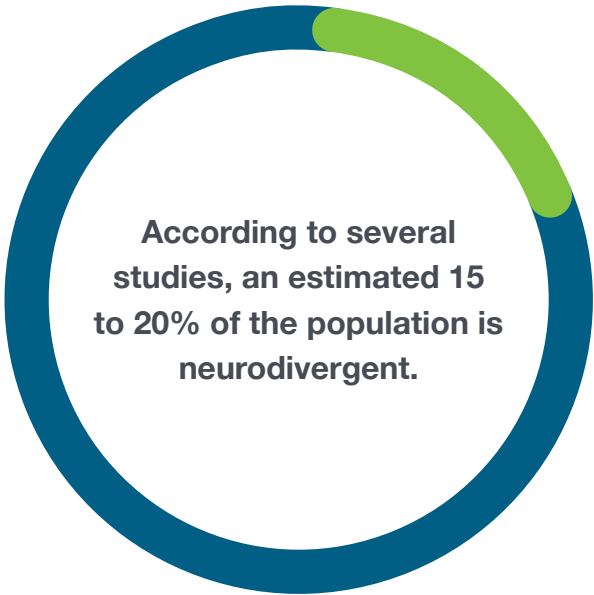


Overview of challenges in educational space design

The varied sensory needs and learning styles of neurodiverse individuals present significant challenges for traditional classroom setups.

Addressing these challenges requires ensuring a conducive environment for active learning while also tackling concerns such as hygiene, sustainability, and accessibility.

Designing spaces that accommodate these diverse needs is no easy task, as stated by Sarah Cameron, Senior Interior Architect at Brand Architecture, who notes that in the last eight years, almost every facet of the built form for schools has undergone investigation and consistent changes.



Only 41% of students with autism spend 80% or more of their school day in general education classes, compared to 67% of all students with disabilities.¹

The CDC states that children with ADHD, for instance, are more likely to experience difficulties with academic performance, neurotypical social interactions, and emotional regulation.

International Dyslexia Association (2021) highlights that without appropriate instructional strategies, students with dyslexia are at risk for “reading failure,” impacting their academic success and self-esteem.

1. Arundel, Kara. “Percentage of Students with Autism on the Rise.” K-12 Dive. Last modified April 24, 2024. <https://www.k12dive.com/news/percentage-of-students-with-autism-on-the-rise/714124/>.

Balancing inclusivity and functionality while adhering to regulatory standards can be complex in educational settings.

This complexity is underscored by statistics from the National Center for Learning Disabilities (2021), which reports that students with “specific learning disabilities” drop out of high school at nearly three times the rate of their neurotypical peers, underscoring the urgent need for systemic transformation.



Designing inclusive educational spaces

Embracing neurodiversity in educational spaces requires a shift towards inclusive design principles, emphasizing the creation of environments that foster a sense of belonging and support diverse learning needs. Designing for inclusivity involves considering physical, sensory, and cognitive aspects to effectively accommodate all students.

For instance, architectural elements like patterned wall surfaces or screens should be approached with caution, as they may distract individuals who are deaf or hard of hearing, confuse those who are blind or partially sighted, and overwhelm those with sensory or neurological processing difficulties. Thus, functional elements on walls should be distinguishable through visual and textural contrast.¹

Key design considerations include:

- Acoustics
- Sensory aspects
- Color
- Socialness
- Zoning of spaces
- Privacy
- Light reflectance

Biophilic design principles, exemplified by projects like Catherine Infant School in Leicester, UK, lead by Stephanie Kyle at Maber Architects, incorporate nature and a natural palette to create calming and positive spaces with fewer distractions. Sensory and textural materials, tactile exploration, and effective wayfinding benefit non-verbal, vision-impaired, and neurodivergent children, aiding in sensory regulation, concentration, engagement, and reducing cognitive overload.²

Neutral colors, known to reduce sensory overload, are

particularly beneficial for young children and those with special education needs and disabilities.

Jo Viney, Principal at Brinnie T Design, an autistic individual with two autistic children, emphasizes the importance of inclusive design in educational spaces. She advocates for creating spaces where students experiencing sensory overload can withdraw and reset, enabling them to re-engage in active learning effectively.

The aim is to create inclusive, aesthetically pleasing designs that cater to all users without compromise. GA Architects in the UK are recognized for their comprehensive approach to designing autism-friendly environments, focusing on elements like peace and order, adequate sunlight and ventilation, minimal visual stimulation, proper proportions proxemics, safety, durable materials, good observation, and acoustics.³

Laura Donato from Y2 Architecture in Australia highlights the pivotal role of architecture and educational planning in developing learning environments that promote engagement and adaptability. She emphasizes the importance of creating functional, inspirational, and adaptable spaces to meet the diverse needs of learners, ensuring comfort, safety, and engagement for all occupants.

1. BS 8300-2:2018 Design of an accessible and inclusive built environment
2. Stephanie Kyle Maber Architects, Catherine Infant School Leicester, <https://www.maber.co.uk/projects/catherine-infant-school/>
3. Classroom Design for Children with an Autism Spectrum. Barbara Uherek-Bradecka 2020 IOP Conf. Ser.: Mater. Sci. Eng. 960 022100



Mental health and inclusivity

Supporting active learning through color psychology and inclusive school environment design

In the pursuit of fostering environments conducive to active learning, leveraging color psychology plays a pivotal role. Jo Viney, Principal at Brinnie T Design, emphasizes the nuanced relationship between color and emotional states, noting that different children may respond differently based on their individual nervous systems.

Viney highlights the importance of considering how individuals cycle between sympathetic and parasympathetic system states, and how these states influence social engagement and learning, stating, “There are questions as to whether you would want a color that stimulates or relaxes. Different children with different scenarios may be working on different nervous systems. Some people have an emotional connection to color whereas other people don’t. Individuals generally cycle between sympathetic and parasympathetic system states and how they play into the social engagement system is important in learning – and which state is required for which subject or style of learning.”

Incorporating sensory-friendly elements and adaptable layouts further enhances inclusivity and supports mental well-being.

Jo Viney stresses the importance of understanding how the built environment can be more inclusive, “The bottom line is that apart from better training for teaching staff, understanding how the built environment can be more inclusive... There are basic principles that can be followed to help all users of the space/s. This includes addressing wayfinding, lighting (i.e. zero flicker), acoustic building materials etc. Good design provides for improved lived experience within the space(s).”

Flexibility in space design is paramount for catering to diverse needs and promoting engagement. Robbie Turner, Director of Inclusion and Diversity at RIBA, underscores the profound impact of the built environment on individuals’ lives, advocating for inclusion and accessibility throughout all stages of design.

Turner emphasizes the value inclusivity in design, “The role our built environment has on each and every person’s life cannot be overestimated. That’s why it is so important that inclusion and accessibility is at the heart of all stages of design, if we’re going to build a world where everyone feels welcome, safe, and valued.”



Creative Minds International | USA



Hygiene + cleanability considerations

Creating a hygienic environment involves prioritizing materials and surfaces that are easy to clean and maintain. This ensures cleanliness while minimizing the risk of microbial growth and contamination. Meeting hygiene requirements is important, but it shouldn't come at the expense of aesthetics.

Therefore, it's essential to implement seamless, non-porous surfaces that not only fulfill hygiene standards but also contribute to the overall visual appeal. Additionally, utilizing stimulating or calming technologies alongside robust cleaning protocols helps maintain cleanliness standards effectively.

“In terms of cleaning and maintenance, we have had nothing but positive feedback from our team about Altro products throughout the building [Parson's Tower], so in terms of practicality its proving to be the right choice.”

Steve Johnson,
General Estates Manager at
Newcastle College's parent company NCG



Parson's Tower, Newcastle College | UK



Sustainability

Strategies for reducing the environmental footprint of educational buildings

Efforts to diminish the environmental impact of educational buildings encompass various strategic approaches. Integrating sustainable materials and practices, such as low-maintenance, adhesive-free flooring options, serves to minimize resource consumption and environmental harm.

Moreover, implementing energy-efficient systems and passive design strategies elevates the building's overall performance.

Additionally, instilling a sense of environmental stewardship through education and engagement within the school community cultivates a culture of sustainability and responsible resource utilization among students, staff and stakeholders.

Choosing flooring that performs without the need for additional finishes and waxes is another strategy. Vinyl composition tile (VCT) might seem appealing due to its low installation cost, but it is not a sustainable choice. The continuous maintenance required over VCT's lifespan, including the frequent use of harsh chemicals for cleaning and waxing, can not only contribute to higher costs but also have a detrimental environmental impact.

Products that don't require this extensive upkeep offer a more sustainable and cost-effective solution in the long run. A need to balance longterm costs and impacts versus purchase price becomes an integral part of the strategy.



Charles Q. Murphee PK-8 School | USA



“Availability of diverse colors and finishes in wall and floor finishes allows for interior architecture design concepts to come to life. Durable materials and those that can be recycled/upcycled are paramount in providing a sustainable design solution. The sources of raw materials, the manufacturing process and life-cycle analysis of materials are increasingly important to understand for designers and their clients.”

Laura Donato,
Architect,
Y2 Architecture, Australia

Donato emphasizes the importance of diverse colors and finishes in wall and floor materials to bring interior design concepts to life. She stresses the importance of prioritizing durable materials that can be recycled or upcycled, along with understanding the sources of raw materials and conducting life-cycle analyses.

Furthermore, sustainability extends beyond material choices to include durability and product longevity. Emphasizing the importance of high-quality products, Laura Donato notes their inherent ability to last longer, thus contributing to sustainability efforts.



Andst Children's and Education Centre | Denmark



Durability

Addressing warranty, acoustics, and minimizing downtime and maintenance

Addressing durability in educational environments involves several critical considerations aimed at ensuring longevity, functionality, and user satisfaction.

The selection of materials and finishes renowned for their durability stands as a foundational step, vital for withstanding the demands of high traffic and consistent usage. Equally important is ensuring acoustic comfort, achieved through strategic design interventions and the integration of sound-absorbing materials, which contribute to a conducive learning environment.

Minimizing downtime and maintenance costs emerges as a key objective, achieved through investments in long-lasting, low-maintenance solutions.

These solutions include adhesive-free options and slip-resistant surfaces, backed by industry leading guarantees and rigorous testing to ensure safety and durability. Testimonials from industry professionals emphasize the importance of interior architecture and appropriate finishes in withstanding the demands of everyday living and learning.

Richard Booth, Headteacher at The Reach Free School, calls attention to the multifaceted benefits of durable flooring solutions, stating, “I would recommend this flooring to anyone that wants a hard-wearing, great looking modern solution that also helps to reduce noise and increase comfort in the environment.”

Meanwhile, Courtney Toland, Manager of Corporate Services at Kojonup District High School in WA, underscores the positive

impact of improved acoustics on the overall performance and functionality of educational spaces, “They notice that acoustics are important; there has been an improvement in the room... All in all, a quick install that saved money and time kept the installer happy, and the space revived and performed better with acoustics.”

It is important to emphasize the critical role of hygiene and cleanability in flooring choices, challenging the conventional preference for carpet in educational and healthcare settings. Altro’s vinyl flooring solutions offer unparalleled ease of maintenance and cleanliness, contrasting with the absorbency and difficulty of cleaning inherent in carpet tiles.

Altro’s system, featuring impervious surfaces and steam cleanability, ensures a hygienic environment, addressing concerns highlighted by the recent global pandemic and providing a superior alternative to traditional carpeted surfaces.

In promoting stress-free environments, particularly through acoustics, the well-being of staff and users is prioritized. Noise, whether from people or equipment, can significantly impact health, necessitating the creation of tranquil indoor atmospheres. Incorporating sound-absorbing or diffusing elements into designs, alongside maximizing natural light, and ventilation, facilitates the cultivation of positive, therapeutic atmospheres conducive to overall well-being.

By addressing durability holistically and integrating solutions that prioritize functionality, safety, and well-being, educational environments can effectively support the diverse needs of their users.



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Accessibility and comfort features



Accessibility and comfort features are crucial in creating inclusive environments, ensuring equitable access through universal design principles. Incorporating ergonomic furniture and adjustable elements not only caters to diverse physical needs but also promotes well-being among occupants. Factors such as climate control, natural lighting, and ergonomic design contribute to overall physical wellness, addressing concerns like musculoskeletal disorders among teachers.

Vinyl flooring, with its shock absorption, easy maintenance, comfort, slip resistance, and durability, mitigates risks associated with prolonged standing, enhancing safety in educational settings, and proactively addressing work-related musculoskeletal disorders. Considering the comfort of teachers who stand for extended periods and providing ergonomic features underfoot can help maintain their physical well-being

Additionally, addressing physical wellness for children and supporting teaching staff who are on their feet all day are essential considerations. With Australian teachers facing a high

risk of musculoskeletal disorders, vinyl flooring offers benefits such as shock absorption, easy maintenance, comfort, slip resistance, and durability, potentially alleviating these risks. By implementing vinyl flooring in classrooms, institutions can proactively address musculoskeletal disorder risks among teachers, creating a conducive environment for teaching and learning.





Solutions

Altro’s product range meet and exceed requirements, offering hygiene, durability and aesthetic appeal

Altro's product range stands out for its innovative solutions tailored to the unique challenges of designing educational spaces for neurodivergent individuals.

With over 105 years of global experience and with a dedicated focus on hygiene, durability, and aesthetic appeal, Altro’s flooring and wall products surpass industry standards, ensuring enduring performance and user satisfaction.

Through a commitment to continuous research and development, Altro maintains its position at the forefront of delivering cutting-edge solutions that prioritize inclusivity, sustainability, and user well-being. This dedication to advancement ensures that Altro’s offerings evolve in line with the evolving needs and expectations of educational environments.

Designing educational spaces for neurodiversity necessitates a holistic approach that encompasses factors such as inclusivity, sustainability, hygiene, and aesthetics. While addressing design challenges, its essential to carefully consider neurodiversity and accessible design in education sectors, alongside other critical factors, to create truly comprehensive and effective solutions.

Altro is a world-leading manufacturer and innovator in commercial floors and walls. We turn ordinary interiors into thriving environments, transforming spaces to enhance people’s emotional and physical well-being.

Let us help you with your next project - 800.377.5597

Conclusion

Designing educational spaces for neurodiversity necessitates a holistic approach that considers various factors, including inclusivity, sustainability, hygiene, and aesthetics. Altro’s product range emerges as a cornerstone in this endeavor, offering comprehensive solutions that not only meet but exceed the requirements for creating inclusive, sustainable, and hygienic learning environments.

By prioritizing the well-being and success of all learners, we can cultivate a more inclusive and equitable educational landscape, thereby benefiting individuals, educational institutions, and communities alike.

This commitment to holistic design ensures that educational spaces not only accommodate diverse needs but also contribute positively to the overall well-being and success of their users.