

From "Spectator" to "Participant": Investigating How Interactive Design Alters Adult Visitor Behaviour in a Passive Museum Environment

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Abstract: This research investigates how adult visitor behaviours are influenced by passive exhibition designs in traditional museums and whether interactive digital design can transform visitor engagement. Using the Museum of Sydney as the primary case study and comparative observations from other local museums, the study adopts qualitative methodologies such as behavioural tracking, cultural probes, and visitor feedback. Results suggest that interactive spatial design significantly enhances emotional engagement, dwell time, and participation motivation among adult visitors.

Keywords: Interactive design, museum studies, adult visitors, behaviour tracking, cultural probes, spatial engagement.

1. Introduction

In recent years, the role of museums has evolved from static repositories of knowledge to participatory spaces encouraging active visitor involvement. Despite this trend, many historical and mid-sized museums retain largely passive display methods. This paper examines how interactive technologies and spatial design interventions can reshape the behaviour of adult visitors in passive museum environments, using the Museum of Sydney as the core research site.

2. Background and Research Questions

The use of culturally resonant materials has been shown to elicit deeper emotional responses and longer engagement in adult viewers. For example, Reynolds [1] demonstrates how tactile Indigenous objects like possum skin cloaks contribute to layered cultural memory and visitor reflection. Similarly, Bilous [2] explores how spatial memory and narrative layering in maritime museums influence the recall and meaning-making process for adult audiences.

The Museum of Sydney offers a predominantly non-interactive, stationary exhibition experience. During multiple observation visits, adult visitor behaviour revealed patterns of disinterest and brief engagement, particularly in non-digital spaces. This prompted the following research questions:

1. Do adult visitors exhibit different behavioural patterns in passive vs. interactive museum spaces?
2. What display strategies increase dwell time and engagement?
3. Can the integration of interactive technologies transform passive audience behaviour into participatory engagement?

3. Rationale and Context

Emotional engagement is strongly linked to non-verbal and sensory curatorial methods. As Chatterjee [3] shows, soft materials and silence can activate suppressed narratives and create a meditative visitor experience. Gallagher and Staff [4] support this by arguing that symbolic representations particularly of feminine archetypes can prompt intense cultural and gendered self-reflection in museum contexts.

As museums worldwide shift from didactic to participatory

institutions, audience expectations have evolved. Simon [11] introduced the concept of the "participatory museum," emphasising the need to transform visitors from passive recipients into co-creators. However, many small and medium-sized cultural institutions in Australia still rely on traditional static displays, with minimal integration of digital or immersive interaction. With a background in animation and media studies, the researcher conducted multiple site visits to museums in Sydney, including the Museum of Sydney, where a theatre-centric first floor contrasted starkly with the passive and sparsely visited second floor. This personal observation, supported by visual tracking and behavioural mapping, inspired a deeper inquiry into how spatial and technological design can influence adult engagement patterns.

To broaden the scope of analysis, comparative studies were also conducted at the Powerhouse Museum, the Chau Chak Wing Museum, and the Australian Museum. The Powerhouse Museum integrates digital interaction in its design-themed galleries, including touchscreen interfaces and VR experiences. In contrast, the Chau Chak Wing Museum features both archaeological and art collections with minimal interactivity, relying more on traditional curation and interpretive panels. The Australian Museum, recently renovated, incorporates multimedia storytelling in First Nations exhibitions, which enhances engagement but still lacks participatory feedback mechanisms.

Comparative observations confirmed that visitor dwell time and emotional engagement increased significantly in spaces offering sensory or participatory input. The Powerhouse Museum's VR sections prompted longer stays (averaging 20–25 minutes per visitor per room), and visitors were often observed discussing content with companions—indicating deeper cognitive involvement. Conversely, at the Chau Chak Wing Museum, many visitors performed a quick walkthrough without stopping to read detailed labels or linger by static displays.

These comparative insights highlighted that successful audience engagement in adult visitors depends not only on the presence of interactive technology but also on the degree to which the design facilitates exploration, narrative connection, and active contribution.

4. Methodology

This research adopts a mixed-methods qualitative approach, combining behavioural observation, cultural probes, and structured feedback to analyse emotional and spatial interactions.

4.1 Site Familiarisation and Planning (Week 1–2)

Initial walkthroughs identified high-traffic and low-engagement zones and informed spatial layout diagrams and observation logistics.

4.2 Field Observation and Data Collection (Week 3–4)

Three zones were selected for fixed-point observation: cinema entrance, gallery hallways, and interactive screen areas. Visitor movements were manually tracked using path maps and stopwatch timing.

4.3 Cultural Probes and Emotional Feedback (Month 2–3)

Ten to fifteen participants (aged 30–60) completed emoji-based emotional response cards and walk-through impression forms. These tools were tailored for dark environments (e.g., theatres) and allowed for real-time emotional self-reporting.

4.4 Feedback Collection and Interviews

Post-visit interviews (6–8) were conducted alongside exhibition feedback cards to assess visitor motivation, perceived interaction value, emotional impact, and spatial recall. Data was coded thematically.

4.5 Visualisation and Final Report (Month 3)

Dwell time data, emotional response charts, and heatmaps were compiled. These visualisations supported the final report and design proposal.

5. Results and Discussion

The spatial strategies adopted by the National Museum of Australia offer insight into participatory planning. Hauck et al. [5] highlight how collaborative processes during design phases can directly influence public receptiveness and satisfaction with museum spaces. Similarly, Message [6] criticises surface-level diversity measures and calls for structurally inclusive narratives that speak to multiple cultural identities—something increasingly expected by diverse adult visitors.

The observation phase revealed clear differences in audience behaviour across exhibition types. Average dwell time in the immersive cinema area was 18 minutes, compared to just 5 minutes in static gallery zones. Interactive corners, although modest in scale, showed a 40% higher engagement rate when paired with clear prompts and multimedia content.

Visitor feedback highlighted a desire for more tactile, auditory, and responsive installations. Over 70% of participants responded positively to features that enabled creative participation (e.g., adding stories, touching screens, or manipulating digital exhibits).

Comparative data showed that institutions like the Powerhouse Museum, which prioritised interactivity, generated sustained engagement and higher return visit interest. On the other hand, institutions with purely didactic approaches, such as Chau Chak Wing Museum, risked alienating adult visitors who preferred dynamic storytelling.

Emotionally, immersive zones elicited resonance, surprise, and reflective calm, whereas stationary areas were more often described as confusing or indifferent. This validates the hypothesis that spatial layout and interaction design significantly influence emotional and cognitive engagement.

6. Design Proposal: Sydney City Evolution and Residents' Life

Exhibition design must also address the historical silences and omissions present in national narratives. Nettelbeck [7] examines the portrayal of Indigenous dispossession in national museums and suggests that transparent storytelling is essential for building institutional trust. Likewise, O'Reilly and Parish [8] advocate for co-curated migrant stories to ensure emotional resonance and authenticity, which this proposed exhibition aims to implement through oral history components and community participation.

Based on the findings, an interactive exhibit titled "Sydney City Evolution and Residents' Life" is proposed. Key features include:

- A 360-degree visual timeline of Sydney's urban transformation, with surround sound and lighting

- Life-size touch interfaces to access oral histories from historical figures (e.g., immigrants, convicts, builders)

- An interactive 3D city model showing changes in population, infrastructure, and architecture

- A memory wall where visitors can contribute reflections or projections about Sydney's future, displayed dynamically at the exit

This proposal transforms passive viewing into a participatory loop where visitors become not only consumers of historical content but contributors to the museum's evolving narrative.

7. Significance of the Research

Exhibitions that confront traumatic or ethically complex histories have been shown to encourage deeper reflection. For instance, Singley [9] observed that minimalist yet evocative visual language in exhibitions about nuclear testing facilitated moral engagement. Wilson [10] further supports this by demonstrating how immersive layouts simulating institutional childhood trauma prompt audience members to slow down and emotionally connect with the content. This research addresses a critical gap in adult-focused museum interaction studies. While children's interactivity has been widely studied, the behavioural preferences and emotional triggers for adult visitors remain underexplored.

The methodology applied in this study builds on Lok et al. [12]'s emotional interaction frameworks and Gaver et al. [13]'s cultural probe techniques. By contextualising these within a real museum setting and cross-comparing multiple institutions, this study provides a replicable model for curators and designers aiming to enhance spatial storytelling.

The findings can inform future renovations and policy decisions within cultural institutions—especially in regional or mid-sized museums with limited resources. Through empirical observation and visitor-centred design thinking, this study offers actionable pathways to deepen engagement and accessibility.

8. Conclusion

Interactive design significantly transforms the museum experience for adult visitors. From increased dwell time to richer emotional reactions, the benefits of integrating multimedia, participatory tools, and adaptive spatial planning are evident. As museums strive to remain relevant, especially to adult demographics, embedding interactivity into their physical and narrative architecture becomes a vital strategy.

9. Appendix: Visual Comparison of Exhibition Environments

The following visual map synthesises key comparisons across passive and interactive museum environments, drawn from field observations and case studies at institutions such as the Art Gallery of NSW, Sydney Jewish Museum, National Maritime Museum, Australian Museum, Museum of the Future, Sydney Modern Museum, and others.



Visual Map1: How different museum environments affect adult audience behaviour and engagement

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Acknowledgements

The map outlines how different spatial and curatorial strategies affect adult audience engagement. It categorises museums into passive or interactive spaces and highlights key dimensions such as spatial openness, emotional engagement, participation options, and technological integration.

This map visually supports findings discussed in Sections 3 and 5, showing how design characteristics correlate with dwell time and behavioural responses.