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# Creating Inclusive Library: Designing Welcoming Spaces for Autistic Patrons, A Case of Kollam Public Library

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**ABSTRACT:** This dissertation examines the aspects of inclusivity and accessibility for the autistic community in public spaces, with a focus on libraries. Challenges such as sensory sensitivities are addressed, and ways to create more inclusive environments are suggested. It is highlighted that inclusivity and understanding can greatly improve the lives of neurodivergent people by reducing stressors. However, society today is characterized as being loud, fast-paced, chaotic, and bright. The research was conducted using qualitative and quantitative methods, including a questionnaire with parameters such as circulation, color, and texture, along with general guidelines for libraries in the context of Kerala. It was found that the current condition of Kollam Public Library is inadequate for autistic patrons, who would find it difficult to cope within the space. The color scheme and texture were found to be favorable for the patrons.

**KEYWORDS:** Autism, Inclusive design, Library

## I. INTRODUCTION

The aspects of inclusivity and accessibility for the autistic community in public spaces, with a main focus on libraries, are explored in this dissertation. The challenges faced in such environments, like sensory sensitivities, are discussed, and ways to create more inclusive spaces are suggested. It is noted that if society were more inclusive and understanding, the lives of neurodivergent people could be greatly improved by reducing stressors. However, the society we live in today is described as loud, fast-paced, chaotic, and bright. The community is served by librarians through the provision of knowledge, a safe environment, and motivation. Access is defined not only as physical but also as conceptual, intellectual, and multi-sensory.

### 1.1. Aim

The aim of this study is to examine the aspects of inclusivity and accessibility for the autistic community in public spaces, with a primary emphasis on libraries, focusing on the Kollam Public Library.

### 1.2. Objectives

To understand the importance of inclusive design in public spaces.

To learn about the difficulties autistic people may have in going to public places, especially libraries.

To examine the aspects of inclusivity and accessibility for the autistic community in Kollam Public Library.

### 1.3. Derivation from Existing Theories/Data

The study is grounded in the principles of inclusive design, which emphasize the need for environments to be usable by all people, to the greatest extent possible, without the need for adaptation. Existing literature highlights the sensory and social challenges faced by autistic individuals in public spaces, underscoring the necessity for inclusive design. Observational studies and archival research on public libraries provide data on current accessibility measures and their effectiveness, informing the specific focus on the Kollam Public Library.

### 1.4. Scope

- Focuses on public spaces with an emphasis on libraries, specifically the Kollam Public Library.
- Examines inclusivity and accessibility from the perspective of the autistic community.
- Aims to identify practical design strategies to enhance library experiences for autistic individuals.



### 1.5. Limitations

- **Observational Bias:** The reliance on observational methods may introduce observer bias, affecting the objectivity of the findings.
- **Secondary Data:** The study heavily relies on secondary data sources, such as literature reviews and case studies, which may limit the depth of primary data insights.
- **Generalizability:** Findings from the Kollam Public Library may not be fully generalizable to other libraries or public spaces with different contexts and user demographics.
- **Public Response:** The study explores the public's response to the incorporation of autistic patrons, which may vary and impact the effectiveness of inclusive strategies.

## II. LITERATURE REVIEW

This study is anchored in existing literature and research that highlights the importance of designing public spaces, particularly libraries, to be inclusive and accessible for the autistic community. The following key works provide the theoretical foundation for this research:

- **Autism Spectrum Disorder: Review Article,** by Wafaa Abdulmutalib Naji outlines the symptoms and treatments associated with ASD, providing a crucial understanding of the challenges faced by individuals with autism in public spaces (Naji, 2023). This foundational knowledge informs the need for specific design considerations to support the autistic community.
- **Creating Inclusive Library Environments,** by Michelle Kowalsky and John Woodruff offers strategies and guidelines for making library spaces more accessible for patrons with disabilities (Kowalsky & Woodruff, 2021). The methodologies and conclusions presented in this work emphasize the importance of tailored modifications to library environments to accommodate diverse needs.
- **Research on autism-friendly architecture** intersects with the specialized field focusing on designing environments that cater to the unique sensory and spatial needs of individuals with ASD. Notable principles include sensory sensitivity, visual clarity, and spatial organization, which are critical for creating autism-friendly spaces (Mustafa & Aspectss\*, 2020). This research advocates for the use of natural light, reduced noise levels, clear signage, and adaptable layouts.
- **Magda Mustafa and Aspectss,** have developed a framework based on seven design concepts that facilitate architecture for autism: acoustics, spatial sequencing, escape space, compartmentalization, transition spaces, sensory zoning, and safety (Mustafa, 2015). These principles are vital for ensuring that public spaces are not only inclusive but also beneficial for all user groups.

## III. METHODOLOGY

The methodology integrates a mixed-methods approach, incorporating both qualitative and quantitative data collection and analysis. This design allows for a comprehensive examination of the subject, integrating subjective experiences with objective measurements.

### 3.1 Qualitative Study

- **Literature Review and Case Studies:** Review of literature and case studies of various libraries that have incorporated inclusive design principles. This provides a theoretical foundation and practical examples of successful interventions.
- **Live Site Visits:** Conduct site visits to libraries with known inclusive designs for autistic patrons. These visits involve photo and video documentation of existing conditions, focusing on design elements such as lighting, textures, and spatial organization.
- **Interviews with Autism Specialists:** Conduct discussions with specialists in autism to gain insights into the specific needs and challenges faced by autistic individuals in public spaces.

### 3.2 Quantitative Study

- **Surveys:** Conduct surveys to analyze the experiences of autistic patrons in the Kollam Public Library and other selected libraries. The surveys collect data on user satisfaction, perceived accessibility, and areas needing improvement.



- Measurement of Environmental Factors: Quantitatively evaluate the library environment by measuring factors such as lighting levels, types of textures used, and the number of colours in various spaces. This helps in assessing sensory aspects that impact autistic patrons.

### 3.3 Data Analysis Framework



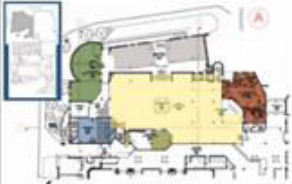

- Qualitative Analysis: Conduct a thematic analysis of the literature review, case studies, and interview data to identify common themes and strategies for inclusive design. Observations from site visits are analyzed to assess the effectiveness of current design elements.
- Quantitative Analysis: Use statistical methods to analyze survey data and measurements of environmental factors. Correlation analysis is conducted to identify relationships between ASD, inclusive design features, and the experiences of autistic patrons.

## IV. DATA ANALYSIS AND FINDINGS

Data was collected from literature case studies, live case studies, and site-specific analysis at Kollam Public Library to evaluate the effects on autistic patrons and identify strategies for enhancing inclusivity and accessibility. The data from literature case studies are summarized in Table 1, live case studies in Table 2, and the site-specific analysis of Kollam Public Library in Table 3.

### 4.1 Literature case study

Table 1: Literature case study

PARAMETERS	Thornhill Community Centre Library	The K.O. Lee Aberdeen Public Library
Location and Neighborhood	 <ul style="list-style-type: none"> <li>• Ontario, Canada</li> <li>• Located centrally in a large residential zone.</li> <li>• Act as the main central zone of the village community in Canada.</li> </ul>	 <ul style="list-style-type: none"> <li>• Aberdeen, US</li> <li>• Similar as Thornhill Library</li> <li>• Located in residential area.</li> </ul>
Design Approach	Sensory Approach	Sensory Approach
Spatial Sequencing	 <ul style="list-style-type: none"> <li>• Smaller rooms surrounding the large central space.</li> <li>• Limited number of segregation to avoid confusion.</li> <li>• Separated large space for children and differently abled near to existing garden.</li> </ul>	 <ul style="list-style-type: none"> <li>• The whole plan is divided into 2 part with the entry pathway</li> <li>• Readers zone is simply divided into 2 spaces- Children and adults.</li> <li>• Linear pathways providing minimum confusion.</li> </ul>



<p><b>Colour</b></p>	<ul style="list-style-type: none"> <li>• Subtle and pastel colour scheme was used</li> </ul>	<ul style="list-style-type: none"> <li>• pastel, warm and cool color palette used</li> </ul>
<p><b>Texture</b></p>	<ul style="list-style-type: none"> <li>• Soft and glazed textures are used overall the library since rough texture cause sensory trigger.</li> </ul>	<ul style="list-style-type: none"> <li>• Variety of textures and tactile tiles used for sensory stimulation.</li> </ul>
<p><b>Acoustics</b></p>	<ul style="list-style-type: none"> <li>• 150 mm dense concrete masonry walls used for improving acoustics.</li> </ul>	<ul style="list-style-type: none"> <li>• 19mm thick carpeting</li> <li>• Wood wool boards act as natural sound absorbers, preventing soundwaves from bouncing between walls</li> </ul>
<p><b>Circulation and Transition</b></p>	<ul style="list-style-type: none"> <li>• Multi directional circulation</li> <li>• Mere corridors</li> <li>• No curves or circular motion</li> </ul>	<ul style="list-style-type: none"> <li>• Linear movement for easy understanding of circulation.</li> <li>• No circular movement</li> <li>• A single long corridor</li> <li>• The corridor act as heart of movement structure.</li> </ul>
<p><b>Escape spaces</b></p>	<ul style="list-style-type: none"> <li>• Muted colours</li> <li>• Isolated space</li> <li>• Provide a private space for them to get comfortable</li> </ul>	<ul style="list-style-type: none"> <li>• Cool colours</li> <li>• Individual cubicles</li> <li>• Such spaces help them relax, refocus and calm down from any sensory triggers.</li> </ul>
<p><b>PARAMETERS</b></p>	<p><b>Markham Public Library</b></p>	<p><b>The K.O. Lee Aberdeen Public Library</b></p>
<p><b>Lighting</b></p>	<ul style="list-style-type: none"> <li>• No much attention was provided for lighting</li> <li>• Task lighting provided in reading areas</li> <li>• 35W Equivalent Tube Light Bulb, Non-Dimmable Daylight</li> </ul>	<ul style="list-style-type: none"> <li>• Warm lights are used.</li> <li>• Dimmable products are used.</li> <li>• 36 Watts LED Batten Tube Light warm light</li> </ul>

#### 4.2 Questionnaire with Mr. Ranganath K S

The brief of the discussion is that the individual visits the library weekly, primarily for their role as a librarian, their interest in reading, and Balasahityam. They feel calm and focused in the library and prefer visiting in the early morning when it is less crowded, finding dimmable lights more comfortable. They favor the study cubicles for their quiet environment but avoid the study area due to feeling overwhelmed. They suggest quiet study rooms, sensory-friendly areas, clear signage, and comfortable seating, and they face challenges in finding quiet spaces and would appreciate personal assistance from the library staff.


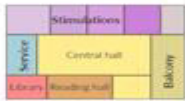



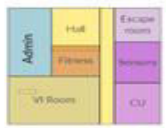



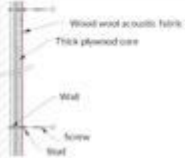

#### 4.3 Questionnaire with Dr. Immanuel Thomas

Autistic individuals generally exhibit mild behavioral patterns, preferring comfort zones and responding to discomfort with repetitive behaviors or aggression. They favor warm, dimmable lighting and monotonous colors in quiet areas, with preferences for well-lit, warm tones while reading. Comfortable textures such as wood and soft fabrics are preferred, avoiding hard and rough materials.




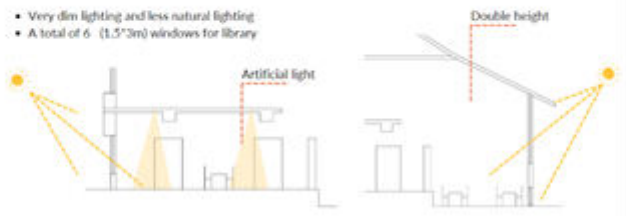

4.4 Findings from Live Case study

Table 2: Live case study

PARAMETERS	Different Art Centre, Trivandrum	Effect on Autistic Patrons
Location and Neighborhood	 <ul style="list-style-type: none"> <li>Kutukkiottam, Magic planet, Trivandrum</li> <li>Located away from the town, remoted near residential area.</li> <li>Topographically having many undulations engineered efficiently.</li> </ul>	
Design Approach	Based on behavior and sensory approach	Minimize triggers and uncomfortability
Spatial Sequencing	 <ul style="list-style-type: none"> <li>Smaller rooms surrounding the large central space.</li> <li>Balcony space for performance</li> <li>Library space is located after a transition space.</li> <li>Transitions amongst different activity maintained.</li> </ul> 	<ul style="list-style-type: none"> <li>Transition help them adapt to different activity</li> <li>Spontaneous changes cannot be tolerated by their minds.</li> <li>Minimize behavioral triggers.</li> </ul>
Circulation and Transition	 <ul style="list-style-type: none"> <li>Multi directional circulation</li> <li>Mere corridors</li> <li>No curves or circular motion</li> <li>Through branching can create confusions, transition spaces provide them time to analyze</li> <li>Open planning</li> </ul> 	<ul style="list-style-type: none"> <li>Reduce dependency</li> <li>Easy navigation</li> <li>Prevent being lost</li> </ul>
Escape spaces	 <ul style="list-style-type: none"> <li>Escape room are near sensory and visual stimulation zones.</li> <li>This help supported to use the aid to change the focus of the patrons.</li> <li>Muted colours and cozy space.</li> </ul> 	<ul style="list-style-type: none"> <li>Avoid hyperstimulation.</li> <li>Control sensory stimulations.</li> <li>Induce soft stimulations</li> </ul>
Colour	 <ul style="list-style-type: none"> <li>Muted colours with monochrome scheme in most spaces</li> <li>No bright fluorescent colours used within the building</li> <li>Bright contrasting colors in sensory stimulation zone</li> </ul>	<ul style="list-style-type: none"> <li>Control hypo/hyper sensitivity towards colours</li> <li>Bright contrasting colours help in sensory stimulation zone</li> </ul>
Texture	 <ul style="list-style-type: none"> <li>Wool, wooden furniture, rubber, Tactile tiles, Cushions, Wooden flooring</li> </ul>	<ul style="list-style-type: none"> <li>Avoid rigid institutional atmosphere</li> <li>Make them more comfortable</li> <li>Homely feel</li> </ul>
Acoustics	<ul style="list-style-type: none"> <li>Acoustical proofing wasn't considered except for diagnosis room.</li> <li>Wood wool acoustical panels</li> </ul> 	<ul style="list-style-type: none"> <li>Reduce hypo/hyper sensitivity towards noises.</li> </ul>
Lighting	 <ul style="list-style-type: none"> <li>Warm lightings only used</li> <li>High intensity bright light for sensory zones</li> <li>Most lights from ceiling to avoid direct contact with eyes.</li> </ul>	<ul style="list-style-type: none"> <li>Protect their eyes from bright lines</li> <li>Reduce the tendency to stare into bright glittery lights</li> <li>Reduced side effects on Eyesight</li> </ul>

4.5 Site Analysis: Kollam Public Library

Table 3: Site Analysis

PARAMETERS	Kollam Public Library	Effect on Autistic Patrons
Location and Neighborhood	 <ul style="list-style-type: none"> <li>• Karbala, Kollam</li> <li>• Located near Central Railway Station, Kollam</li> <li>• High risk for conflicts</li> <li>• Large traffic congestion</li> <li>• Busy street with chances to unpredictable movements</li> </ul>	<ul style="list-style-type: none"> <li>• High risk of getting violent</li> <li>• Chances of high sensory stimulation due to exterior noise</li> <li>• Behavioral change due to unfamiliar surrounding</li> </ul>
Design Approach	Differently abled not considered	Minimal visits
Spatial Organization	 <ul style="list-style-type: none"> <li>• Lounge area leads to reading room, book storage and upstairs</li> <li>• Limited number of separation</li> <li>• Large number of levels</li> <li>• No separate spaces for children and adults</li> </ul>	<ul style="list-style-type: none"> <li>• Confusion arises due to planning</li> <li>• Emotional instability due to zoning in different levels</li> <li>• Stimulation in behavior due to confusion</li> </ul>
Circulation and Transition	 <ul style="list-style-type: none"> <li>• Multi directional circulation</li> <li>• No corridors</li> <li>• No curves or circular motions</li> <li>• Linear movement</li> <li>• Open planning</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce dependency</li> <li>• Easy navigation</li> <li>• Prevent being lost</li> </ul>
Escape spaces	<ul style="list-style-type: none"> <li>• No escape rooms</li> </ul>	<ul style="list-style-type: none"> <li>• No space to control sensory stimulations,</li> <li>• Irritated behavior with lack of space to relax</li> </ul>
Colour	 <ul style="list-style-type: none"> <li>• Traditional colours and reduced contrast</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced sensory stimulation</li> </ul>
Texture	<ul style="list-style-type: none"> <li>• Wooden furniture, Concrete flooring</li> </ul> 	<ul style="list-style-type: none"> <li>• Create rigid institutional atmosphere</li> <li>• Make them less comfortable</li> </ul>
Acoustics	<ul style="list-style-type: none"> <li>• Acoustical proofing wasn't considered</li> </ul>	<ul style="list-style-type: none"> <li>• Cause hypo/hyper sensitivity towards noises.</li> </ul>
Lighting	<ul style="list-style-type: none"> <li>• Very dim lighting and less natural lighting</li> <li>• A total of 6 (1.5*3m) windows for library</li> </ul> 	<ul style="list-style-type: none"> <li>• Hypo/ hyper tension</li> <li>• Induce fear</li> <li>• Irritation causing stimulation</li> </ul> 

V. RESULTS AND DISCUSSION

Based on the survey, interviews, and analysis of literature and live case studies, the condition of Kollam Public Library for incorporating autistic patrons was examined. The analysis revealed that the library's location in a busy area with high foot traffic is not conducive to the comfort of autistic patrons. The spatial arrangement and circulation within the library are confusing, which can cause distress for these individuals. Additionally, the lighting in the library is poor,

although the color and texture palette is generally soothing and appropriate for autistic patrons. As a conclusion, the study discusses strategies for accommodating autistic individuals in libraries across Kerala, using Kollam Public Library as a reference point for necessary improvements and implementations.

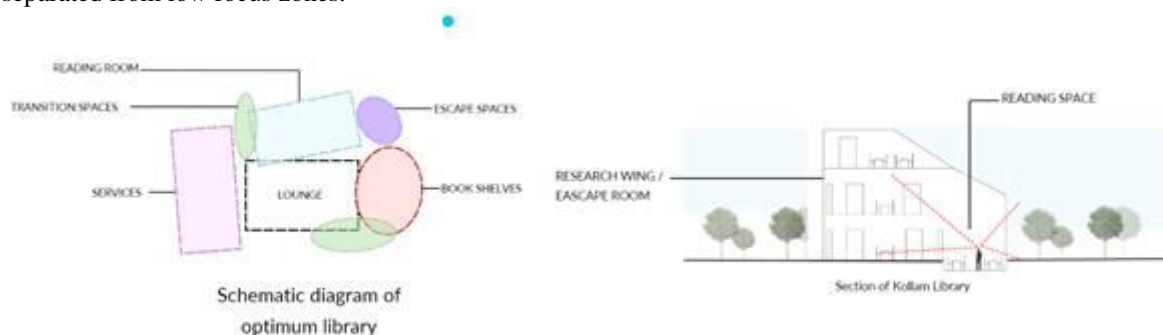
## VI. CONCLUSIONS AND RECOMMENDATIONS

As the conclusion of this dissertation, general guidelines essential for public libraries in Kerala to follow in order to create an inclusive and accessible environment for autistic patrons are presented. These guidelines are derived from the inferences and findings of the studies conducted during this research.

### 6.1 General Guidelines & Design Recommendations

#### Spatial Organization

Research shows Autistic often struggle with memory related to navigating and locating spaces or objects. High focus zones separated from low focus zones.



#### Circulation and Transition



#### Colour

Minimize dramatic contrast. In case of Kollam Library colour palette is good.

#### Texture

In general, natural materials are the preferred choice whenever possible- for example wood flooring and natural fabric upholstery.

Tactility should be a guiding factor in material choices, addition of loose soft furnishing such as tactile swatches, cushions and area rugs.

#### Acoustics

Free standing acoustical panels

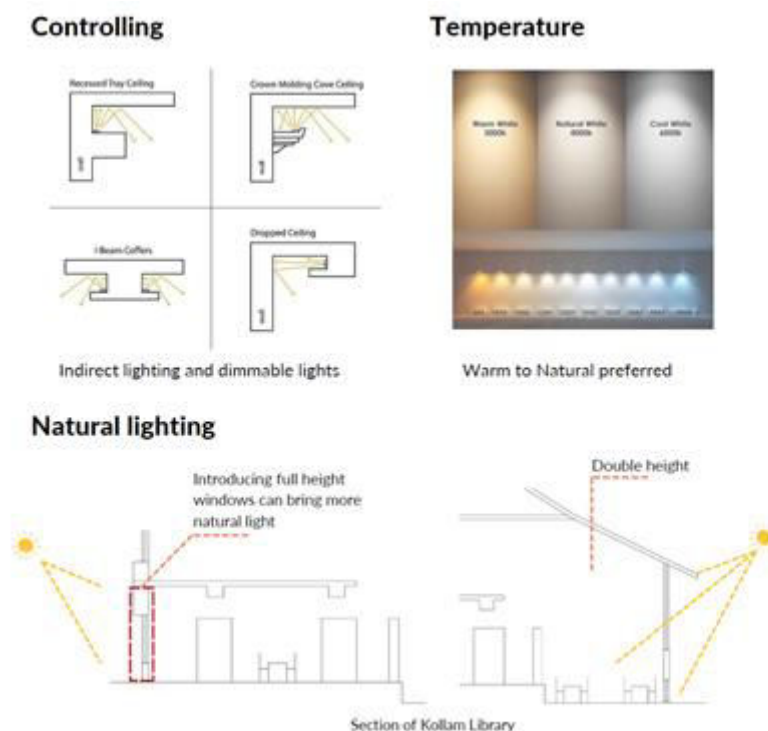
Different configurations and levels of enclosure.

Sound absorbent materials like wood wool panels, carpeting etc...

Acoustical ceiling treatments including ceiling mounted sound absorbent panels, gypsum boards.



## Lighting



Source: Temperature of lighting

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