

Emotional Responses to Spatial Arrangements in Museum Interiors

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Abstract – Museums are increasingly conceptualized not only as repositories of knowledge but also as emotionally resonant environments. This research investigates how spatial arrangements within museum interiors, specifically the configuration paths, ceiling heights, spatial sequencing, and transitions influence emotional responses of visitors. Drawing upon theories from environmental psychology and spatial design, the study utilizes a mixed - method approach, incorporating observational analysis and a two - tiered pictorial questionnaire administered to visitors and academic groups. Three international museums: The Guggenheim Museum, The British Museum, The National Museum of African American History and Culture (NMAAHC) were used for the pictorial questionnaire survey and observations were conducted at one local museum: Museum of Modern and Contemporary Art (MMCA). Data reveals distinct correlations between spatial conditions and emotional states such as freedom, focus, curiosity or anxiety highlighting the role of spatial configuration and phenomenological immersion in shaping user experience. The findings offer practical insights for designers and curators, demonstrating how spatial arrangements can be strategically employed to evoke targeted emotional outcomes in museum interiors.

Keywords: Spatial Configuration; Environmental Psychology; Museum Design; Emotional Interior Design; Visitor Experience

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I. Introduction

Museums, in their contemporary form, serve not merely as vessels of curated knowledge but as immersive environments engineered to provoke emotional and intellectual responses. As architectural and interior experiences become more sensorially and psychologically integrated, designers are increasingly accountable for crafting spaces that not only inform but also transform. The spatial organization of interiors, its rhythms, proximities, sequences, and thresholds become an active agent in shaping perception, behaviour and effect (Pallasmaa,2005)

Spatial design in museum settings thus extends beyond aesthetics or function; it enters the realm of emotional architecture. Elements such as ceiling height, enclosure ratios, linear or labyrinthine circulation, transitions between zones, and the material language of walls and floors collectively influence how visitors feel, behave, and remember. While previous studies in museum design (MacLeod et al,2012; Bitgood,2011) have acknowledged visitor psychology, they often overlook the nuanced spatial – emotional relationship. Especially how specific configurations correlate to specific emotional outcomes. Furthermore, empirical investigations into user experience often prioritize the exhibition over the environment.

This research directly addresses that gap, focusing on the spatial arrangement as a primary emotional instrument in museum interiors. Through a design –theoretical lens supported by environmental psychology and spatial theory, the study investigates how different spatial tactics – scale, form, light, path, transition evoke both positive (e.g. joy, curiosity, calm) and negative (e.g. anxiety, tension, melancholy) emotions across varied museum typologies.

II. Interior Design as a Medium of Emotional Response

Interior design plays a crucial role as a dynamic medium for eliciting emotional and psychological responses, particularly in museum interiors where the interaction between space and human perception is paramount. Contemporary scholarship recognizes interior design as a “container of life”, serving as a spatial interface that fundamentally shapes cognition, behaviour and mood (Vitta,2012). Museums, as specialized environments, require acute sensitivity to spatial narratives, wherein every design decision, from materiality and lighting to scale and volume influences the emotional atmosphere experienced by visitors (Tzortzi,2015: Ravelli,2006).

Emotions elicited by spatial experience are neither random nor merely aesthetic; they emerge from the deliberate orchestration of structural transitions, shift in scale, visual stimuli and sensory feedback. Influential design theorists such as Peter Zumthor emphasize the creation of atmospheric tension through material depth, modulation of light and shadow , and spatial sequencing strategies that engage the full spectrum of the user’s emotional range beyond visual appeal (Zumthor,2006).Emotional responses can broadly be categorised into positive states (joy ,awe, curiosity) and negative ones (anxiety ,tension, melancholy),with spatial design functioning to either amplify or temper the emotional tone of exhibited content. Table 1 summarizes the key spatial elements and their associated emotional effects:

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Table 1*Spatial elements and emotional response evoked*

Spatial Element	Emotional Response	Key Reference
High ceilings, vertical volumes	Freedom, openness, awe	Pallasmaa (2005); Yoshida (2018)
Dim lighting, enclosed spaces	Introspection, tension, intimacy	Zumthor (2006); Bitgood (2011)
Curved circulation, complex paths	Curiosity, exploration, mild anxiety	MacLeod et al. (2012); Tzortzi (2015)
Symmetrical, axial clarity	Calmness, clarity, orientation	Ching (2014); Ravelli (2006); Hein (2006)
Sudden spatial transitions	Surprise, heightened sensory awareness	Zumthor (2006); Bitgood (2011)
Vertical circulation (e.g. ramps, stairs)	Anticipation, reflection	Tzortzi (2015)

III. Spatial Arrangement and User Behaviour

The spatial arrangement and organization of museum interiors significantly influence visitor behaviour, perception and emotional engagement. According to environmental psychology, spatial features such as circulation patterns, enclosure ratios, ceiling heights and axial planning affect visitors' cognitive load, comfort and curiosity (Mehrabian & Russell, 1974). Wide - open area commonly evokes feelings of freedom and calm, promoting relaxed movement, whereas narrow, complex pathways stimulate intrigue and anticipation through increased cognitive engagement (Rosenfeld & Serra, 2019).

Space syntax theory further clarifies how spatial configuration governs movement patterns and visitor orientation (Hillier & Hanson, 1984). Clear, legible paths mitigate cognitive strain and enhance navigability, while more interactive or networked circulation invites exploration, prolongs dwell time, and heightens spatial awareness, enriching experiential outcomes (Alghamdi et al., 2022; MacLeod, Hanks, & Hale, 2012). Museums strategically employ these layout techniques to choreograph visitor interactions, physically and emotionally aligning user flow with curatorial narratives (Tzortzi, 2015).

IV. Museums as Experiential Narratives

Modern museums have evolved from static repositories into dynamic experiential environments where spatial sequencing and emotional pacing organize narrative journeys. This transition mirrors storytelling techniques found in cinema and literature, where spatial order constructs meaning and evokes emotional engagement (Hein, 2006; Bitgood, 2001). Experiential narratives unfold through deliberate configurations of lighting, materiality, circulation and spatial transitions fostering immersive and affective encounters with cultural content.

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A widely studied spatial narrative strategy involves guiding visitors through emotional arcs by sequencing spatial conditions. For instance, tightly controlled, dimly lit areas with textured materials can evoke feelings of sorrow and introspection, while transitions into expansive, light filled spaces signify hope and reflection, effectively embodying emotional journeys within museum settings. Recent empirical studies exemplify this approach:(Faccioli, Johnson, and Smith 2023) analysed the emotional impact of spatial sequencing in culturally sensitive exhibitions, demonstrating how controlled lighting and spatial compression increase empathetic engagement .Similarly,(Alghamadi ,Alessa and Alshehri 2022) investigated visitor responses to spatial layouts in museum environments ,finding that spatial pacing aligned with emotional content significantly enhances visitor immersion and memory retention. This spatial choreography aligns visitor movement with the emotional arc of the exhibition, deepening engagement and facilitating memory retention.

Additionally, contemporary museums increasingly employ multisensory design strategies, including tactile exhibits, ambient soundscapes, scent integration and digital technologies such as augmented and virtual reality. These elements coalesce to create inclusive, participatory experiences that accommodate diverse audiences and enhance accessibility (Massa amin et al., 2025; Pan ;2025). The use of embodied cognition models supports the idea that active sensory engagement strengthens learning and empathy, transforming museums into spaces for meaningful dialogue and intercultural connection.

V. Methodology

The research employed a mix – method approach to explore the impact of spatial arrangement on emotional response with special reference to museums. Two questionnaire surveys were designed; an imaged based questionnaire survey based on three international museums and a real time questionnaire survey conducted at the Museum of Modern and Contemporary Art (MMCA), Sri Lanka. Variables related to layout, scale, proportion, movement, flow, materiality and texture and how it evoked human emotions was tested through the questionnaire surveys.

A. Image Based Questionnaire Survey

The image-based questionnaire survey was used to understand perception related to spatial design of three international world-renowned museums. Descriptions of selected international museums are summarized in Table 2. Questionnaire items designed to test the emotional response to specific spatial characteristics are summarized in Table 3. A total of 30 responses were collected. The sample population for the picture-based questionnaire survey was selected using a simple random sampling method within two target populations, undergraduate and young graduates with knowledge of interior design and architecture.

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Table 2*Spatial character of selected international case studies*

Museum Name	Key Interior Characteristics
The Guggenheim Museum - New York	Double and triple height volumes Curved circulation ramps Metallic finishes and natural light Unexpected openings and framed vistas
The British Museum - UK	Strong linear circulation paths Tall vertical volumes and vaulted ceilings Natural daylight filtered through glazing Minimal transitional ambiguity
National Museum of African American History and Culture (NMAAHC) - USA	Controlled transitions through ramps and narrow zones Use of textured, darkened materials Strategic daylight at narrative turning points Sequential vertical circulation and emotional pacing

Table 3*image-based questionnaire survey tested variables*

Spatial Character	Secondary Spatial Feature	Tested Emotion
Ceiling height	Lighting natural and artificial	Freedom
Ceiling height	Openness, subdivision of space	Intimacy, focus
Room size	Size of featured exhibits	Focus
Room size	Colours and lighting	Belonginess, comfort
Layout and openness	Colours and lighting	Calmness, comfort
Pathway openness, vistas	Colours and lighting	Freedom
Pathway openness, curves	Colours and lighting	Anticipation, surprise
Pathway movement, vistas	Colours and lighting	intrigue
Volume, lighting, colours	Shape of space	Happiness, joy
Volume, lighting, colours	Shape of space	Sorrow, grief

B. Real Time Questionnaire Survey

Real time feedback was collected through a questionnaire survey conducted among visitors at the exhibition; 88 Acres- the Watapuluwa Housing Scheme by Architect Minnette De Silva held at MMCA Sri Lanka. The exhibition designed by Mr. Johnthon Edward explores this sprawling hillside development which was ahead of its time in providing affordable accommodation for a diverse ethno - religious community of government public servants in Sri Lanka. Visitors were asked to evaluate their spatial experience of the exhibition through a series of questions targeted at understanding the impact of spatial character on emotional response. The questionnaire items used are summarized in Table 4. A total of 30 responses was collected.

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Table 4*Questionnaire items*

Question	Scale point	
	1	5
Ease of navigation	Very easy	Very confusing
Movement through space	Very natural	Very frustrating
Pathways and transitions trigger curiosity	Not at all influential	Extremely influential
Room heights evoke comfort and relaxation	Very comfortable	Very overwhelmed
Feeling related to used textures	Warm and inviting, cold and sterile, rough and rugged, smooth and polished, natural and organic, artificial and synthetic	
Overall emotional state	Excited and energetic, calm and peaceful, happy and joyful, sad or melancholic, curious and intrigues, bored or uninterested	
Feeling of being engaged and immersed	Not at all	Completely immersed
Design of space to enhance understanding and appreciation	Not at all	Very much
Sense of personal connection	No connection at all	Very strong and connected

VI. Results and Discussion

A. Image Based Questionnaire Survey

Table 5 summarizes the findings from the image-based questionnaire survey. Respondents were required to identify the image most associated with the described emotion. The tested emotions include freedom, intimacy, focus, calmness, comfort, belongingness, anticipation, surprise, intrigue, joy, happiness, sorrow, grief. The images were selected based on the literature review discussed under section two, three and four.

The images which were highly linked to emotions of freedom and calmness had spatial attributes such as high ceilings and good daylighting. High ceilings and symmetrical, axial clarity were attached to a feeling of freedom in movement. Over 90% of respondents linked images of expansive, tall, vertical atrium spaces from the British Museum and the Guggenheim Museum to feelings of freedom and calmness. The images most strongly linked to emotions of intimacy and focused attention were predominantly from the British museum. Spatial attributes such as lower ceiling heights, subdivided rooms and symmetrical axial clarity were associated with these feelings. Over 80% of respondents connected images of the British Museum's more enclosed gallery spaces with feelings of calm, focus and intimacy. Respondents associated images featuring warm colors, natural textures, and filtered daylight to emotions such as belongingness, comfort and calmness. More than 70% of study participants related feelings of comfort and belonging to museum spaces such as the British museum and the Guggenheim Museum. Where the

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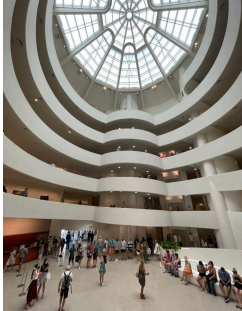
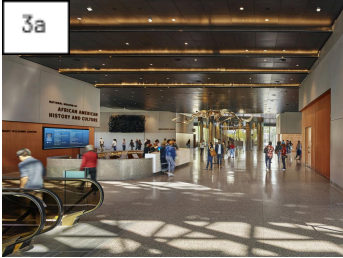
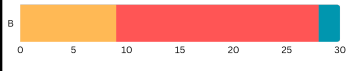
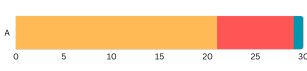

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approachable scale, Familiar materials and gentle lighting fostered inviting and restful atmospheres.

Spaces linked to anticipation and surprise often included curved or non-linear circulation, sudden spatial transitions, and framed unexpected views. The Guggenheim Museum and the NMAAHC were strongly associated with these feelings, with more than 65% of respondents responding to images of winding ramps and controlled thresholds where complex paths and controlled thresholds heightened visitor sensory awareness. Intriguing spatial qualities included layered vistas, networked circulation, and partially obscured views. Approximately 70% of respondents related these feelings to images from the Guggenheim Museum and the NMAAHC, citing the visual complexity and movement cues as key factors in electing curiosity and intrigue.

Images associated with joy and happiness were characterized by open volumes, bright natural lighting, and vibrant color accents. Over 60% of respondents linked these positive emotions to the British Museum’s expansive atrium spaces and the Guggenheim Museum’s luminous galleries, where spatial openness and dynamic volume contributed to uplifted moods. Sorrow and grief were primarily connected to images of compressed, dimly lit spaces with sombre materials. More than 85% of respondents associated these emotions with galleries in the NMAAHC that featured controlled lighting, textured darkened materials and sequential vertical circulation which support reflective and empathetic experiences.

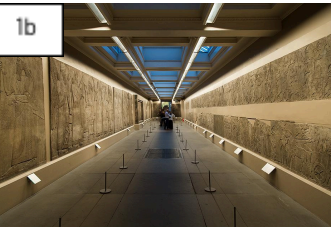
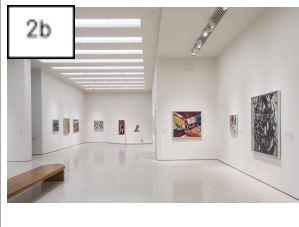










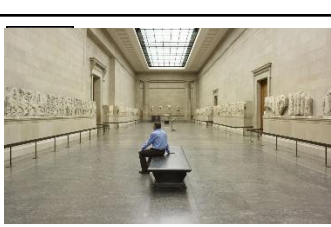
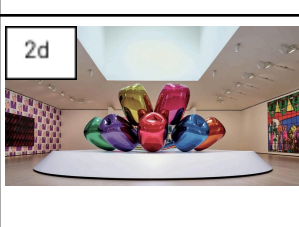
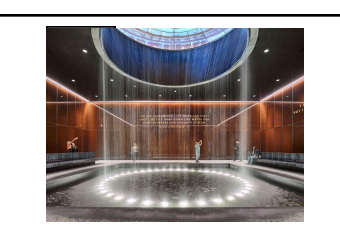




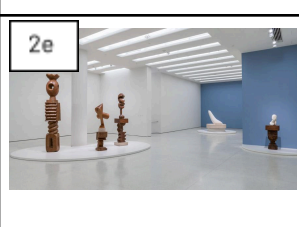
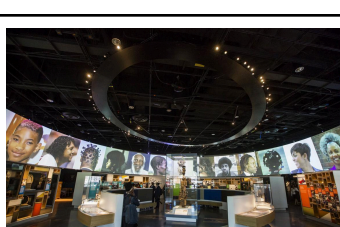



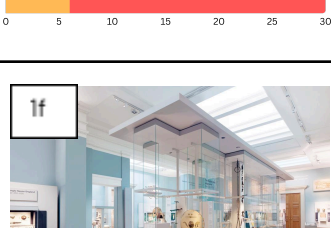
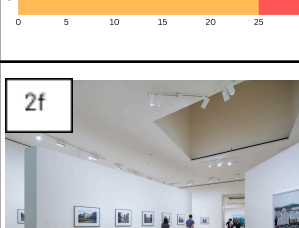
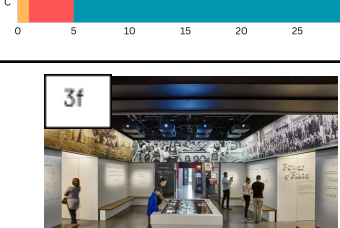

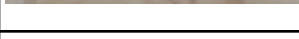

Table 5
Results of Image based questionnaire survey

Tested Emotion	The British Museum	The Guggenheim Museum	The NMAAHC
Freedom in space			
			

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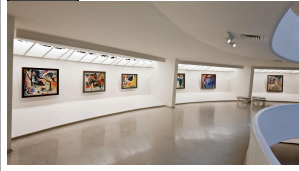

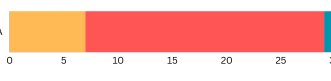
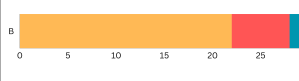

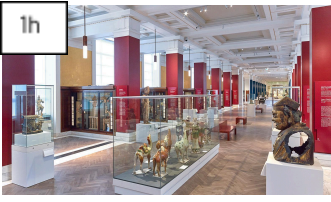


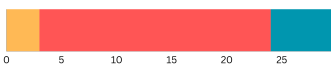
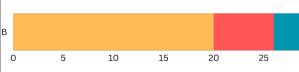


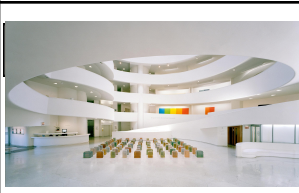
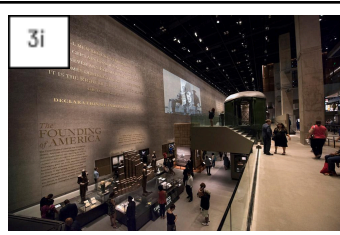
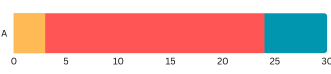
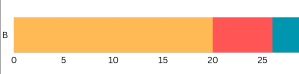


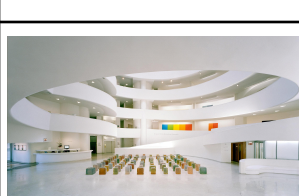
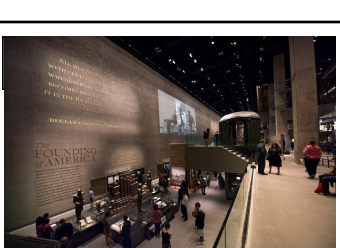
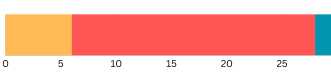
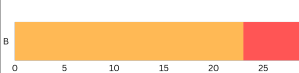

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Freedom in movement			
			
Intimacy, focus			
			
Focus			
			
Belonginess, comfort			
			
Calmness, comfort			
			

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Anticipation, surprise			
			
Intrigue			
			
Happiness, joy			
			
Sorrow, grief			
			



B. Real Time Questionnaire Survey

The exhibition features a minimalist appeal with natural and organic textures and an earthy color palette (Figure 4). These features reflect the theme of the exhibition which showcase the design planning and construction of the Watapuluwa housing scheme. The theme for the exhibition is

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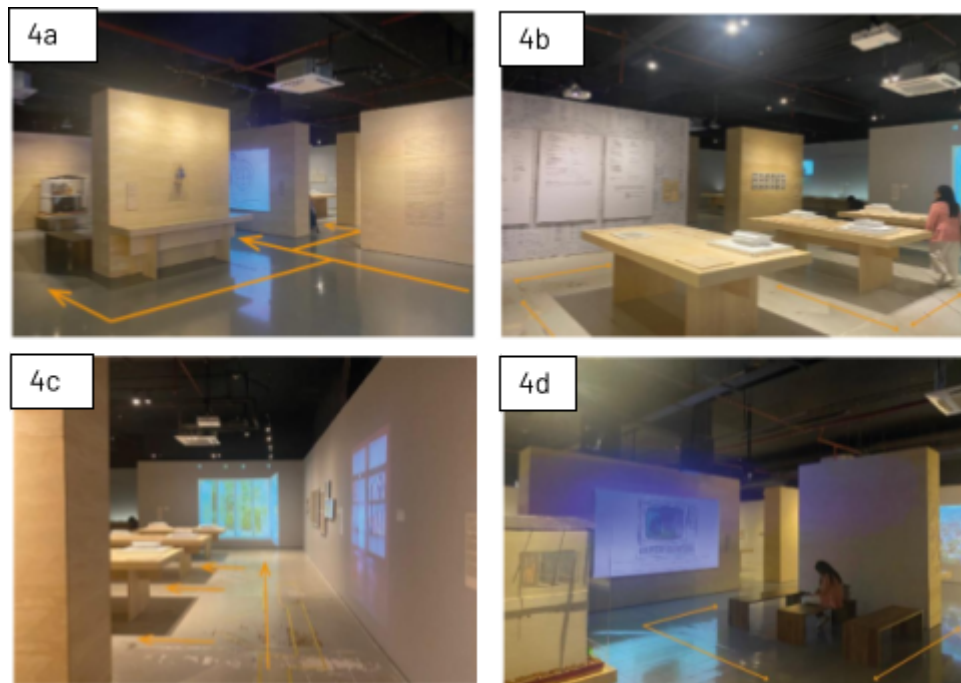
based on these materials, colours, and textures to highlight the simplicity and down-to-earth quality and genius that was embedded in the entire design process. The housing scheme was a first of its kind community driven project which was designed with the participation of its users. The exhibition features the design project from its inception to materialization.

The space features an open plan layout with some compartmentalized spaces. The open plan layout allows freedom of movement while the compartmentalized spaces offer focused contemplation (Figure 4a). A space between partition and ceiling enhances the feeling of freedom of movement (Figure 4a). Use of materials such as warm wood invites touch and intimacy, while cold concrete demands respect and awe. The use of an unfinished appearance to the floor gives out that expression of an architectural site (Figure 4b). These spatial features allow the visitor to feel highly immersed to the exhibition.

Obstacles, strategically placed, create anticipation and surprise, and become tools for emotional transitions (Figure 4c), Use of elements that cater the multisensory aspects aid in fostering emotions. Perspective and sightlines are carefully designed to guide visitors, build anticipation, and highlight key exhibits (Figure 4c). The interplay of light and shadow on textures adds another layer of emotional nuance, creating moments of drama and mystery. The space itself created a mood to make people comfortable with the layout and organization itself which could create awe (Figure 4d). Proving with the fact the very act of movement becomes a verb in the spatial narrative, immersing visitors in the story being told.

Figure 4

Exhibition; 88 Acres- the Watapuluwa Housing Scheme by Architect Minnette De Silva held at MMCA Sri Lanka.



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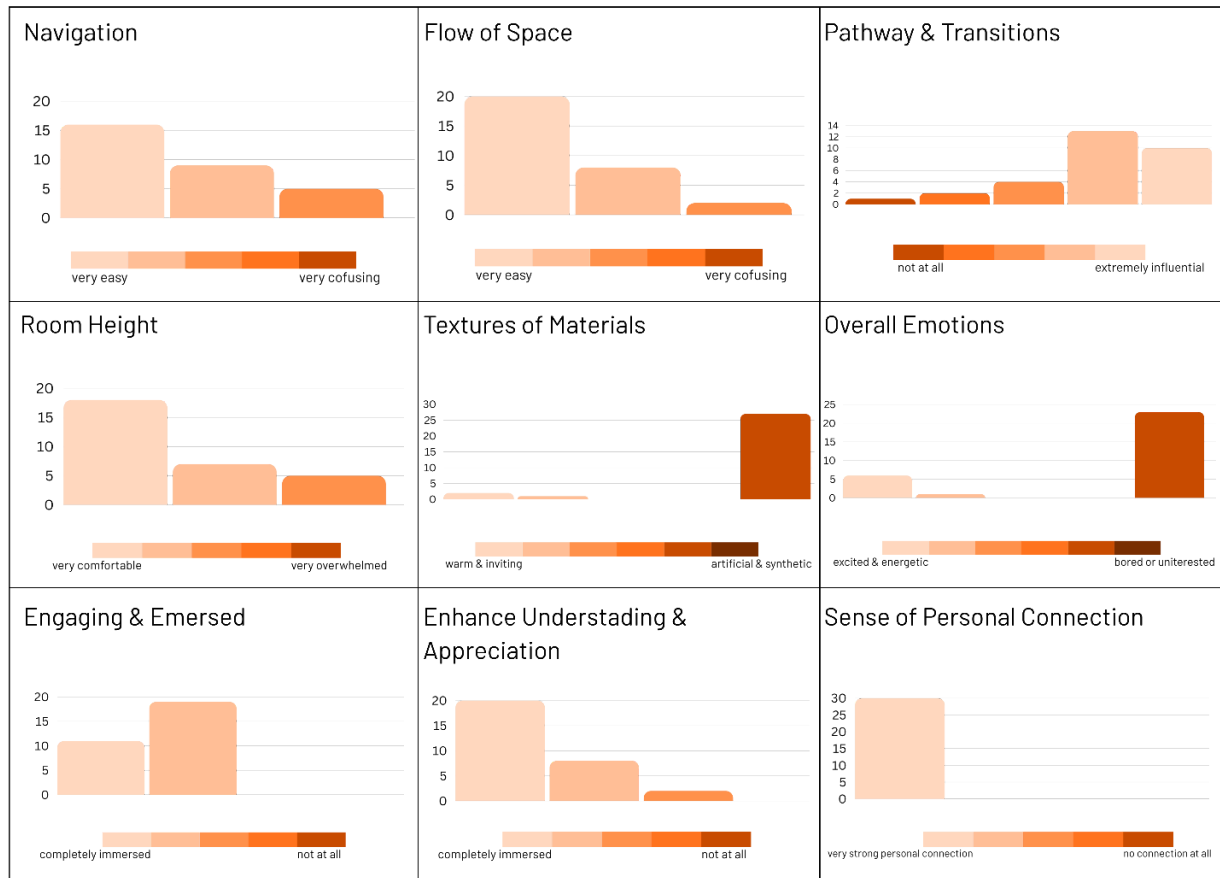
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The questionnaire survey results illuminate the observations discussed above. Visitors rated the exhibition space with positive spatial attributes such as ease of navigation, natural flow of space, pathways and transitions which evoke curiosity and intrigue and natural and organic materials and textures which allows it to connect with the exhibition. These spatial features allowed the visitors to immerse, appreciate and build a personal connection to the space (Figure 5).

Figure 5

Results of real time questionnaire survey



VII. Conclusion

This research highlights the profound impact that spatial arrangements have on evoking emotional responses within museum interiors, emphasizing that museum environments are not only repositories of knowledge but also dynamic, emotionally resonant spaces. Through mixed – method research involving international and local museums, it was demonstrated that factors such as ceiling height, layout, circulation paths and materiality directly influence visitor emotions ranging from curiosity and calm to awe and anxiety by shaping how spaces are perceived and experienced. Findings reveal the deliberate spatial strategies, including axial clarity, varied ceiling heights, organic transitions and multi –sensory design, foster visitor immersion and personal connection, thus making museum journeys both memorable and meaningful.

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The insights carry important implications for designers, curators and museum policymakers, advocating for spatial design as an intentional tool to guide emotional and cognitive engagement. By aligning spatial sequencing, sensory cues and visitor pathways with curatorial narratives, museums can create transformative experiences that accommodate diverse visitor needs and foster meaningful dialogue. Ultimately, this research contributes to the growing recognition of museum interiors as an active agent in shaping memorable cultural and emotional encounters recommending a holistic, people - centered approach to museum design for the future.

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