

SENSORY-SUPPORTED SPATIAL ACTIVATION: ARCHITECTURAL STRATEGIES FOR ELDERLY SOCIAL ENGAGEMENT

A focus on Private Retirement Facilities in Sri Lanka

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Abstract: Population ageing in Sri Lanka has increased reliance on Residential Care Facilities (RCFs), highlighting the need for environments that support both social engagement and sensory comfort. This study examines how spatial configuration and sensory qualities influence elderly social interaction across three private RCF case studies.

A two-phase mixed-methods approach was adopted: Phase 1 used activity mapping and administrative interviews to identify intentionally designed and organically activated social spaces; Phase 2 gathered residents' perceptions through unstructured interviews and walk-along conversations. Findings show that organically activated spaces – those used voluntarily without institutional prompting – were consistently associated with proximity to living quarters, visual connection to engaging surroundings and comfort-related sensory attributes such as thermal regulation, seating quality and acoustic control. Smaller group formats were preferred for fostering meaningful interaction.

The study concludes that social interaction is best supported when spatial accessibility, sensory comfort and emotional resonance align. A resident-centred spatial design framework is proposed to guide future architectural and operational strategies in Sri Lankan eldercare settings.

Keywords: *Ageing well, Residential Care Facilities, Social Interaction, Sensory Comfort, Organic Engagement*

1. Introduction

Sri Lanka is undergoing a rapid demographic transition, with the proportion of persons aged 60 years and above increasing from 6.6% in 1981 to 12.4% in 2012 and projected to reach 24.8% by 2041 (United Nations Population Fund [UNFPA], 2017). Over the same period, the median age of the population rose from 21.4 to 31 years, reflecting broader shifts in age structure (UNFPA, 2017). Simultaneously, changes in family composition and migration patterns have altered traditional caregiving norms. The prevalence of nuclear families, urban migration of younger generations, and reduced co-residence of older and younger family members have weakened the historically dominant model of multi-generational care (De Silva & Welgama, 2014).

In response to these demographic and social changes, private residential care facilities (RCFs) have expanded, particularly in urban centres, catering to a paying clientele from middle- and upper-income groups. While Sri Lanka's healthcare provision remains predominantly public, the private sector is increasingly active in long-term residential eldercare, offering enhanced service quality, comfort, and design standards (Dissanayake & Weeratunga, 2016). This competitive environment has elevated the role of architectural strategies - particularly in the design and activation of communal spaces - as a differentiating factor in attracting and retaining residents.

Despite serving a clientele that values comfort and aesthetic appeal, private RCFs in Sri Lanka tend to prioritise physical care over social programming. While visual qualities are often considered for marketing, spatial strategies that encourage resident-led, informal interaction remain underdeveloped. Centrally scheduled daily routines and activity-driven programmes mean that shared areas are frequently underused outside organised events. This presents a design challenge: how to support spontaneous, everyday interaction through spatial planning rather than through institutional scheduling. Within this context, this study distinguishes between intended spaces, which are formally designated for social activity, and organically activated spaces, which residents choose to occupy without prompting. Understanding why some spaces become organically active while others remain unused is key to improving social engagement in RCFs.

While international research extensively addresses accessibility and safety in elderly care environments, studies on optimizing spatial configurations for organic social interaction remain limited. Sensory design elements – such as lighting, acoustics and tactile qualities – are often treated as therapeutic add-ons rather than integrated into spatial planning. In Sri

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Lanka’s private RCF sector, there is a particular lack of empirical studies exploring how layout centrality, visual connectivity, physical accessibility and sensory reinforcement combine to influence the use and vibrancy of communal areas. This study addresses that gap through an analysis of multiple case studies of private RCFs.

The aim of this study is to identify which spatial configurations best support social interaction in Sri Lankan private RCFs and whether sensory reinforcement plays a role in activating these spaces. To achieve this, the objectives are to:

- Identify socially active spaces within the selected private RCFs.
- Analyse how layout factors (centrality, accessibility, and visual connectivity) affect patterns of interaction.
- Examine the role of sensory qualities (lighting, acoustic control, tactile comfort) in sustaining use of these spaces.

The study focuses on cognitively sound and reasonably mobile residents (independently mobile or using self-operated mobility aids), ensuring that participation in communal spaces reflects personal preference rather than placement by staff. Residents with significant cognitive impairments were excluded as a limitation of the study. The research is limited to three private RCF case studies in Sri Lanka and does not address clinical care aspects, staffing models, or non-architectural service delivery.

2. Literature Review

The World Health Organization’s, [WHO] (2002) Healthy Ageing framework positions “ageing well” as the ongoing process of developing and maintaining functional ability to enable wellbeing in older age. This encompasses maintaining independence, mobility, and a sense of purpose through active engagement in social, cultural, and community life. Empirical studies link higher levels of social participation with reduced cognitive decline, lower depression rates, and improved overall quality of life. In institutional settings, opportunities for informal and structured social interaction are critical to sustaining emotional resilience and identity.

2.1 SOCIAL INTERACTION TYPES AND DYNAMICS FOR AGEING WELL

Positive self-perceptions of ageing (SPA) are linked to higher social integration and active engagement (Diehl et al., 2021), while negative age stereotypes – though not always supported by empirical evidence – can hinder participation (Robertson, 2016).

Social participation extends beyond casual interaction to encompass interpersonal contact, community engagement, structured activities, and technology-mediated connections (Luo et al., 2020). In residential care, strong peer networks and frequent opportunities for contact are associated with improved quality of life (Shen et al., 2022) and smoother adaptation to institutional living, providing emotional stability during transitions (Sun et al., 2021).

From a sociological perspective, Simmel (1950) shows that group size fundamentally shapes the intimacy and complexity of social relations. Dyads foster deep trust and reciprocity, triads allow for balanced yet diversified interaction, and small clusters support semi-private conversations.

Table 1 - Social Group Sizes, Dynamics and Benefits
(Source: Based on (Shen et al., 2022; Simmel, 1950))

Group Type	Typical Size	Interaction Characteristics	Individual benefits
Dyads	2	Deep, focused engagement	Emotional support, trust
Triads	3	Balanced interaction, reduced isolation risk	Cognitive stimulation, varied perspectives
Small clusters	4-6	Semi-private conversations	Sense of belonging, casual support
Large activity groups	7+	Structured, event based	Community identity, reduced loneliness

2.2 DESIGN CONSIDERATIONS FOR SOCIAL AND SOCIABLE SPACE

Lefebvre’s (1991, as cited in Brown, 2020) theory of spatial practice and lived space highlights how the design of environments influences social rhythms. Built environments, therefore, are not passive backdrops, but rather they structure patterns of movement, visibility, and congregation, which together foster or hinder opportunities for social connection.

Small and Adler (2019) extend this discussion by identifying specific spatial factors that influence interpersonal contact. Together, these considerations inform a design approach that encourages both intentional and incidental social engagement, creating spaces where interaction is possible without being imposed.

Table 2 - *Small & Adler's (2019)* proposed Concepts for Designing Social and Sociable Space

Concept	Idea	Outcomes
Spatial Proximity	Keep destinations close	Increase chance encounters
Spatial Composition	Use fixed focal points	Create gathering spots
Spatial Configuration	Arrange paths and barriers thoughtfully	Maintain sightlines, multiple routes
Focused Interaction	Provide central social features	Support sustained engagement
Space Syntax	Ensure good connectivity	Balance access & privacy
Third Places	Offer informal social spots	Encourage casual interaction
Mixed-Use	Combine varied functions	Attract diverse users and activities

2.3 HOLISTIC DESIGN APPROACHES IN AGED CARE

Design in aged care requires a careful balance of safety, autonomy, and quality of life. Physical environments should not only prevent harm but also promote independence, dignity, and social engagement. Within this context, Seemann et al. (2024) emphasise several practical considerations to ensure that residents remain active participants in their environment rather than passive recipients of care:

- Safety & Independence – Clear spatial layouts, tonal contrast for visibility, accessible circulation and adequate lighting.
- Personalisation – Individualised rooms, small household clusters and domestic-scale kitchens to reduce institutional character.
- Outdoor Access – Direct entry to gardens, verandas and well-defined outdoor pathways to support mobility and mental well-being.
- Social Integration – Shared community spaces that act as hubs for interaction.

Sensory reinforcement also plays a crucial role in maintaining engagement and comfort. Age-related changes in vision, hearing, smell, taste, and touch require targeted interventions, such as high-contrast visual environments, minimised noise pollution, and the incorporation of natural sounds. Tactile cues like textured landmarks aid navigation and stability, while natural or nostalgic scents evoke emotional responses and a sense of place. Food-oriented communal spaces can stimulate appetite, encourage social interaction, and support community cohesion (Vincent & Hartt, 2024).

Furthermore, a multi-sensory design approach, as emphasised by Pallasmaa (1996) enriches spatial experience through the integration of sight, sound, touch, smell and proprioception. Design strategies such as biophilic elements, dynamic natural materials, varied lighting and soundscapes create deeper emotional and memory-based connections with space. This approach moves beyond ocular-centric environments, encouraging embodied interaction that supports safety, engagement and psychological well-being.

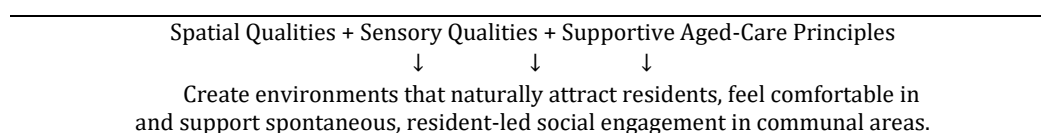
2.4 CRITICAL SYNTHESIS

Taken together, the reviewed literature highlights how elderly social engagement is shaped by the interaction of three interdependent domains: the spatial configuration of communal environments, the sensory qualities that influence comfort and emotional resonance, and the aged-care design principles that support independence and social integration.

Spatial theories emphasise that proximity, visibility, and circulation patterns can either enable or inhibit everyday encounter (Lefebvre, 1991 as cited by Brown, 2020; Small & Adler, 2019). Sensory-oriented scholarship argues that multi-sensory cues – light, sound, texture and materiality – play a critical role in shaping an individual’s willingness to linger, observe or engage with others (Pallasmaa, 1996; Vincent & Hartt, 2024). Aged-care design guidelines extend this understanding by foregrounding the importance of safety, familiarity, and domestic-scale environments for maintaining participation in daily life (Seemann et al., 2024; WHO, 2002).

Although these bodies of research are complementary, their combined application remains underexplored in Sri Lankan private RCFs, where communal areas are often aesthetically pleasing yet functionally under activated. This synthesis forms the conceptual foundation for the current study, proposing that social activation emerges most effectively when spatial accessibility, sensory comfort and supportive aged-care principles operate in tandem.

Table 3 - Integrated Theoretical Foundations Guiding the Study



3. Methodology

This study adopts a multiple case study approach, examining three private residential care facilities with differing spatial layouts, sensory environments, and operational routines. This strategy enables an in-depth understanding of how spatial and sensory factors shape everyday social engagement in real settings, aligning with the study's aim of identifying the environmental attributes that support organically active social spaces.

3.1. RESEARCH DESIGN

A two-phase mixed-methods design was employed to capture both the observable spatial behaviours of residents and their sensory and social perceptions of communal spaces. Activity mapping provides evidence of how communal spaces are occupied throughout the day, offering an objective picture of spatial activation. Unstructured interviews complement these observations by revealing the subjective factors – comfort, atmosphere, emotional connection – that cannot be observed externally. Together, these methods provide the depth and triangulation needed to understand how spatial configuration and sensory qualities interact to shape social engagement in residential care environments. This methodological combination also reflects the integrated theoretical foundation established in the literature, where spatial, sensory and aged-care design principles are understood as inter-dependent.

3.1.1 Hypothesis derivation

The study is guided by the hypothesis that sensory-rich spaces attract residents and support more naturally formed social connections. This proposition, informed by the literature, suggests that environments with visual interest, tactile comfort, and supportive ambient qualities are more likely to encourage residents to enter, remain, and interact than spaces activated solely through scheduled programming.

3.1.2 Phase 1 – Identifying Social Spaces and Their Effectiveness

- Identify deliberately designed social spaces within selected RCFs.
- Map and categorise spaces as organically activated or routine based.
- Document types of activities, interaction levels, and spatial use patterns.

3.1.3 Phase 2 – Identifying Social and Sensorial Preferences of Occupants

- Understand the residents' preferred social networks, group sizes and interaction types.
- Identify sensory and environmental factors influencing space choice.
- Explore the role of emotional connection, inclusivity, and comfort in social space selection.

3.2 DATA COLLECTION

Data for this study were gathered using a combination of qualitative tools

3.2.1 Phase 1 – Identifying Social Spaces and Their Effectiveness

- Administrative Interviews - Background study of each RCF and identification of intended social spaces.
- Visual Site Surveys - On-site observation and photographic documentation of spatial arrangements and features.
- Activity Mapping - Recording spatial use throughout the day to identify organically activated vs. routine-based spaces.

Activity mapping was selected because it offers a reliable means of identifying organically activated spaces by documenting how residents choose to occupy their environment outside of staff-directed routines. This method is particularly suited to studies of communal space use, where spontaneous behaviour reveals more about residents' preferences than scheduled activities.

3.2.2 Phase 2 – Identifying Social and Sensorial Preferences

- Unstructured Resident Interviews - Conversations with residents in organically activated spaces to identify social preferences, emotional connections and sensory influences.

Phase 2 explored why residents gravitate toward spaces, complementing the observational findings from Phase 1. Unstructured interviews and walk-along conversations revealed both conscious preferences and instinctive responses to spatial and sensory qualities.

3.3 DATA ANALYSIS AND PRESENTATION

The study employed three main tools for data analysis and presentation

- Spatial Zoning Plans – Used to map observed space activation patterns against the physical layout of each facility, allowing for visual comparison between designed intent and actual use.
- Tables and Checklists – Applied to systematically record spatial attributes, activity types, and interaction levels, enabling direct comparison with the hypothesised framework.

- Thematic Coding – Used to analyse qualitative interview data, identifying recurring themes related to social preferences, sensory factors, and perceived effectiveness of spaces.

3.4 SAMPLING STRATEGY

A purposive sampling strategy was adopted to select both the study sites and the participant group.

3.4.1 Site Sampling (Case Studies) – Purposeful sampling

Three private (profit-based) RCFs were purposefully selected as case studies:

- Village 60 Plus, Narahenpita
- Village 60 Plus, Nugegoda
- Cinnamon Grove, Thuttipitiya

Selection criteria:

- Contrasting spatial configurations and operational approaches
- Rich, context-specific insight into multi-sensory, socially active spaces
- Willingness of management to participate
- Scoping informed by administrative interviews at each facility

3.4.2. Participant Sampling – Criterion sampling

Inclusion criteria:

- Free from cognitive impairments affecting response accuracy
- Willing residents (to avoid bias from dissatisfaction)
- Reasonable mobility to navigate spaces independently (minor limitations acceptable)

7 residents per facility selected → total sample size n = 21

Residents with significant cognitive impairments were excluded because the study required participants to articulate their sensory experiences and social preferences reliably as well as move independently within the facility during spatial observation. While this criterion ensures the accuracy of interview data and behavioural mapping, it also constitutes a limitation, as the perspectives of cognitively impaired residents – who may interact with space in different ways – are not represented in this study.

4. Data presentation and Analysis

As the data collection was based on two primary approaches - spatial observation with activity mapping and resident interviews - the analysis integrates objective mapping of space activation patterns with subjective accounts of spatial and sensory preferences.

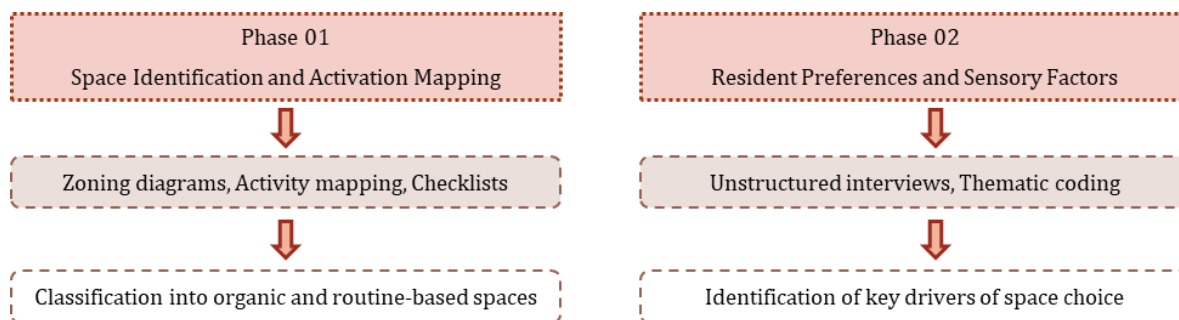


Figure 1 - Data Analysis and Presentation in Phases 01 and 02
(Source: Author)

4.1 PHASE 1 – SOCIAL SPACE AND PATTERN IDENTIFICATION

The data from Phase 1 will be analysed through spatial mapping of use patterns, comparison of intended versus organically activated spaces, and checklist-based evaluation against the hypothesised sensory-rich attributes.

4.1.1 Administrative Interviews – Deliberately Provided Spaces (Routine Activities)

Interviews with facility administrators identified the spaces intentionally provided for routine or programmed social activities in each case study.

- Case study 01 (CS1) – TV lobby, Visitor’s lobby, Garden (all located in the Ground level)

- Case study 02 (CS2) – Main living room (main house), Garden, Mini porch (female residents), Mini lobby (men’s wing)
- Case study 03 (CS3) – Verandah overlooking garden, TV lobby, Entrance seating area

4.1.2 Survey – Organically Used Spaces and Group Sizes

On-site observation and space-use surveys recorded the organically activated spaces - those occupied for deliberate or incidental contact outside of routine programming - along with typical group sizes.

Table 4 - Space Use and Group Patterns
(Source: Author)

Case Study	Organically Activated Spaces	Intended Purpose of Space	Group Size Patterns
CS1	2 mini lobbies at upper floors	TV lobbies and extra dining space	6 – 8 residents
	Bench and security point at entrance	Security point	2 – 3 residents
CS2	Main house porch overlooking garden	As a gathering space for a small group of residents in main house	10 – 12 residents and staff
	Shaded porch outside men’ quarters	Circulation	2 – 3 residents
CS3	Outdoor entrance seating area	Visitor entertainment	4 – 5 residents
	Indoor entrance seating	Office waiting area	4 – 8 residents
	Corridors	Circulation and connection of spaces along one linear path (entry and shrine room connected with bedrooms on either side)	2 – 3 residents (several sets of duos and trios)

4.1.3 Checklist – Spatial Qualities Present in Organically Activated Spaces

Using the literature review framework, the organically activated spaces were evaluated against identified qualities of effective elderly social spaces. The analysis is presented in the tabulated checklist below.

Table 5 - Literature based Spatial Qualities in Intended and Preferred Social Spaces as a Checklist

Case Study	Space Type	Space Name	Proximity to Living Quarters	Visual Connection to Stimulating Surroundings	Comfortable Seating	Balanced Natural Lighting	Low Ambient Noise	Thermal Comfort / Ventilation	Indirect Engagement with Nature
CS1	Intended	TV Lobby	✗	✗	✓	✓	✗	✗	✗
		Visitor’s Lobby	✗	✗	✓	✗	✓	✓	✗
		Garden	✗	✗ (unappealing garden)	✗	✗ (harsh /direct)	✓	✓	✗ (direct)
	Preferred	Mini Lobbies (each floor)	✓	✓ (street activity)	✓	✓	✗	✓	✓
		Entrance Bench/ Seating	✗	✓ (street activity)	✓	✗ (bit direct)	✓	✓	✓
CS2	Intended	Main Living Room	✗	✗	✓	✓	✓	✓	✗
		Garden	✗	✓ (garden)	✓	✓	✓	✓	✗ (direct)
		Mini Porch (Women)	✓	✓ (garden)	✓	✓	✓	✓	✓
		Mini Lobby (Men)	✓	✓ (garden)	✗	✗ (bit direct)	✓	✓	✓
	Preferred	Women’s Porch	✓	✓ (garden)	✓	✓	✓	✓	✓

		Men’s Porch Strip	✓	✓ (garden)	✗	✗ (bit direct)	✓	✓	✓
CS3	Intended	Porch	✗	✓ (garden)	✓	✓	✓	✓	✓
		TV Lobby	✗	✓ (garden)	✓	✗	✗	✗	✗
		Entrance Seating	✗	✓ (garden)	✓	✓	✓	✗	✓
	Preferred	Corridor (artwork/p hotos)	✓	✓ (artwork/ garden)	✓	✓	✓	✓	✓
		Porch	✗	✓ (garden)	✓	✓	✓	✓	✓
		Entrance Seating	✗	✓ (garden)	✓	✓	✓	✗	✓

4.2 PHASE 2 – USERS’ SPATIAL QUALITY PREFERENCE IDENTIFICATION

Phase 2 explored why residents gravitate toward certain spaces over others, complementing the behavioural patterns identified in Phase 1. Residents’ descriptions revealed both conscious preferences and intuitive responses to spatial and sensory qualities which shaped their comfort levels and willingness to engage with others. Thematic coding of interview transcripts distilled recurring patterns related to accessibility, comfort, visual connection and emotional satisfaction.

4.2.1 Thematic findings from unstructured interviews

- *Accessibility and Proximity* – Spaces closer to living quarters or requiring minimal physical exertion were preferred, particularly for residents with mobility limitations.
- *Visual Connection to Stimulating Surroundings* – Spaces that offered a view of activity (e.g., street in CS1, garden views in CS2, corridor displays in CS3) encouraged use by providing conversation prompts.
- *Thermal and Acoustic Comfort* – Residents avoided overly hot, cold, or noisy spaces. Naturally ventilated and shaded areas were particularly valued. Direct garden use was avoided by most since there was little to no shading available.
- *Comfortable Seating and Familiar Materials* – Upholstered chairs, armrests and finishes reminiscent of domestic interiors encouraged longer stays.
- *Indirect Engagement with Nature* – Participants expressed a preference for enjoying nature visually from sheltered spaces, rather than sitting directly outdoors. Views of the outdoors was preferred over actually being outdoors.
- *Scale of Social Group* – Preference was predominantly for trios and smaller groups. Those who considered themselves more introverted mentioned preferring larger groups due to not needing to contribute as much to conversations but being able to passively engage with others.

4.2.2 Comparative Table of Repeated Insights

The spatial preferences derived from the interviews are summarised in Comparative Table 5 below, outlining the *primary draw factors* – the features that initially attract residents to a space – and the *retention factors* - the qualities that encourage them to remain and engage in social interaction.

Table 6 - Primary Draw Factors and Retention Factors of Preferred Social Spaces

Case Study	Key Preferred Spaces	Primary Draw Factor	Comfort/Retention Factor
CS1	Mini lobbies, Entrance bench	View of street activity, proximity	Comfortable seating, natural ventilation
CS2	Women’s porch, Men’s porch strip	Garden view from shade	Shade, seating comfort, weather protection
CS3	Corridor, Porch	Artwork and photo displays, garden view	Shaded seating, thermal comfort

4.3 THEMATIC CODING OF KEY INSIGHTS

The thematic coding process distilled residents’ spatial preferences into three interrelated layers of influence, illustrated in Figure

- *Inner Core* – Comfort Factors: The foundational element sustaining prolonged social use of space, including thermal regulation, comfortable seating, appropriate lighting, and low ambient noise. Without these, even attractive spaces saw reduced occupancy times.
- *Middle Ring* – Accessibility and Proximity: Ease of access from living quarters, minimal physical exertion, and clear circulation paths determined initial space choice, particularly for residents with mobility limitations.

- *Outer Ring* – Visual and Environmental Engagement: Views to stimulating surroundings (street activity, garden vistas, artwork displays) acted as primary attractors, initiating interest and conversation prompts.

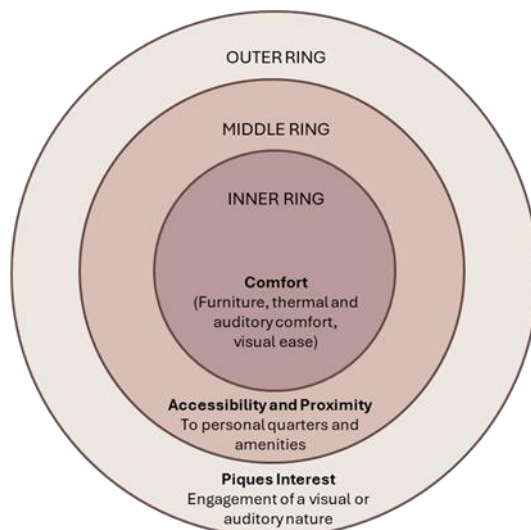


Figure 2 - Thematic Coding of Findings

The layered model emphasises that while visual engagement may draw residents to a location, accessibility ensures they can reach it, and comfort is what encourages them to remain and interact.

5. Conclusions and Recommendations

Social spaces in residential care settings succeed not through design intent alone but when they meet three resident-centred conditions: they must attract interest, be accessible without effort and offer a level of comfort that invites lingering.

When a space is visually or acoustically appealing but physically difficult to access, residents tend to overlook it regardless of its sensory qualities. Similarly, even the most accessible space is underused if it's uncomfortable or overstimulating.

5.1 A DESIGN FRAMEWORK FOR CREATING SOCIAL SPACES WITHIN RESIDENTIAL CARE FACILITIES

The following multi-stage framework is proposed to support organic social interaction among elderly residents through spatial and sensory design:

- *Attraction to a Space*: Use familiar materials, culturally resonant elements and visual stimuli in strategic locations along common paths.
- *Accessing a Space*: Prioritise inclusive design, clear wayfinding and perceived safety to ensure spaces feel approachable and navigable.
- *Willingness to Stay*: Provide thermal and acoustic comfort, ergonomic furniture and adjustable sensory settings to support comfort and ease.
- *Encouragement to Interact*: Integrate visual prompts, familiar cultural cues and reduce distractions to facilitate passive or active engagement.

When spatial layouts, material choices and sensory qualities align with the lived experiences of residents, social connection emerges more naturally. This framework offers a practical reference for architects and care facility designers aiming to foster genuine community through space, rather than through programming alone.

5.2 RECOMENDATIONS FOR FUTURE RESEARCH

To extend and deepen these findings, the following areas are recommended for future exploration:

- **Broader Resident Profiles**: Include individuals with mobility impairments, cognitive decline, or from lower-income facilities to understand how needs shift across groups.
- **Cross-Cultural Validation**: Apply the framework in different cultural contexts to test its relevance beyond the Sri Lankan setting.
- **Temporal Patterns**: Investigate how use of social spaces changes across seasons, times of day, or stages of adjustment to the facility.

- Quantitative Methods: Pair observational data with tracking technologies or environmental sensors to validate findings with measurable patterns.

Together, these steps can contribute to a more nuanced and inclusive understanding of how to design care environments that not only function but invite people to connect, stay, and thrive.

6. References, Annexures and Acknowledgements

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6.2 ANNEXURE

The routinely activated spaces - those used through institutional schedules and programmed activities - and the organically activated spaces - preferred and used by residents without prompting - were analysed through activity mapping across the three case studies.

