

Inclusive Architecture: Crafting Lively Spaces For Specially Abled

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Abstract

The term specially abled people refer to individuals who have physical, cognitive, sensory, or developmental disabilities but possess unique abilities, strengths, and perspectives. Rather than focusing on limitations, the term emphasizes their capabilities and potential.

Specially abled individuals may have challenges related to mobility, vision, hearing, speech, or intellectual development. However, with the right support, accessibility, and inclusive opportunities, they can lead independent, fulfilling lives. Many specially abled people have extraordinary talents in areas such as art, technology, sports, and education.

Architecture plays a crucial role in integrating individuals into the mainstream by designing spaces that cater to their learning, working, and everyday needs. By creating environments that are thoughtfully designed, architecture can facilitate learning and personal development. These spaces, whether for education, work, or daily activities, can serve as tools for growth, providing opportunities for individuals to learn new skills and gain valuable knowledge and bring them to main stream simply through their interaction with the environment. When spaces are carefully crafted, they inspire individuals to engage and absorb information, fostering both creativity and productivity.

Keywords— Specially abled, Inclusive, crafted spaces, mainstream, opportunities.

Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition that affects an individual's ability to interact socially, communicate effectively, and regulate behaviors. It is called a spectrum disorder because it presents in a wide range of symptoms and severity levels. While some individuals may experience mild challenges, others may require significant support in their daily lives. As, In a quiet hospital room, a mother holds her newborn baby, overwhelmed with joy and love. She



Fig. 1. What is autism.

watches her child's tiny fingers grasp hers, feeling a deep connection. Like any other parent, she dreams of the future – first words, first steps, laughter filling the home. Everything seems perfect, but beneath the surface, unseen to the world, something unique is unfolding in the child's brain. Autism, though not yet visible, is already a part of this child's journey.

As the months pass, the mother notices small differences. While other babies smile at their parents' faces, her child rarely meets her gaze. When she calls his name, he does not turn toward her. Other babies babble excitedly, but he remains mostly silent, staring intently at spinning objects or flickering lights. At first, she brushes it off – maybe he's just a quiet child, maybe he will speak later. But as he reaches his first birthday, the differences become more apparent. He does not wave goodbye, he does not point at things he wants, and he seems deeply upset when his routine changes.

By the time the child turns two, the differences become impossible to ignore. While other toddlers run to their parents for comfort, he prefers to be alone, engaging in repetitive behaviors like lining up his toys in perfect rows. If anyone disrupts the order, he becomes distressed. He flaps his hands when excited, stares at ceiling fans for long periods, and has intense reactions to loud noises. The mother starts feeling uneasy. She watches other children playing together, laughing and talking, and wonders why her child seems to exist in a world of his own.

Worried, the parents visit a pediatrician, who conducts some developmental screenings. The

doctor asks questions – "Does he respond when you call his name? Does he imitate gestures? Does he show interest in what you are doing?" – and the answers begin to form a pattern. The doctor refers them to a specialist, and after several assessments, they hear the words that change their lives: "Your child has Autism Spectrum Disorder."

At first, the diagnosis feels overwhelming. The mother wonders – Will he ever talk? Will he make friends? What will his future look like? But soon, they learn that autism is not a disease; it is a different way of experiencing the world. They begin researching and connecting with therapists. They meet speech therapists to help with communication, occupational therapists to assist with sensory challenges, and behavioral specialists to teach daily living skills. Their house transforms into a structured space filled with visual schedules, picture communication boards, and sensory-friendly toys.

Slowly, with therapy and patience, progress begins. He learns to communicate using pictures and gestures, and eventually, he speaks his first words. He still struggles with social interactions but finds comfort in predictable routines. He learns skills that help him express his needs, reducing his frustrations. The parents celebrate every small victory – eye contact, a hug, a new word – knowing that each step is a breakthrough.

As he grows, they must decide on his education. A regular school seems challenging – too noisy, too unpredictable. The parents worry that teachers might not understand his needs and that he might struggle to make friends. After much thought, they enroll him in an autism-friendly school, where teachers are trained to support children like him.

To integrate autistic children into mainstream society, various methods are used. The process begins with parent counseling, where parents receive guidance and knowledge about how to support their child's development at home. Early intervention starts at home, where parents apply therapeutic techniques to help their child communicate and interact. However, at a certain stage, schooling becomes essential. A school provides a structured environment where the child interacts with peers who have similar experiences. While therapy continues at home, a school plays a vital role in fostering social interaction, speech development, and behavioral adaptation.

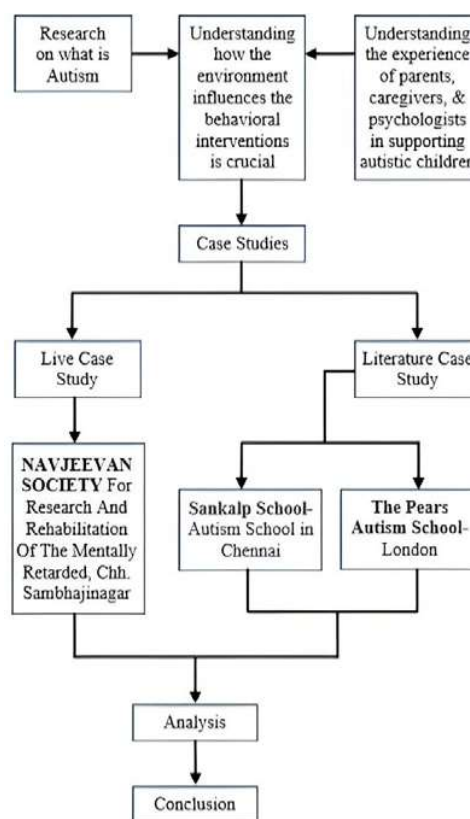
Speech therapy and social therapy help autistic children learn to communicate and interact with others. Being in a school setting allows them to engage with children at their level, making socialization easier. Schools and teachers play a crucial role in this journey. Teaching a neurotypical child and teaching a child with autism require different approaches. Recognizing these differences and implementing specialized teaching methods can help autistic children transition into mainstream society.

On his first day, he walks into the classroom, uncertain but curious. The school is different from traditional schools – quiet, structured, and filled with sensory-friendly tools. The teachers use visual aids to help with communication and social stories to teach him how to interact with others. He learns through specialized methods, using hands-on activities and personalized lessons. The school does not just focus on academics; it teaches life skills, helping him become independent. Over time, he makes progress. He learns how to express his emotions, interact with classmates, and complete daily tasks on his own. The teachers guide him with patience, celebrating every step forward. His parents, once fearful of his future, begin to see a different possibility – one where he can live a meaningful and independent life, not despite autism, but because of his unique strengths.

Autism is not a roadblock; it is a different path. With the right support, understanding, and love, every autistic child can grow, learn, and thrive in their own way. The journey is not always easy, but every step, every breakthrough, and every moment of connection makes it worthwhile.

Methodology

The methodology for designing an autism center begins with research on autism, focusing on understanding sensory sensitivities, cognitive needs, and behavioral patterns of individuals with autism.



It also involves analyzing environmental influences on behavioral interventions, ensuring that spatial design supports therapy and learning. Additionally, insights from parents, caregivers, and psychologists are gathered to understand their experiences in supporting autistic children, ensuring that the design meets their needs. The study includes case studies, both live and literature-based, to analyze successful autism-friendly spaces and derive key architectural elements. Finally, a conclusion is drawn from these studies, summarizing best practices and design strategies for creating an inclusive and supportive environment.

Case Studies

Live Case Study – NAVJEEVAN SOCIETY For Research And Rehabilitation Of The Mentally Retarded, Chh. Sambhajinagar

Location – Plot No. P 65, Naregaon Road, Chikalthana MIDC Area, Chhatrapati Sambhaji Nagar, Maharashtra 431210

Architect – Vijay Sangwkar & Asso.

Plot Size – 3,589 sq.m (38,631 sq.foot)

Navjeevan is a dedicated specialist facility located in the Chikalthana MIDC area of Chh. Sambhajinagar, designed to serve as both an educational and rehabilitation center for individuals with autism and other mental disabilities. The center provides a structured and inclusive environment where both children and adults can receive tailored support to enhance their cognitive, social, and motor skills. It aims to bridge the gap between education and therapy, offering a holistic approach that includes special education, behavioral therapy, speech therapy, occupational therapy, and life skills training.

With a focus on personalized care, Navjeevan ensures that every individual receives the support they need to develop independence and improve their overall well-being. The facility is equipped with sensory-friendly spaces, therapy rooms, and activity areas that cater to the unique needs of autistic individuals, helping them navigate daily challenges with greater ease.

Beyond individual support, Navjeevan also works to create awareness and community involvement, providing guidance to families, caregivers, and educators to ensure a well-rounded support system. By integrating education, therapy, and skill development, the center plays a pivotal role in fostering the social inclusion and empowerment of individuals with special needs, helping them lead fulfilling lives.



Fig. 2. Campus of Navjeevan Society, Chh. Sambhajinagar.

The campus is designed to ensure accessibility, sustainability, and a user-friendly environment, integrating open spaces, natural elements, and structured learning areas. The facility comprises a school building with six classrooms, providing inclusive and interactive learning spaces tailored to individual needs, along with a hostel building that offers safe and accessible living quarters for students and residents. To support vocational training and skill development, specialized workshops are equipped with necessary tools to help individuals gain confidence and independence. The recreation area is designed to promote both physical well-being and mental relaxation through open play zones and calming spaces. Additionally, early intervention centers focus on detecting and addressing developmental challenges at an early stage through specialized therapies and educational support. A key feature of the campus is the sensory gardens, designed as therapeutic landscapes to engage the senses, aiding in motor skills, cognitive abilities, and emotional regulation. By integrating functionality with nature, Navjeevan fosters interaction, independence, and community integration, making it a model facility for holistic rehabilitation and education.

Purpose & mission – Navjeevan aims to provide a nurturing and inclusive environment where individuals with special needs receive personalized care, education, and therapy. The facility is designed to support their holistic development by integrating rehabilitation, vocational training, and therapeutic interventions tailored to each individual's requirements.

The facility offers specialized workshops to promote self-sufficiency and employment opportunities through training in arts, crafts, and practical skills. It focuses on social integration by developing essential life skills and fostering confidence. Additionally, therapeutic and sensory spaces provide a supportive environment for emotional, cognitive, and physical well-being, ensuring a holistic approach to personal growth and independence.



Fig. 3. Workshop products made by students for sale.

Surrounding Area & Visual Comfort –The campus design prioritizes visual comfort and tranquility by incorporating natural elements and thoughtful design choices. The space is surrounded by dense greenery, creating a natural buffer that filters light, reduces noise, and promotes relaxation. Inside, a calming colour palette featuring mild colours minimizes distractions, promotes calmness, and reflects natural light effectively. The seamless integration of natural materials, balanced contrasts, and strategic openings blends indoor and outdoor spaces, fostering a soothing environment ideal for learning, relaxation, and well-being.

Access To The Building - The building's access system prioritizes child safety and security through controlled entry points and advanced surveillance measures. With a gated entry, children are prevented from wandering unsupervised, while continuous monitoring through CCTV cameras enhances security. This secure access system ensures a safe and well-managed environment, giving parents and guardians peace of mind.

School Building & Classroom Area - The school building is thoughtfully designed to foster a personalized, interactive, and comfortable learning environment. Each of the six classrooms accommodates 10 students and 2 teachers, ensuring tailored attention and a collaborative atmosphere. Centrally placed tables promote student interaction and engagement, while well-lit spaces facilitate focused learning. The single-story school building features a well-organized layout, incorporating six teaching spaces, a multipurpose therapy room, staff office, toilets, and storage areas, all designed for easy accessibility and functionality. **Hostel Building** - The hostel building is thoughtfully designed to cater to the diverse needs of its residents. The building comprises 7-8 rooms, carefully allocated



Fig. 4. Hostel area.

to provide a comfortable and functional living environment. One room is dedicated to hostel students, accommodating six beds, while three rooms have been repurposed as activity classrooms to ensure adequate space for student engagement. Additional rooms have been designated for visiting parents, office space, and a canteen area for children. The building's central courtyard enhances ventilation and fresh air circulation, creating a pleasant and healthy living environment that promotes overall well-being. The interior design incorporates a thoughtful color palette and texture selection to create a calming, engaging, and comfortable environment. Circulatory and transition spaces feature a subtle yellow hue, while classrooms boast white walls and neutral tones to promote a sense of calmness. In contrast, the Early Intervention Center showcases colourful imagery of animals and cartoons, carefully designed to captivate and comfort children, fostering engagement, curiosity, and relaxation.



Fig. 5. Early intervention room.

Literature Case Study 1 –SANKALP SCHOOL– Autism School in Chennai

Location – 88, Thiruvalluvar Street, Kollapancheri,
After Parivakkam, Poonamallee – Pattabiram Road,
Poonamallee, Chennai – 600072

Architect – Ar. Benny Kuriakose, Ar. Kabir Vajpeyi

Plot Size – 1.35 acres

Sankalp is a pioneering organization dedicated to empowering students with special needs, enabling them to become confident and contributing members of society. With a mission to foster overall development and promote inclusion, Sankalp provides comprehensive support services. As an award-winning organization, Sankalp operates two centers in Chennai, offering best-in-class special education, vocational training, remedial education, and therapy to children and young adults with special needs, making a positive impact on their lives and empowering them to reach their full potential.



Fig. 6. Campus of sankalp school.

Sankalp: Empowering Lives Through Inclusive Education

Established in 1999, Sankalp is a not-for-profit organization dedicated to enhancing the lives of children and young adults with Autism Spectrum Disorder (ASD), Specific Learning Disability (SLD), and Intellectual and Developmental Disabilities (IDD). With a strong emphasis on individualized, hands-on learning and a holistic approach, Sankalp enables students to become confident, contributing members of society.

The current project is a redesign of the Sankalp School, Chennai, located on Thiruvalluvar Street, Kollapancheri, Chennai. Originally functioning as the Ebenezer Home for Children and the Elderly, the existing building spans a total built-up area of 17,500 sq. ft.

As a registered trust, Sankalp operates several specialized units:

- The Learning Centre & The Early Intervention Centre – Supporting children with ASD.
- Sahayika – A skill training center for adolescents with ASD.
- The Open School – Designed for children with SLD.
- Akaraah – An early intervention center for children with ASD.

Through these initiatives, Sankalp continues to foster inclusive education, skill-building, and personal growth, ensuring a meaningful future for individuals with special needs.



Fig. 7. Old building of sankalp school



Fig. 8. New construction of sankalp school.



Fig. 9. New building of sankalp school.

1. The Learning Centre and The Early Intervention Centre – For children with Autism Spectrum Disorder
Important Points Considered in Design of Sankalp Special Needs School

- Building as learning aid (BALA)
- Outdoor Activities and landscaping
- Verandah
- Natural lighting
- Colours And Materials
- The interior design of Special Schools
- Interiors – Classroom Furniture

A) Building as learning aid (BALA)

- **Understanding Angles Through Door Swing Motion** - Engaging with the motion of a swinging door provides a hands-on approach to learning angles. By observing or interacting with the door, students can intuitively grasp concepts such as acute, obtuse, and right angles, making geometry more tangible and interactive.
- **Understanding Heights Through Vertical Scale** – By observing the varying heights of walls, ceilings, and furniture, students develop a practical understanding of scale and proportion. This hands-on experience enhances spatial awareness and depth perception, helping them compare and analyze different heights effectively.
- **Exploring Geometry Through Floor Finishes** – The diverse textures, patterns, and materials of floor finishes provide a practical framework for recognizing geometric shapes and spatial divisions. Engaging with these surfaces through movement or observation helps students grasp concepts of symmetry, boundaries, and spatial relationships.

- Enhancing Visual Learning Through Wall Patterns – Vibrant interiors and textured wall patterns create an interactive environment for students to recognize colours, shapes, and designs. This sensory- rich approach fosters engagement and strengthens visual processing skills.
- Enhancing Motor Skills Through Low-Level Interiors – Interactive boards, drawing surfaces, and sensory elements placed at lower levels encourage physical engagement, fostering fine motor skills, hand-eye coordination, and precise control over tasks like drawing and assembling.
- Enhancing Navigation and Spatial Awareness – Strategically placed campus maps aid children in navigation while fostering a sense of direction. Complementary signage with distance indicators further enhances their ability to interpret spatial relationships and read their surroundings effectively.

B) Outdoor Activities And Landscaping

Children naturally explore their surroundings through movement and play. Schools can harness this by incorporating diverse activities like sports, arts, carpentry, pottery, and farming, which enhance motor skills, creativity, and problem-solving. Outdoor learning fosters cognitive, emotional, and social growth while instilling values like teamwork and independence. Utilizing negative spaces – setbacks, courtyards, and shaded zones – as interactive learning areas creates dynamic educational experiences. Integrating indoor and outdoor spaces promotes experiential learning, making education more engaging and holistic.

Outdoor Play Areas in Schools: Outdoor play enhances children's physical and cognitive growth. Schools can incorporate jungle gyms, slides, mud and water play areas, and upcycled play equipment. Open spaces like courtyards, setbacks, and lawns can be repurposed for activities, promoting creativity and environmental awareness.

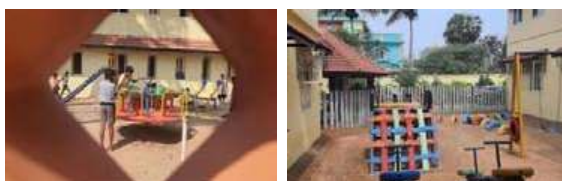


Fig. 10. Outdoor activities

The Role of Landscaping in Learning: Thoughtful landscaping enriches learning by integrating nature into school campuses.

Spaces for flowering and medicinal plants, interactive elements like aquariums, and rainwater harvesting tanks as educational tools foster environmental consciousness and hands-on learning.



Fig. 11. Landscape spaces.

C) Significance of Verandas and Transition Spaces – Research highlights the importance of verandas and transition spaces in educational environments. These areas function as buffer zones, effectively separating high-stimulus activities—such as general classrooms, one-on-one interactions, and speech therapy—from low-stimulus activities like music, art, craft, and psychometric treatments. This spatial organization enhances focus, reduces sensory overload, and promotes a balanced learning experience.

D) Optimizing Classroom Distraction Control – Rather than eliminating windows to minimize distractions, adjustable blinds or similar coverings can be used as needed, allowing for flexible control over natural light and external stimuli while maintaining ventilation and openness.

E) Colours & Materials – Natural and calming colours and materials are used. Disturbing and overly stimulating colours are avoided.

F) Interiors Classroom Furniture – The minimum width and depth of a table for a single student is 600 x 450 mm. The table dimension often preferred is 600 x 600 mm.

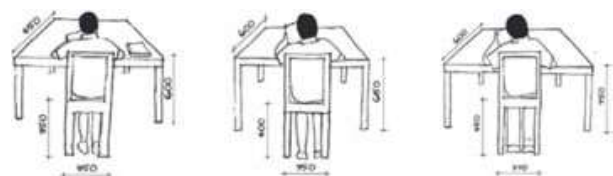


Fig. 12. Furniture layout

SCHOOL FURNITURE	AGE 3-6	AGE 7-12	AGE 13-18
Seat Height	350mm	400mm	450mm
Seat Depth	350mm	350mm	370mm
Desk Height	600mm	650mm	750mm
Desk Depth	450mm	600mm	600mm

Fig. 13. Table of school furniture



Fig. 14. Interior of classroom.

Literature Case Study 2 – The Pears Autism

School- London

Location – Muswell Hill, North London, United Kingdoms

Architect – Ar. Penoyre + Prasad

Plot Size – 10 acre (435600 sq. foot)

Typology – School & Centre

The area around the school is mostly residential, with a few green spaces and woods that are part of a conservation park. The school is situated in a quiet residential zone in London, UK, benefiting from minimal noise and traffic. Set back from the street, it is surrounded by lush greenery, reinforcing its connection to nature and the outdoor environment. The site is bordered by two primary schools, farmland, the Green Pumping Station, and a conserved woodland area. The land is flat, covering 14,000 sq. meters, with an interior space of approximately 5,000 sq. meters.

The model is a one piece, a rectangle shape surrounding with some greenery and trees. It also has a small outside court as a play area and the parking is the last component. This way of design makes it easy to understand, just a few times and student will get the sequence of it.

The Pears National Centre, developed by Ambitious About Autism, has been thoughtfully designed to blend harmoniously with its surroundings in the Muswell Hill conservation area. The architects prioritized natural materials and sustainable technologies, ensuring an environmentally responsible and context-sensitive approach to construction.



Fig. 15. The pears national centre

Programs - The project is a two-story building designed for students with autism, staff, and visitors, divided into two main zones: a student-centered school and a staff-centered headquarters for "Ambitious about Autism" and the Treehouse School. The layout is mirrored on both floors for easy navigation. The student zone includes classrooms, workshops, life skills areas, and adaptable learning spaces, while the staff zone features administrative offices, training rooms, and creative shared spaces. The design emphasizes simplicity, flexibility, and functionality to support both education and daily life.

Scale - The school follows a longitudinal layout with a central transitional space and classrooms along the periphery. Skylights of varying sizes, shapes, and placements enhance daylighting and passive cooling, sometimes extending to the ground floor to create double-height atriums. The facade, lined with windows and louvered shutters, balances openness with sun protection. Glass overhangs around the periphery further regulate light. Externally, the structure appears rectangular, but its facade and interior spaces are shaped by strategic skylights, ceiling heights, circulation, and daylighting to meet programmatic needs.

Form - The school features a distinctive longitudinal triangular form with a green inclined roof. Its facade design complements the linear shape, with windows projected along the longer sides while minimizing openings on the shorter sides. The design carefully balances sensory stimulation and tranquility, ensuring a harmonious environment.

Circulation - The Pears National Centre follows a linear circulation flow, with primary movement at its core separating children’s spaces from adult areas.

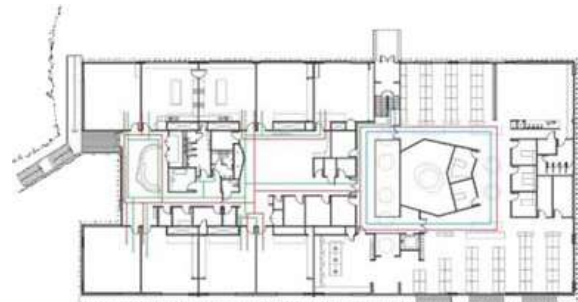


Fig. 17. Users movements

Guests, parents, and board members occupy the first floor, while teachers and staff are on the second. Secondary circulation leads to specific functional areas, while tertiary circulation occurs within individual rooms. The design allows learning to extend beyond classrooms, with a multi-purpose hall integrated into the circulation zone for larger gatherings. The horizontal circulation serves as a central hub for interaction, incorporating essential services.

Transition - The design ensures a seamless transition between indoor and outdoor spaces, emphasizing nature as an integral part of learning. Outdoor areas provide diverse spaces for play, learning, and relaxation, enhancing sensory experiences. A direct entrance to the second floor from the outdoor area offers students a dynamic and engaging spatial transition. To foster parental involvement, a green rest area surrounds the outdoor court, allowing parents to observe and connect with their children in a natural setting.



Fig. 18. Transition between indoor & outdoor spaces.

Building System - The building incorporates passive design strategies to optimize energy efficiency. Heat gain occurs through expansive windows and skylights, while the angled roof maximizes daylight and thermal absorption. Concrete stores heat during the day, and operable skylights facilitate passive cooling at night. Additionally, coupled-air ventilation enhances airflow. As a result, the building is expected to consume 67% less energy than Greater London Authority benchmarks, with 10% of its energy sourced from renewables, including ground-coupled air pipes.

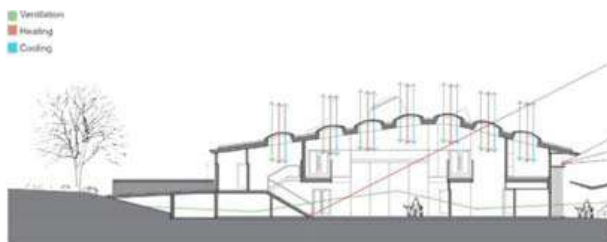


Fig. 19. Passive design strategies

Sustainability - The building integrates sustainable strategies to optimize natural resources such as wind, sun, and rain. Key features include sun reflectors, skylights for daylighting and passive heating/cooling, a double-ceiling atrium, and louvered facades to control sunlight. Additional elements like a solar energy system, green roof, highthermal mass, and natural ventilation enhance energy efficiency. During the day, concrete absorbs heat, while skylights facilitate nighttime cooling. The inclined roof maximizes daylight and heat gain. Overall, the building is expected to use 67% less energy, with 10% sourced from renewable energy, including ground-coupled air pipes.

Details - The classroom design incorporates multiple zones, separated by lockers or cabinets for functional organization. Rug carpets enhance sensory experiences and help define areas. Shared spaces emphasize flexibility, with child-scaled openings ensuring comfort and accessibility. Cylindrical columns serve both structural and aesthetic roles, catering to autistic children's tendency to rotate around them. The use of double-volume spaces enhances visual connectivity and allows ample natural light from the roof, creating a well-lit and engaging learning environment.



Fig. 20. Interior of classroom.

Comparative Analysis

1. NAVJEEVAN SOCIETY (Chh.Sambhajinagar, India)

- Functional design with open spaces and segmented learning areas.
- Natural ventilation and courtyards for a comfortable environment.
- Barrier-free accessibility for inclusivity.
- Focus on vocational skill-based training.
- 2. Sankalp School (Chennai, India)
- Adaptive learning environment with structured zones.
- Use of non-toxic materials and acoustic treatments.

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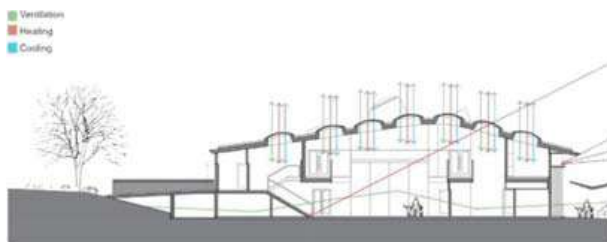


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- Use of non-toxic materials and acoustic treatments.

3. The Pears Autism School (London, UK)

- Advanced sensory-integrated design with flexible learning spaces.
- Curved walls for safety and therapy pods for individual needs.
- High-tech sensory rooms and natural lighting for a calming atmosphere.
- Sustainability features such as green roofs and solar energy.
- Holistic, therapy-led education with individualized interventions.

Conclusion

Autism Spectrum Disorder (ASD) is not a limitation but a different way of perceiving and interacting with the world. While it presents unique challenges, early intervention, therapy, and specialized education can help autistic individuals develop essential skills for communication, social interaction, and independence. Parental support and structured learning environments play a crucial role in nurturing their growth. Schools designed for autistic children provide a safe, sensory-friendly space where they can learn at their own pace, supported by teachers trained in specialized teaching methods. With the right guidance, patience, and acceptance, autistic individuals can lead fulfilling lives. Society must continue to create inclusive spaces, advocate for awareness, and recognize the strengths that autistic individuals bring. Autism is not a barrier—it is a different journey, and with love and support, every child can thrive in their own unique way.

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