Department of
Architecture and Built
Environment

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Enactive Engagement:
Visitor Learning in an Industrial Heritage Museum

[A Case Study of Derby 'Museum of Making']

XIJING CHEN

BA, MA

Supervisors: Prof. Jonathan Hale, Dr Laura Hanks

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PREFACE

The initial idea for this thesis was inspired by a visit to Stowe School, situated in Stowe House, in September 2021. The school embodies the principle of *"knowing beauty when he sees it all his life"*, offering a unique environment where traditional education is enriched by liberal reading.

This experience left a strong impression on me at the beginning of the first year of study. Returning to the University Campus, I began to notice "*beauty*" in my surroundings and to appreciate how learning can be shaped by the environment.

In 2022, the passing of former Chancellor Professor Yang Fujia (1936–2022) further influenced my reflections. The official university website recalled his words: *"I visited countless universities around the world and gradually understood what liberal arts education is"*. Liberal arts education has long been a foundation of Western academia. Through these four years of study, I have experienced significant growth in my logical thinking, one of the seven subjects in Liberal Arts, while recognising that there is still much to learn.

These influences have led me to reconsider the meaning of "*beauty*", particularly through Leon Battista Alberti's theory, which defines it as a harmony arising from the concord of all parts, achieved not through personal fancy but through objective reasoning. This perspective has deepened my understanding of the relationship between beauty, learning, and the environment.

ACKNOWLEDGEMENT

This thesis has been shaped through many ups and downs, and it would not have been possible without the support, guidance, and encouragement of numerous individuals, to whom I am deeply grateful.

First and foremost, I would like to express my heartfelt gratitude to my primary supervisor, Prof. Jonathan Hale. His unwavering support, inspiration, and invaluable guidance have been instrumental in shaping this research. His profound influence has extended beyond the traditional boundaries of architectural studies, offering me a deeper understanding of what education truly means. The experience of dialogue in his office often recalls the memory of conversations with my mother, who shows the same patience in listening to my thoughts.

I would also like to extend my sincere appreciation to my secondary supervisor, Dr. Laura Hanks. At a critical stage when I faced challenges in continuing my research, she provided practical advice on fieldwork and case selection within the discipline of architecture. Her insights closely aligned with my research interests and motivated me to approach my work with enthusiasm and positivity.

I am also sincerely thankful to my internal examiner, Dr. Didem Ekici, and Prof. Tim Heath from the Faculty of Engineering for their valuable suggestions during the Year 1 and 2 review stages. A special thanks to the staff at the Museum of Making, particularly Pippa Vidal Davies, for sharing insights on the development of industrial heritage, especially in Derby Museums. I would also like to extend my gratitude to Victoria Green, who provided me with an internship opportunity in sustainable interior design and heritage regeneration consultancy.

I am incredibly grateful to my ACT colleagues and friends at the University of Nottingham for their support in my primary research, particularly in the visitor survey for the case study. Their valuable suggestions helped me refine my literature

ABSTRACT

Since the 1970s, many industrial buildings in the United Kingdom have been remodelled as museums, often following a uniform 'light touch' design philosophy. The Museum of Making in Derby, however, represents a transitional model that bridges traditional industrial features with contemporary design. It adopts a novel approach to display, presenting objects in an archive-like setting, while also engaging visitors in the hands-on experience of craft techniques. It appears to mark a significant milestone in the evolution of industrial museum practice, as suggested by its shortlisting for the Art Fund's 2022 Museum of the Year Award.

This study investigates the reactivation of the Derby Silk Mill as the Museum of Making, assessing its success in relation to its own stated ambitions, from the perspective of museum learning experience, exploring how its architecture functions as a key element in facilitating knowledge transmission. It focuses on themes of adaptive reuse, spatial characteristics, and museum communication to examine enactive engagement in relation to the wider context of industrial museums in the UK. The research draws on historical typologies, such as the Cabinet of Curiosities, while critically engaging with the Tate Modern Director Nicholas Serota's notion of the modern museum as a 'history book'. Using a case study approach, it combines site-based investigations, including policy, documentary studies, mapping, and modelling, with visitor studies that address time-spent engagement, movement patterns, behavioural trajectories and feedback. Findings highlight the uniqueness of the industrial museum as a 'third learning space', conceived not merely as a repository of artefacts but as an authentic living environment that fosters embodied engagement, spontaneous exploration, and active learning. It reveals how each of these experiences is facilitated by its distinctive spatial configuration and its historical and contemporary building fabric.

The study contributes to debates on the future of museum design by positioning the industrial museum as a distinctive

cultural space. It argues that adaptive reuse strategies should establish industrial museums as participatory learning environments where collections, people, and practices co-produce evolving knowledge, informing both conceptual design and ongoing operations. Through bodily engagement supported by dynamic interpretive strategies, such as bodily imagination and hands-on activities, the industrial museum typology can move beyond static preservation, redefining museums as active forums for discovery, creativity, and civic participation.

PUBLICATIONS

PhD Project

Chen, X., Hale, J. & Hanks, L.H. 2025. Situated Theory in Architectural Heritage: Heineken Experience Amsterdam and The Prince Philip Maritime Collections Centre. In: *London Heritage 2025*. UK, London: University of Greenwich.

Chen, X., Hale, J. & Hanks, L.H. (In press). 'Ongoing Cultural Narratives in Two Industrial Museums', in Cirklova, J. (ed.) *Museums – Places of People, Time, and Memory: An Exploration of the Intersection of Place and History.* Cambridge Scholars Publishing.

Chen, X., Hale, J. & Hanks, L.H. 2023. 'Actual' or 'Authentic' Industrial Museums. In: *Prague – Heritage, Past and Present - Built and Social*. Czech Republic, Prague: Amps.

Chen, X., 2022. Visitors Engagement in Silk Mill. In: 'Voices in Architecture' of *AHRA Research Student Symposium*. UK, London: University of Westminster.

Collaborative Project

Chen, X., Wang, X., Hale, J. & Hanks, L.H. 2023. Developing the local community to enhance the global cultural identity in Dubai Al Seef. In: *Local Cultures-Global Spaces*. Amps: Rochester Institute of Technology, Chinese University of Hong Kong, University of Melbourne, 166-175. https://amps-research.com/wp-content/uploads/2024/08/Amps-Proceedings-Series-37.1.pdf

Hatice, O., Chen, X., Hale, J. & Hanks, L.H. 2022. Blind musicians 'see' beauty in House Museum. In: *The Fifteenth International Conference on the Inclusive Museum*. US, Philadelphia: Moore College of Art and Design.

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GLOSSARY

The following table presents definitions of key terms and acronyms used in this thesis, as well as those commonly found in the relevant field of study. Establishing a clear understanding of these terms is essential for comprehending the research. While this glossary is not exhaustive, it serves as a concise reference to guide the reader through the terminology used throughout the thesis.

Term	Acronym	Definition	Source	Position
Black Country Living Museum	BCLM			Chapter 3
Derby Museum & Art Gallery	DMAG			Chapter 3 Chapter 5
Museum of Making	MoM			Thesis
Authenticity		They may be considered to meet the conditions of authenticity if their cultural values, as defined by the proposed nomination criteria, are truthfully and credibly expressed through a variety of attributes.	(Glossary 1994)	Chapter 3 Chapter 6 Chapter 7
Milieu		The people, physical and social conditions and events that provide the environment in which people act or live.		Chapter 4 Chapter 6
Show and Tell		Emphasising visual power and structured presentation, and this approach allows exhibitions to control and direct visitors' focus through a structure, which is a clear and developmental sequence of display	(Bennett 1995)	Chapter 6
Third Learning Space		This model complements traditional academic learning in		Chapter 4 Chapter 7

		universities and practical apprenticeship learning in workplaces by offering an engaged and sensory-rich educational experience.		
Occasional Visitors (OV)				Chapter 2 Chapter 7
Workshop Participants (WP)				Chapter 7
Second Time Interviewers (STIs)				Chapter 7
Museum Staff (MS)				Chapter 2 Chapter 5 Chapter 8

Chapter 1 – INTRODUCTION

1.1   Research Background

This Chapter introduces the emergence of the research topic and its background. It identifies gaps in the existing works of the literature and discusses the significance of this study. Subsequently, the research aims, objectives and approach are presented, and the thesis structure is outlined to provide an explicit explanation of the thesis content.

1.1.1 Overview

In the UK, society has transitioned into a post-industrial phase, with the service sector now generating over 81% of the nation's total economic output, far surpassing the manufacturing sector (House of Commons Library 2024). This shift has left many industrial ruins at risk of further decay. To address this, this research investigates the potential of industrial architecture to gain new purpose through adaptive reuse, empowering communities by repurposing these abandoned structures as hubs for public engagement, such as museums.

However, as shown in Figure 1.1, while the museum sector experienced rapid growth in the mid-1970s, peaking at 5.6% growth in 1974, museum closures have been steadily increasing. From an annual closure rate of 0.1% in 1961, this

figure rose to a peak of 1.3% in 2015, marking the highest rate

of museum closures in recent history (Liebenrood 2024).
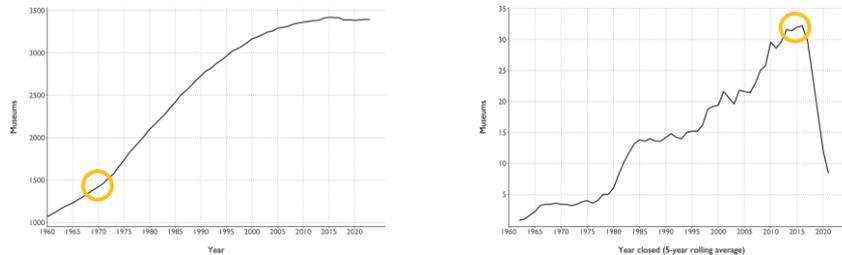
Figure 1 1   UK Museum sector size, 1960-2023; and Closures per year, 1960-2023 (5-year rolling average). (Source: Liebenrood, 2024.)

Adaptive reuse as a design approach is deeply intertwined with

the history of industrial buildings and their transformation to

meet contemporary needs. The goals of adaptive reuse extend

beyond the preservation of architectural and cultural heritage;

they also aim to reactivate historic buildings by attracting new

activities, extending their lifespans, and revitalising their

significance in modern society.

This research focuses specifically on the reactivation of

industrial buildings converted into museums, examining their

potential to engage visitors through meaningful learning

experiences. Using a case study approach, this study explores

various design strategies for fostering active visitor engagement.

It evaluates the museum experience through two main

dimensions: intellectual and embodied engagement. The study seeks to identify the most effective spatial design strategies for these experiences while assessing the levels of engagement facilitated by learning opportunities. Ultimately, the insights gained aim to contribute to the development of innovative approaches for future museum design.

Overall, this research examines the complex relationship between visitors and industrial architecture, focusing on the interplay between the building itself, exhibitions, and social activities. Additionally, it seeks to provide meaningful insights into recent practices in converting industrial buildings into museums across the UK and EU.

With at least 44 industrial buildings in the UK and 15 in the EU converted into museums, referring to Appendix A - Industrial Museum Database, this research employs a rational model for visitor engagement to identify a pioneering case study for detailed analysis. The Museum of Making (MoM) in Derby, England, was selected as the case study. It is important to note that this study combines both conceptual and empirical research approaches. This combination is necessary because many existing theories lack an in-depth understanding of the reactivation of industrial buildings from the perspective of the

museum and its learning experiences. Developing a deeper understanding of this phenomenon is expected to support the application of adaptive reuse principles in future design practices.

This section on the research background explores industrial museums as an architectural phenomenon, addressing their challenges and providing an overall understanding of the adaptive reuse of industrial heritage buildings into museums.

1.1.2 Industrial Museums as an Architectural Phenomenon

There were two industrial revolutions, both of which happened in the UK. The first revolution lasted from the mid-18th century to about 1830 and was mostly confined to Great Britain; the second one, the technological revolution, lasted from the mid-19th century until the early 20th century and spread throughout Great Britain, Continental Europe, North America, and Japan.

This study examines an architectural phenomenon: industrial buildings converted into museums in the UK's post-industrial economy since the 1970s. The common aim of these museums is to preserve and present materials related to Industrial heritage. To narrow down a great number of possible examples, a set of three influential factors have been considered: year, region, and architectural reused programme.

Year

The first influential factor in understanding the conversion of industrial buildings into museums involves categorising restoration outcomes across different time periods. The examples in the database are segmented into key eras: 1970 onwards, 1971 to 2000, and 2001 to 2020, post-2020. This categorisation allows for the identification of patterns and trends in restoration practices.

Analysing these periods offers valuable insights into the transformation of industrial buildings in the UK's post-industrial economy since the 1970s. As depicted (Table 1.1), 18 industrial buildings underwent conversion into museums between 1971 and 2000. In the subsequent period, from 2000 to 2020, the number decreased to eight (Table 1.2).

After 2020, at least two notable industrial buildings underwent adaptive reuse, transforming into museums and office spaces with integrated exhibitions: the Museum of Making in Derby and Shrewsbury Flaxmill Maltings. The Museum of Making, completed in 2021, stands out as a contemporary example within this evolving landscape, showcasing innovative approaches to preserving industrial heritage while engaging audiences.

Table 1 1　Eighteen industrial museums opened between 1971 and 2000. (Source: Summarised by the Author)

Year	1971	1971	1974	1974	1978	1979	1982
Name	Nottingham Industrial Museum	Kirkaldy Testing Museum	Gladstone Pottery Museum	Bradford Industrial Museum	Black Country Living Museum	Houghton Mill	Kelham Island Museum
Location	Nottingham	London	Stoke-on-Trent	Bradford	Birmingham	Houghton	Sheffield
Year	1982	1983	1984	1985	1985	1986	1987
Name	Leeds Industrial Museum	Wandle Industrial Museum	Barry Mill	Helmshore Textile Museum	Merseyside Maritime Museum	West Cheshire Museum	Calderdale Industrial Museum
Location	Leeds	Mitcham	Barry (S)	Helmshore	Liverpool		Halifax
Year	1990	1990	1991	1995	(S) is Scotland.		
Name	Crabble Corn Mill	Robert's Smail's Printing Works	Etruria Industrial Museum	The Old Mill Museum			
Location	Dover	Innerleithen (S)	Stoke-on-Trent	Ashford			

Table 1 2　Eight industrial museums opened between 2001 and 2020. (Source: Summarised by the Author)

Year	2000	2004	2005	2006	2012	2014	2015
Name	Hats Works	National Wool Museum	National Waterfront Museum	New Lanark	Science and Industry Museum	Middleport Pottery	Verdant Works
Location	Stockport	Felindre (W)	Swansea (W)	New Lanark (S)	Manchester	Stoke-on-Trent	Dundee (S)
Year	2016	(W) is Wales, (S) is Scotland.					
Name	Abbeydale Industrial Hamlet, Sheffield						

Region

The second influential factor contributing to the conversion of industrial buildings into museums is the geographical region of Great Britain. Figure 1.2 illustrates a map depicting major cities in Great Britain, providing insight into the areas where manufacturing thrived and subsequently saw the conversion of industrial facilities into museums.

The industries represented on the map span textiles, ceramics, steel, shipbuilding, and more. Upon observation, a notable concentration of red dots is observed in the regions of Yorkshire and the Humber, the North-West, and the West Midlands. Particularly interesting is the prevalence of textile-related industries in these regions. Examples of converted industrial buildings include the National Wool Museum, the Helmshore Textile Museum, and the Museum of Making.

This geographic distribution highlights the historical significance of these regions in industrial development, with a specific emphasis on the textile industry, which has left a lasting imprint on the landscape in the form of converted museums. Of the five industrial landscapes in Great Britain recognised by UNESCO for their cultural significance – Derwent Valley Mills, Ironbridge Gorge, New Lanark, Cornwall and West Devon Mining

Landscape, and Blaenavon Industrial Landscape – both

Derwent Valley Mills and New Lanark place a strong emphasis

on the legacy of the textile industry.
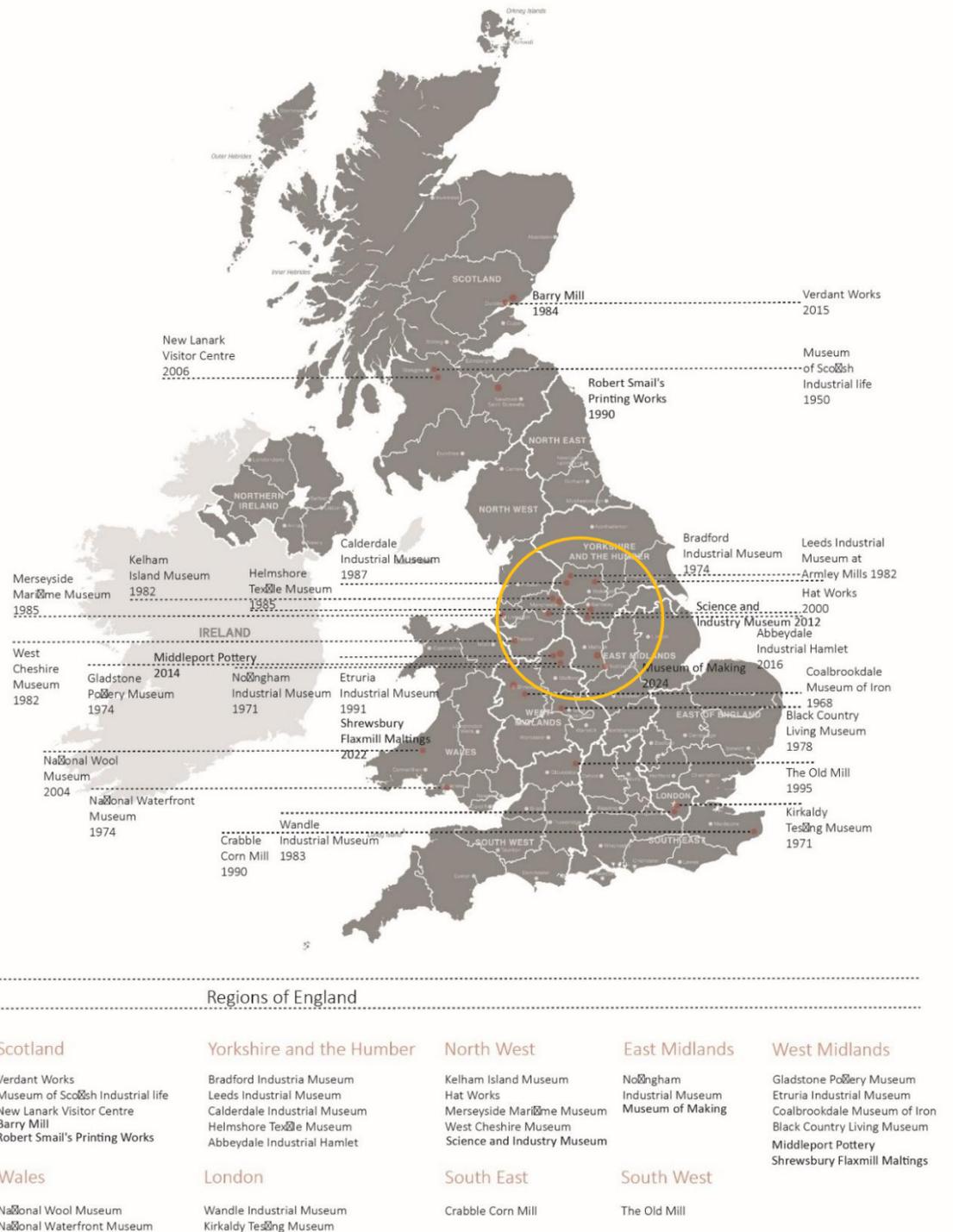
Figure 1 2   The Location of twenty-eight Industrial Museums in Great Britain. (Source: Drawn by the Author)

Architectural Reuse Programme

The third influential factor in the conversion of industrial buildings into museums is the architectural reuse program. Across many industrial buildings in the UK, a consistent pattern emerges: the restoration of exteriors and interiors to their original state, paired with adaptive reconfigurations of interiors to meet contemporary needs.

As Figure 1.3 shows, this approach manifests in two distinct orientations: employing a 'light' design philosophy or an innovative adaptive reuse approach. First, some cases prioritise 'restoring the past' with the 'light' touch. In these instances, the goal is to resurrect the atmosphere of bygone working scenes, life, and culture. This is often achieved through immersive exhibits that transport visitors back in time, providing a vivid experience of historical industrial life.

In contrast, the strategy of 'inserting the future' takes a more forward-looking stance with an innovative adaptive reuse approach. Here, the space goes beyond merely showcasing the past; it becomes a catalyst for revitalising industrial sites. The emphasis is on empowering a vibrant community with cultural and social memories, turning these spaces into active hubs for both preserving history and fostering contemporary connections.

This architectural approach, blending historical restoration with modern functionality, further underscores the intricate interplay of economic, regional, and architectural factors in the transformation of industrial spaces into museums.

To develop deeper into the evolution of restoration methods, these two comparative approaches are conducted. The Gladstone Pottery Museum, representing an earlier case, is juxtaposed with the Museum of Making. Additionally, the Ironbridge Gorge, sharing similarities with the Derwent Valley Mills as it is located on a world-famous industrial heritage site, offers insights into comparable museum experiences. This comparative approach aids in discerning shifts or consistencies in design philosophies and restoration strategies over time.

Figure 1 3   'Restoring the past' and 'Inserting the future'.
(Source: Photos taken by the Author)

1.1.3 Challenges Facing Industrial Museums

At the outset of this research, fieldwork was conducted at several prominent museums and galleries in Great Britain,

including the British Museum, Museum of Liverpool, Tate

Liverpool, Tate Modern, and IWM London (Figure 1.4). These

visits provided foundational insights into museum practices and

challenges within the Great Britain context.
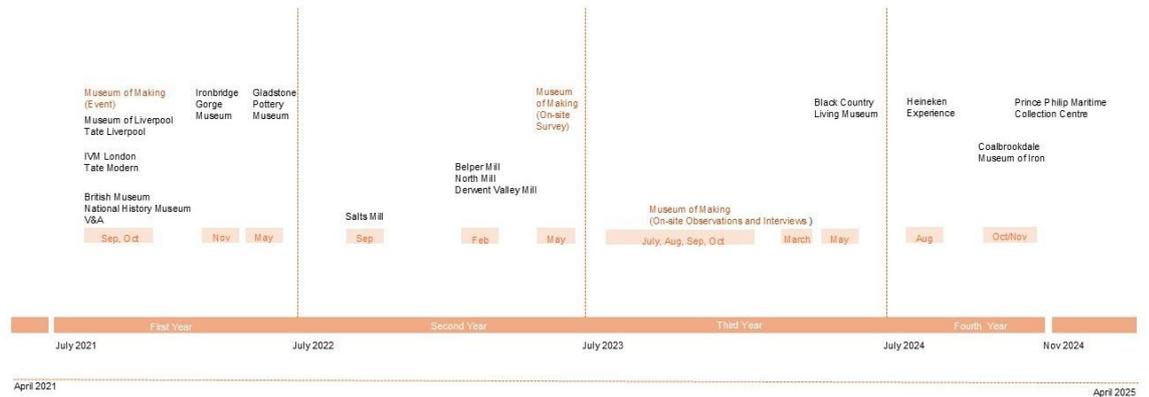
Figure 1 4   Fieldwork in the Industrial Museum between 2021
and 2024. (Source: Created by the Author)

Building on this understanding, this study examines the

identified challenges through the view *of **adaptive reuse,**

museum interpretation*, and ***learning experiences**.* The aim is

to address these issues within the context of architectural design

for industrial museums.

Industrial museums encounter various challenges, many of

which are closely tied to architectural considerations. In the

beginning, in line with Suzanne Macleod's top 20 principles for

the Future of Museum and Gallery Design, seen as Appendix D

– Future Museum Design. This study identifies three key challenges at the beginning of this study:

- *Taking Account of the Local*: museum makers must understand and reflect the cultural uniqueness of the local environment to cater to the interests and needs of the community they serve.
- *Being Multi-Sensory*: museum experiences should engage the whole human being, encompassing both the body and the mind.
- *Being Embedded in Its Environment*: museums should blur the boundaries between the museum experience and everyday life, creating a 'third space'.

Taking Account of the Locals (Adaptive Reuse): In the adaptive reuse of industrial buildings, the architect's considerations significantly influence the conceptual design stage, particularly in restoring and transforming the structure. Cesare Brandi, in his work *The Theory of Restoration* (translated in 2005), introduces a concept of treating a work of art as a holistic restoration strategy, thereby strengthening the historical connection between industrial buildings and their transformation into museums. Similarly, Liliane Wong (2017), in her book *Adaptive Reuse: Extending the Lives of Buildings*, employs

mathematical symbols to express the new order achieved in the restored building.

Graeme Brooker and Sally Stone (2004), who focus on reworking waste and redundancy, explore the concept of 'disorder' and its potential to adaptively transform buildings into new typologies. Meanwhile, Fred Scott (2008), in his book *On Altering Architecture*, draws inspiration from art conservation, delving into the psychological and sociological dimensions of transforming existing structures. Tim Edensor (2005), in *Industrial Ruins: Spaces, Aesthetics and Materiality* warns of the dangers of erasing evocative urban sites, emphasising the importance of retaining historical and aesthetic materiality.

Although these scholars do not directly address the concept of 'the local', they all advocate for embedding local sociological elements and historical contexts into the adaptive reuse process.

To create a 'new order' in adaptive reuse projects, Peter Block in *Community: The Structure of Belonging* highlights the significance of physical space in fostering a sense of community. When an industrial building is converted into a museum, the community's sense of belonging extends beyond the building itself, contributing to the growth and identity of the

surrouding city. Edward Relph (1976), in *Place and Placelessness*, further reinforces this perspective, emphasising that physical settings, activities, and meanings are interrelated. These elements serve as the raw materials for establishing the identity of a place.

Being Multi-Sensory (Museum Interpretation): Joy Monice Malnar (2004), in her book *Sensory Design*, describes phenomenal reality as the outcome of a sensory-emotional experience centred on the human body. When an industrial building is adaptively reused as a museum, its design and experience must holistically engage visitors, addressing both body and mind. Traditionally, museums have relied on verbal and textual formats to mediate and create engagement through exhibitions, as Laura Hanks (2012) discusses in her book chapter *Writing Spatial Stories*. Similarly, Jonathan Hale (2018), in *From Body to Body: Architecture, Movement, and Meaning in the Museum*, emphasises that as material beings occupying three-dimensional space, humans perceive and understand the world through their interaction with objects arranged around them.

Yi-Fu Tuan (1977), in his book *Space and Place: The Perspective of Experience*, highlights the inescapable

connection between culture, the human body, and the interplay of space and place. Expanding on this, both Harry Francis Mallgrave (2018) and Adam Sharr (2012), in *From Object to Experience: The New Culture of Architectural Design* and *Reading Architecture and Culture: Researching Buildings, Spaces and Documents*, respectively, argue that embodied experience is central to understanding architecture. They suggest that buildings serve as cultural artefacts shaped by and shaping the bodies and surroundings from which they arise.

A well-designed, immersive museum experience allows individuals to perceive time subjectively, detached from specific durations and instead tied to events or incidents. H. Porter Abbott (2008), in *The Cambridge Introduction to Narrative*, explains that human time is event-driven, shaped by narrative rather than chronological precision. Within a museum space, the interaction of these elements creates dynamic relationships of 'becoming' within space and time, moving beyond static states of 'being'. This concept is influenced by Leslie Kavanaugh, who, drawing from Gottfried Wilhelm Leibniz, conceptualises space as a network of interrelations. Her ideas are further developed in her article included in the edited volume *Design Research in Architecture: An Overview* (2013), edited by Murray Fraser.

Being Embedded in Its Environment (Learning Experiences): Nicholas Serota (2000), in his book *Experience or Interpretation: The Dilemma of Modern Art Museums*, proposed that museums are evolving from being merely 'cabinets of treasures' to becoming akin to historical books. Similarly, Falk and Dierking (1992), in *The Museum Experience*, emphasise that museums are ideal physical contexts for meaningful learning, offering rich and multi-sensory experiences.

Between 1992 and 2020, many studies explored the museum's role as an informal learning space. Graham Black (2012) introduced the innovative idea that museums could bridge the gap between formal and informal learning. This concept can be traced back to Eilean Hooper-Greenhill (1992), who highlighted a shift in display arrangements within museums - from grouping items by theme and material to organising them chronologically or sequentially. Museums can serve as 'third learning spaces' for two key reasons. First, as Hooper-Greenhill (1994) argued in *Museums and Their Visitors*, learning in museums emphasises the *process* of learning rather than the *outcome*. Second, Graham Black (2005), in *The Engaging Museum: Developing Museums for Visitor Involvement*, pointed out that museums

facilitate both life-wide and life-long learning, making them spaces for continuous personal growth and exploration.

To achieve meaningful learning experiences, Graham Black also (2012) proposed that museums should adopt interpretation strategies that encourage visitors to engage with the 'real thing'. In *The Engaging Museum: Developing Museums for Visitor Involvement*, he argued that this approach enables museums to offer highly interactive experiences that act as a confluence of personal, socio-cultural, and physical contexts. This dual focus on awareness-making and meaning-making ensures that museums not only educate but also create opportunities for deeper, more participatory engagement with their audiences.

1.2   Research Gap

As highlighted in section 1.1.3, a knowledge gap has been identified regarding how industrial museums are activated through visitor engagement with learning experiences. On the one hand, broader disciplines such as architecture/interior architecture and museum studies have been explored. Researchers like Graeme Brooker and Sally Stone have significantly contributed to understanding adaptive reuse design approaches, particularly the complex process of remodelling existing buildings. On the other hand, scholars such as Nicholas

Serota, Eilean Hooper-Greenhill, and Graham Black have focused on enhancing the museum experience and expanding its potential as a multi-functional space.

While the literature in both architecture and museum studies provides valuable insights, these two disciplines remain disconnected in their treatment of industrial museums. This disconnection reveals a clear research gap, which this study aims to address by integrating the two fields. The core research question emerges: *How can enactive visitor engagement be achieved through learning experiences in an Industrial Heritage Museum?*

1.3   Research Significance

This study aims to align the integration of Structuralism and Phenomenology, proposing a new framework to explore the "Body-Space" relationship in the context of industrial museums.

During the complex process of remodelling an industrial building along with cultural continuity, decision-making regarding which parts of the building to preserve or remove plays a critical role in shaping the "Body-Space" relationship. As time and space evolve, bodily memory often forms a profound connection with the built environment, influenced by elements such as building typology and materiality.

Additionally, this research seeks to examine contemporary industrial museum spaces and their potential for further development, building upon historical museum typologies. Historically, the earliest museum typologies were designed to look backwards, preserving the history of human activities. Two key initial musuem typologies are particularly significant in this regard (Marotta 2012):

- The *Theatre of Memory*, which focused on the recollection of ideas and knowledge.

- The *Cabinet of Curiosity*, which served as collection showcasing the diversity and wonder of the natural and human-made world.

Moreover, true learning within a museum context is highly interactive and involves both perceptual and cognitive learning processes (O'Connor et al. 2020). By examining these learning processes, this study will define the varying degrees of visitor engagement and identify the most effective spatial settings for fostering engagement.

1.4   Research Aims and Objectives

This research, motivated by personal interest[1], focuses on the reactivation of industrial buildings repurposed as museums, with a particular emphasis on understanding the visitor experience and learning processes within museum spaces. The Museum of Making, located in Derby, England, has been chosen as the primary case study to provide a detailed exploration of these themes.

The study aspires to make two key contributions:

- Academic Contribution: to advance debate on the future of museum design by positioning the industrial museum as a distinctive type of cultural space.

- Practical Contribution: to provide guidance for adaptive reuse, offering recommendations to enhance visitor

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[1] Motivation: With nearly a decade of experience in cultural interior design, I have been deeply fascinated by spatial configuration that evoke emotional responses and activate spaces. My journey began with projects ranging from tailoring retail spaces to designing restaurant interiors, where I explored how design can enhance spatial experiences. This curiosity shaped my master's studies; one of the projects was investigating design approaches that help British cashmere stores compete. Building on this foundation, my PhD research delves into museum spaces, focusing on fostering a deeper dialogue between museums and visitors through spatial experiences, within industrial heritage settings. This study integrates philosophical perspectives, architectural theory, and an exploration of historical museum typologies to identify enhanced design strategies to inform the future of museum design.

engagement while balancing heritage preservation with contemporary innovation.

To achieve these objectives, the study sets out three specific objectives that align with the core research questions and provide measurable outcomes, as Table 1.3 shows:

Table 1 3   Research question, sub-questions, and objectives in this study. (Source: Summarised by the Author)

Research Question		
How can enactive visitor engagement be achieved through learning experiences in an Industrail heritage museum?		
Research Sub-questions		
What key elements influence the adaptive reuse of industrial buildings as museums?	How do buildings support the museum experience?	How do visitors engage with the museum through active learning experiences?
Research Objectives		
To identify the *key elements* influencing the adaptive reuse of Derby Silk Mill to the Museum of Making.	To describe the *spatial characteristics* of the Museum of Making which support the overall museum experiences.	To examine the *transmission of knowledge* with the Museum of Making through the learning experience.

1.5   Research Approach

To achieve the objectives of this study, three core areas of focus have been established: identifying the key elements influencing adaptive reuse, describing spatial characteristics, and examining learning experiences within museum spaces.

The literature review reveals a critical gap, indicating that industrial museums have the potential to act as a third learning space by activating visitor engagement through spatial design.

This study adopts a structuralist approach to investigate the cultural continuity of museum time and space, addressing architectural challenges such as temporal and spatial transformations achieved through diverse restoration methods. Additionally, a phenomenological approach is employed to analyse two historical museum typologies and their evolution into modern interpretations. By contrasting these philosophical perspectives – structuralism and phenomenology - the research seeks to illuminate a significant knowledge gap concerning industrial heritage museums.

Subsequently, a primary case study will be conducted using phenomenological observation to evaluate the applicability of the proposed theoretical framework. This will identify context-specific variables under a conceptual framework that will then be tested through qualitative and quantitative data collection. These measures aim to validate the framework, ensuring its reliability and the generalisability of findings to inform the design of effective museum spaces.

The study will conclude by discussing that one of the museum's roles will become a third learning space, linking this concept to the proposed theoretical framework. In summary, this research contributes both academically, by advancing theoretical perspectives on adaptive reuse in industrial museums, and practically, by evaluating the primary case to develop enhanced spatial strategies for future museum spaces.

1.6   Thesis Structure

This thesis is divided into two major sections: the first focuses on a comprehensive literature review, and the second explores the case study, primary data collection, and the analysis of results. To provide a clear and concise overview, the thesis comprises eight chapters. Below is a summary of each chapter, highlighting its key objectives and findings:

Chapter 1: **Introduction** - This chapter introduces the industrial museum as an architectural phenomenon. Using a database of 59 industrial museum examples, it categorises these museums based on region, year, and architectural reuse programme. Additionally, insights from general museum visits inform the identification of three significant challenges for future museum design. These challenges are explored theoretically and serve as a foundation for the subsequent chapters.

Chapter 2: **Methodology -** This chapter outlines the research methodology, including data collection and analysis methods. It explains the rationale for selecting the Museum of Making (MoM) as the single case study and describes the case study process. Four key methods – documentary study, spatial analysis, phenomenological observation, and opinion collection – are employed to evaluate the case. The data are then analysed in conjunction with the literature to provide insights from multiple perspectives.

Chapter 3: **(Literature Review) Industrial Architectures Adaptively Reused as Museums** - The first part of the literature review addresses the question: *How can industrial buildings be adaptively reused as museums?* Using structuralism as a philosophical perspective, the chapter explores architectural issues, including the temporality of industrial culture continuity and spatial transformations through restoration methods. It examines adaptive reuse practices in the UK regarding industrial museums, particularly their cultural impacts.

Chapter 4: (Literature Review) Industrial Architectures Supporting Museum Experiences - This chapter focuses on the sub-question: *How do buildings support the museum*

experience? It examines two historical museum typologies –
The *Theatre of Memory* and *The Cabinet of Curiosity – and*
traces their evolution into modern museum spaces. Two
contemporary examples, the Heineken Experience and The
Prince Philip Maritime Collection Centre, are analysed to identify
spatial characteristics that facilitate learning. The chapter
concludes by proposing a new typology of museums as 'third
learning spaces'.

**Chapter 5: (Case Study) The Museum of Making as a Focus
Case Study** - This chapter presents The Museum of Making as
the primary case study, analysing its design approach through
three key aspects: context, spatial arrangement, and materiality.
The MoM's 300-year history is explored, highlighting its
connection to Derby's natural and urban environments. The
chapter also examines how the MoM places the community at
its centre, fostering cultural relationships with Derby and
Derbyshire's industrial heritage. Meanwhile, building materials
are discussed as mediums that connect visitors to embodied
experiences within the museum.

**Chapter 6: (Case Study) Museum Experience in The
Museum of Making** - This chapter investigates The Museum of
Making's museum interpretation strategies, focusing on

intellectual and embodied experiences. It incorporates primary

data from visitor reflections, collected through an online survey

of general visitors and observational studies with recruited

participants, supported by interviews. By comparing these data

sets, the chapter evaluates the effectiveness of the MoM's

spatial arrangements and discusses their alignment with the

literature.

Chapter 7: (Case Study) The Museum of Making as a Third

Learning Space - Building on the theory of museum education,

this chapter explores learning processes in the MoM, focusing

on perceptual and cognitive learning. Interviews with recruited

occasional visitors and workshop practitioners provide primary

data to assess the MoM's potential as a 'third learning space'.

The discussion integrates theoretical insights and primary

findings, offering an in-depth analysis of what the MoM provides

for both architectural students and general visitors, as a third

leaning space.

Chapter 8: Overall Discussion – This chapter explores

learning experiences from three perspectives: how industrial

museum architecture supports learning, how museum

interpretation facilitates learning, and how knowledge is

transmitted in industrial museums. By synthesizing insights from

the comprehensive industrial museums discussed in Chapters 3

and 4, this chapter examines architectural strategies,

interpretative approaches, and communicative methods. It aims

to demonstrate how the Museum of Making (MoM) functions as

a dynamic learning environment.

Chapter 9: Conclusion – The final chapter synthesises the

study's findings, structured around the three research

objectives: key elements influencing adaptive reuse, spatial

characteristics of the MoM, and visitors engagement through

learning experiences. The implications of these findings are

discussed, highlighting their academic and practical

contributions to museum design, including architectural design

and museum interpretation. The study concludes by proposing a

framework for enhancing bodily engagement through learning

experiences in industrial museums, informed by the two

historical typologies – The *Theatre of Memory* and *The Cabinet*

of Curiosity. It lays the groundwork for future research into

adaptive reuse of the industrial buildings and visitor engagement

through learning experiences across the EU and UK.

Chapter 2 – RESEARCH METHODOLOGY

2.1 Introduction

This chapter outlines the methodologies employed in developing

theoretical assumptions and gathering primary data for this

research project. The study's workflow follows a progression

from *Theory → Case → Data*, while the analysis process adopts

the reverse sequence of *Data → Case → Theory*.

As Figure 2.1 shows, the research begins by establishing a

strategy to define initial ideas, categorise research themes, and

identify preliminary fieldwork sites. This foundational overview

serves as a basis for selecting and conducting the main case

study.

In the case study section, four key research methods for data

collection are presented:

- **Policy/Documentary Study**: provides a macro-level

  understanding of the main case by examining archives,

  policies, reports, newspapers, magazines, websites, and

  literature, spanning a wide historical range from 1841 to

  2024.

- **Spatial Analysis**: with the structuralism examination, the

  spatial analysis offers an objective description of the

spatial environment of the main case and comparable

precedents with part of main case, focusing on

architectural and design elements.

- **Phenomenological Observation**: adopts a subjective

  perspective to explore the lived experiences of recruited

  visitors, observing their time spent, movements, and

  interactions within the space.

- **Opinion Collection**: aims to interpret visitor behaviours

  through their comments. This data is gathered in two

  ways: one is from general visitors via Google Reviews

  and TripAdvisor; the other is from recruited visitors

  through semi-structured interviews.

Additionally, insights from museum staff and architects are

obtained through interviews to provide official perspectives on

the museum's design and interpretation.

By synthesising findings from these methodologies, this study

aims to answer the three core research objectives through an in-

depth overview analysis of the main case. It also seeks to

identify significant theories in the context of active industrial

museum spaces, contributing to both academic and practical

discourse in this field.

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                    ┌──────────────────────────┐
                    │   Background Reading     │
                    └──────────────────────────┘

    ┌─────────────────────┐        ┌─────────────────────┐
    │  Initial Concepts   │        │  Initial Fieldwork  │
    │   (Key Theory)      │        │   (Key Examples)    │
    └─────────────────────┘        └─────────────────────┘

                    ┌──────────────────────────┐
                    │        Case Study        │
                    └──────────────────────────┘

  ┌──────────────┐  ┌──────────────┐  ┌──────────────┐  ┌──────────────┐
  │Policy/Document│  │Structuralism │  │Phenomenologic│  │   Opinion    │
  │              │  │ examination  │  │al Observation│  │  Collection  │
  │              │  │Spatial       │  │  Visitors'   │  │              │
  │              │  │ Analysis     │  │ Behaviours   │  │              │
  └──────────────┘  └──────────────┘  └──────────────┘  └──────────────┘

                    ┌──────────────────────────┐
                    │    Museum Experience     │
                    └──────────────────────────┘
                         ┌──────────────────────┐
                         │  Learning Experience │
                         └──────────────────────┘
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Key Findings

(Synthesise Key Theory, Key Example, and Case Study to Answer Three Objectives)

| Adaptive Reuse | Spatial Characteristics | Knowledge Transmission |

Contribution

Figure 2 1   The Methodological Framework of this Study.
(Source: Created by the Author)

2.2 The Research Methodology

The research methodology for this study combines theoretical and empirical approaches to establish a robust framework for understanding the adaptive reuse of industrial buildings as museums. While architectural theory provides foundational principles for conceptual and philosophical inquiry, the methodology focuses on the systematic empirical processes used to collect, analyse, and interpret data, which is articulated by inquiries using specific techniques (Groat 2013).

At the outset, the architectural theory served two primary purposes:

- **Establishing Principles**: it defined key concepts and overarching philosophies to guide the research, offering a scaffold for discussion and informed debate(Lucas 2016).
- **Providing Structure**: it framed the inquiry into adaptive reuse by connecting structuralism and phenomenology as philosophical foundations.

The empirical methodology, on the other hand, emphasised practical investigations into real-world phenomena (Wang and Groat 2013). Following one year of initial concepts and fieldwork across a range of examples, the Case Study approach was identified as the most suitable research strategy.

A Case Study was chosen because it allows for an in-depth investigation of a phenomenon within its real-life context, especially when the boundaries between the phenomenon and its physical setting are not clearly defined. By combining structuralism and phenomenology, this approach analysed both the historical and contemporary spatial settings of the chosen site and interpreted visitor behaviours to address the research objectives.

2.2.1 Initial Concepts

The initial concept for activating visitor engagement through the visiting experience was proposed as the nature of the setting, which was divided into two categories: *Architectural Design* and *Museum Interpretation*. Both categories aimed to explore the ways in which spatial and interpretive techniques could effectively enhance visitor engagement (Table 2.1).

Under the framework of structuralism, the first category examined adaptive reuse in terms of time accumulation, functional changes, materials preservation, and cultural transformation, in Chapters 3 and 5. The 5Ps framework – Programme, Product, Process, People, and Place – was particularly emphasised to comprehensively understand the adaptive reuse process, shown in C.1 5P Programmes.

Under the framework of phenomenology, Chapter 4, this second

category explored the role of museum interpretation in fostering

visitor engagement through two types of experiences: overall

and learning experiences, Chapters 6 and 7. Furthermore,

intellectual and embodied experiences keywords were

categorised by embodied transactions, multi-sensory,

authenticity, awareness and meaning making, and the third

learning space was identified as integral to this category through

perceptual and cognitive learning.

Table 2 1   Initial Concepts of the Scope of this Study. (Source: Summarised by the Author)

Architectural Design				
Adaptive Reuse				Case Analysis
Time Accumulation	Functional Changes	Materials Preservation	Cultural Transformation	5Ps: Programme, Product, Process, People, and Place
Museum Interpretation				
Intellectual and Embodied Experiences				Case Analysis
Embodied Transactions	Multi-Sensory	Authenticity	Awareness and Meaning making	Perception, Cognition Third Learning Space

2.2.2 Initial Examples

Similarly to exploring initial concepts, the scope of selecting

examples consisted of two areas, online survey and fieldwork. In

the process, the examples survey started from the historical

museums, which were narrowed down to the redundant industrial buildings converted into museums and art galleries.

In the first step, some examples of historical museums were surveyed online, as Table 2.2 shows, including Back to Backs in Birmingham, Southwell Workhouse in Nottingham, IWM in London, King Richard III Visitors' Centre in Leicester, H.C. Andersen's House in Odense, Denmark and La Sucrière in Lyon, France. On the other hand, the initial museum fieldwork focused on Greater London and Liverpool, including the British Museum, National History Museum, V&A, IWM London, Tate Modern, Museum of Liverpool, and Tate Liverpool.

Subsequently, the initial site visit for the general museum started in July 2021, including the British Museum, National History Museum, V&A, IWM London, Tate Modern, Museum of Liverpool, and Tate Liverpool.

However, even if these historical museums could foster a sense of ownership through human connection with visitors, it is a broad-based example for exploration of activating visitor engagement.

In the second step, a new conceptual element regarding redundant industrial buildings converted into museums and galleries was added to the site selection. More specific

examples were surveyed online. They are Tate Modern London, Tate Liverpool, Museum of Making, Musée d'Orsay in Paris, France, Ruhr Museum in Essen, Germany and M9 Museum District, Venice, Italy.

Eventually, a book section titled *Placing citizens at the heart of museum development: Derby Silk Mill – Museum of Making* led to the discovery of the main case – the Museum of Making.

Table 2 2   The Sequence of Surveys for Selecting Museum Examples. (Source: Summarised by the Author)

Step 1	Historical Museums and Arts Gallery	Online Survey: Back to Backs, Southwell Workhouse, IWM London, King Richard III Visitors' Centre, H.C. Andersen's House, La Sucriere, etc.
		Initial Fieldwork: British Museum, National History Museum, V&A, IWM London, Tate Modern, Museum of Liverpool, and Tate Liverpool
Step 2	Redundant Industrial Buildings Converted Into Museums and Galleries	Online Survey: Tate Modern London, Tate Liverpool, Musée d'Orsay, Museum of Making, Ruhr Museum, M9 Museum District, Ningbo Museum of Art, 798 Art Zone, ID Town, The Pier-2 Art Centre, Huashan 1914 Creative Park
Step 3	Book Section	Main Case: Museum of Making

2.2.3 Fieldwork for Comparative Study

To deepen the analysis, once the MoM was identified as the main case study, an extensive collection of examples related to

the architectural phenomenon of converting industrial buildings into museums was gathered (Denscombe 2014). As outlined in Section 1.1.1, a total of 59 industrial museum examples were selected, consisting of 44 in Great Britain and 15 within the European Union, as seen in Appendix A - Industrial Museum Database.

An analysis of the industrial museum database revealed that the majority of industrial buildings were converted into museums during the 1970s in Section 1.1.2, often following similar architectural approaches. However, these earlier transformations typically focused on invoking nostalgic emotion and lacked the contemporary design sensibilities seen in more recent GB projects built after the 2000s. Consequently, it became necessary to select additional precedents for comparison to provide a broader contextual understanding alongside the main case.

After finalising the MoM as the main case with sufficient preliminary knowledge, a second round of fieldwork was conducted, more specifically, focusing on six precedents with distinct architectural emphases (Table 2.3).

In this comparative study, specific functional and experiential elements of the six precedents were contrasted with those of the MoM:

- **Industrial Landscape**: examined through the Ironbridge Gorge Museums, focusing on the integration of individual industrial heritage within the surrounding landscape.

- **Spatial Movement**: explored at the Gladstone Pottery Museum, highlighting the movement patterns shaped by the museum's spatial layout.

- **Museum Atrium**: investigated in the Black Country Living Museum, focusing on the use of atriums to create central gathering spaces.

- **Exhibition Design**: analysed in the Shrewsbury Flaxmill Maltings, particularly how exhibitions are incorporated into adaptive reuse projects.

- **Museum Experience**: studied in the Heineken Experience in Amsterdam, examining how sensory and interactive design enhance visitor engagement.

- **Visitor Engagement Strategies**: assessed at the Prince Philip Maritime Collections Centre, focusing on its innovative visitor engagement techniques.

This comparative study allowed for a multi-dimensional

understanding of how industrial heritage sites are transformed

into museums, offering valuable insights into various

architectural and experiential strategies that inform the MoM and

its role as an industrial heritage museum that meets modern

societal needs.

Table 2 3   Six Comparative Studies with Different Architectural
Focus Points. (Source: Summarised by the Author)

Comparative Study						
Visit Date	2021 Nov	2022 May	2024 May	2024 Aug	2024 Aug	2024 Nov
Museum	Ironbridge Gorges Museums	Gladstone Pottery Museum	Black Country Living Museum	Shrewsbury Flaxmill Maltings	Heineken Experience	Prince Philip Maritime Collections Centre
Year Built	1970	1974	2022	2022	1991	2018
Location	Shropshire	Stoke-on-Trent	Dudley	Shrewsbury	Amsterdam	London
Focus Point	Industrial Landscape	Movement	Museum Atrium	Museum Exhibition	Museum Experience	Visitor Engagement

2.3 Methods for Data Collection

This study is deductive research, starting from existing theory

with initial concepts and examples, to formulate hypotheses,

trying to answer the main question: "*How can enactive visitor*

engagement be achieved through learning experiences in an Industrial heritage museum?"

This study adopts a case study approach, combining qualitative and quantitative techniques, to investigate the MoM as the primary case. These methods are carefully selected to address the research objectives from both structuralist and phenomenological perspectives, and it is grounded in three key architectural research themes: humanities, engineering, and social science, as shown in Figure 2.2. The *humanities* perspective is concerned with the historical and philosophical dimensions of the site. This is addressed through the policy and documentary study described in the following 2.3.1.1 Policy and Documentary Study, which investigates the historical and cultural context of the MoM, as well as its integration within the broader urban and landscape fabric. The *engineering* dimension centres on the building's functional performance, described in the following 2.3.1.2 Spatial Analysis. The *social science* perspective focuses on human behaviour and user engagement, relying on the user-based analysis discussed in 2.3.2 User Studies, with two different user groups.
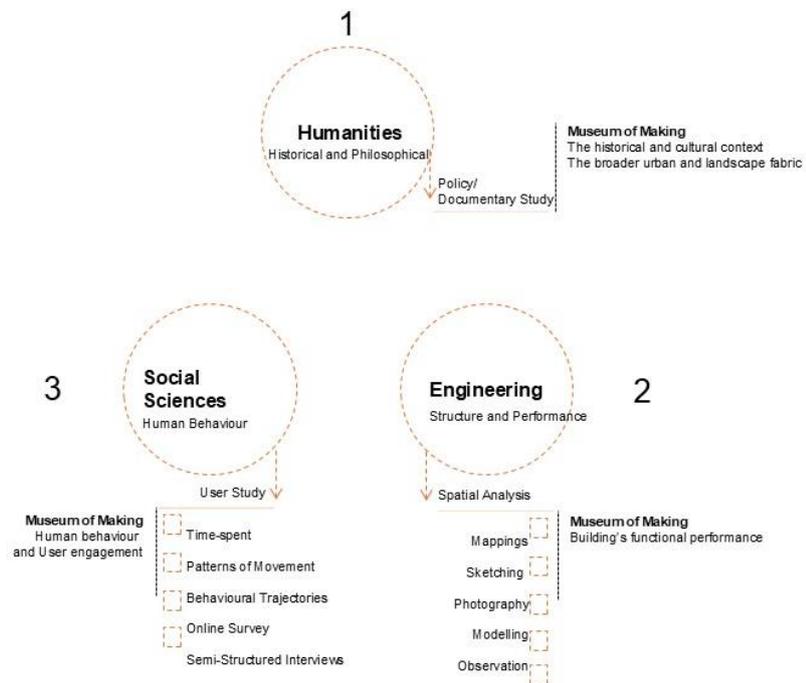
Figure 2 2   Three Key Architectural Research Themes in a Case Study. Source: (Wiedmann 2022b)

In this study, the whole data collection process consists of two major phases:

The first phase is the site-based investigation, which focuses on policy, documentary study and spatial analysis, reflecting the researcher's viewpoint aligned with a structuralist framework. This includes examining the historical and cultural context of the MoM through archival materials, policies, institutional reports, newspapers, magazines, websites, and academic literature,

following a chronological narrative. In addition, special attention is given to the building's transformation, including its integration within the wider urban and landscape context, materiality, programming, functional organisation, and circulation patterns.

The second phase is the user studies, which involves a visitor study based on phenomenological observation, aimed at capturing lived experiences within the museum space. This part explores how visitors engage with the museum in two groups, specifically through patterns of movement, time spent in different areas, and behavioural trajectories.

- The first group comprises local residents from Derby and Derbyshire. Their spatial interaction was observed phenomenologically, supported by existing survey data that provided keywords from an existing online survey.

- The second group includes international visitors, whose behavioural trajectories were tracked and later interpreted through follow-up interviews to understand their attention to the space.

In summary, data collection was conducted in two main phases: the first is a site-based investigation to explore objective spatial and historical attributes, and the second is the user studies to examine subjective visitor interactions. Together, these methods

enable a nuanced assessment of how adaptive reuse museum design shapes meaningful museum experiences. By combining insights from both researchers' objective analysis and visitors' subjective experiences, this methodology offers a holistic understanding of how spatial design impacts learning engagement in the Museum of Making.

2.3.1 Site-based Investigation

The site-based investigation employs two core research methods: policy, documentary study and spatial analysis. These methods are designed to address the architectural and contextual dimensions of the main case - the Museum of Making.

2.3.1.1 Policy and Documentary Study

The documentary study treats documents as a primary source of data to address research inquiries (Denscombe 2014). This method articulates two sub-research questions, addressed in Chapters 3 and 4:

Chapter 3: "How can industrial buildings be adaptively reused as museums?"

In Chapter 3, documents such as archives, reports, literature, newspapers, and websites are reviewed. These include archival materials on the Derby Silk Mill, dating back to 1841, 1843,

1856, and 1975. These documents provide a preliminary understanding of the industrial space, beginning with the mill's construction in 1704, initially named Lombe's Mill. Later, the Derby Industrial Museum was established in 1974. Documents from 1974 to 2024 were also collected, encompassing literature, newspapers, and websites.

Key resources include two book chapters by Suzanne MacLeod (2018 and 2020), which discuss the Museum of Making's user-centred design approach and its focus on placing citizens at the core of museum development. In 2021, Hugh Pearman highlighted the architectural space of the museum in the *RIBA Journal*. In 2022, *The Guardian* published an article comparing the Museum of Making with a Gladstone Pottery Museum, emphasising its potential to help shape a better future.

Chapter 4: "How do industrial buildings support the museum experience?"

Chapter 4 examines documents that recast two historic models of museum architecture – The *Theatre of Memory* and the *Cabinet of Curiosity* – and connects these with contemporary industrial museums. Introduced in the *Architectural Review* (2012), these typologies represent the origins of two distinct types of museums (Marotta 2012).

This study investigates the relevance of these historical

typologies to contemporary museum architecture, discussing

their evolution and significance in current practices (Lucas

2016). Contemporary examples include the Heineken

Experience and the Prince Philip Maritime Collection Centre,

which demonstrate how buildings can support engaging

museum experiences, and develop as a third learning space.

2.3.1.2 Spatial Analysis

Spatial analysis constitutes a central component of this

research, particularly in the investigation of the MoM, using

mapping techniques and other spatial representation tools to

conduct quantitative assessments. This section focuses on the

spatial and structural dimensions of this site, guided by three

architectural functions identified by (Wiedmann 2022a, p.9):

"Structurally, to access the various spaces (to and from the site)

Structurally to protect from environmental factors (both natural and human)

Structurally to reduce waste (material and energy)"

Mappings

The first phase of analysis employed digital mapping, conducted

prior to the on-site visits. Tools such as Google Maps and

Digimap were used to explore both contemporary and historical

contexts of the site. Google Maps facilitated an understanding of the current relationships between the MoM and its natural and built environment, particularly its proximity to the river, connectivity within Derby, and walking distances among the three Derby museums, and identification of the MoM's three main entry points.

Conversely, Digimap provided historical insights, allowing for a comparative analysis of land use and urban development patterns in the 1800s, 1900s, and post-2000. This revealed transformations in the Derby Silk Mill and its surrounding urban fabric, with a particular focus on historical streets and remaining historic buildings.

Integrating findings from mapping and documentary study, a 5Ps framework, place, programme, product, process, and people, was applied to review the building's evolution from the 17th century to its reopening in 2021, shown in C.1 5P Programmes. Visual data were processed and represented using Adobe Illustrator, forming a vital reference before the formal site-based investigation.
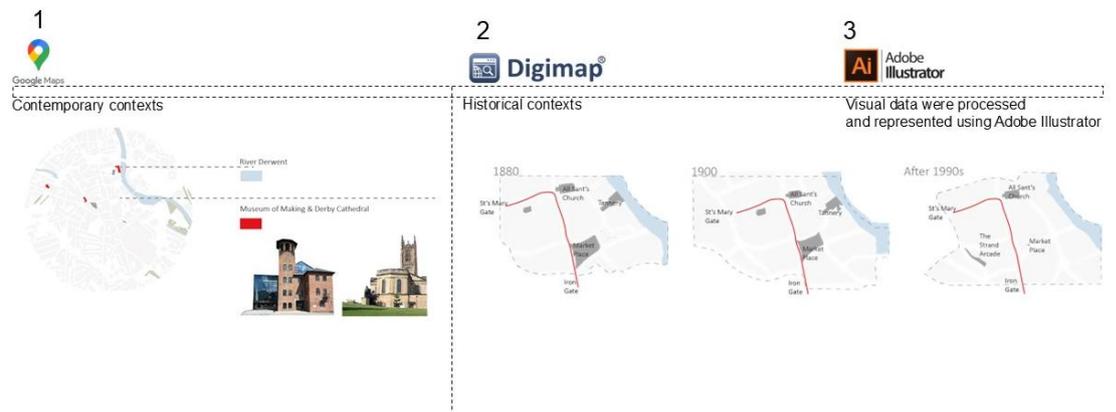
Figure 2 3   Tools Used in Mappings and Their
Representatives. (Source: Created by the Author)

Sketching, Photography, and Modelling

The second phase was based on two on-site visits: one during

the *Assemblage* event (25 October 2021) and another on a

regular operating day (11 September 2022). During these visits,

rough spatial measurements were taken and attention was paid

to the harmonious relations between various rooms and the

building (Wells 2021, p.67).

A research sketchbook was developed as part of this process,

comprising observational and analytical sketches rendered in

pen, pencil, and watercolour (Farrelly and Crowson 2014, p.24).

Photography was also employed to assist spatial memory and

support visual analysis.

Using the data collected, a preliminary 3D model of the MoM

was created in SketchUp. The model captured key architectural

aspects, including form, materiality, functions, and exhibitions.

This model later informed the experiential qualities pattern of

circulation, activity and sensible forms to support them in the

further user studies (Lynch and Hack 1985, p.127).

Figure 2 4   The Sequence of the On-site Visits. (Source:
Created by the Author)

2.3.1.3 Data Distribution

The site-based investigation data were categorised into three

thematic areas: contextual overview, experiences of materiality,

and spatial arrangement, which are further explored in Chapters

5.2, 5.3, and 5.4, respectively.

A substantial portion of the mapping data contributed to the 5.2 Contextual Overview, addressing the MoM's natural and urban setting, historical and cultural background, and its role in community engagement.

In the 5.3   Experiences of Materiality, drew on the 3D model, sketches, and photographic analysis to investigate the relationship between old and new materials. Emphasis was placed on how material choices affect visual and spatial perception and support civic engagement through the transformation of the building envelope and the enhancement of embodied visitor experience.

A smaller portion of mapping data was used alongside modelling and observational techniques to examine spatial arrangement, contributing to Figure 5 8   The Industrial Wall of the MoM. (Source: Drawn by the Author)

5.4 Spatial Arrangement, with a particular focus on spatial continuity and functional zoning. This included transitions: from Derby Museums to the MoM, from external public spaces to the internal environment, vertically, from the ground floor to upper levels. These sequences were analysed to understand how

spatial organisation affects visitor orientation, engagement, and perception of the museum.

Lastly, the assessment of functional spaces, such as the café, exhibition areas, archives, and multipurpose rooms, these are considers not only their operational role but also how they facilitate learning, social interaction, and wider public engagement.
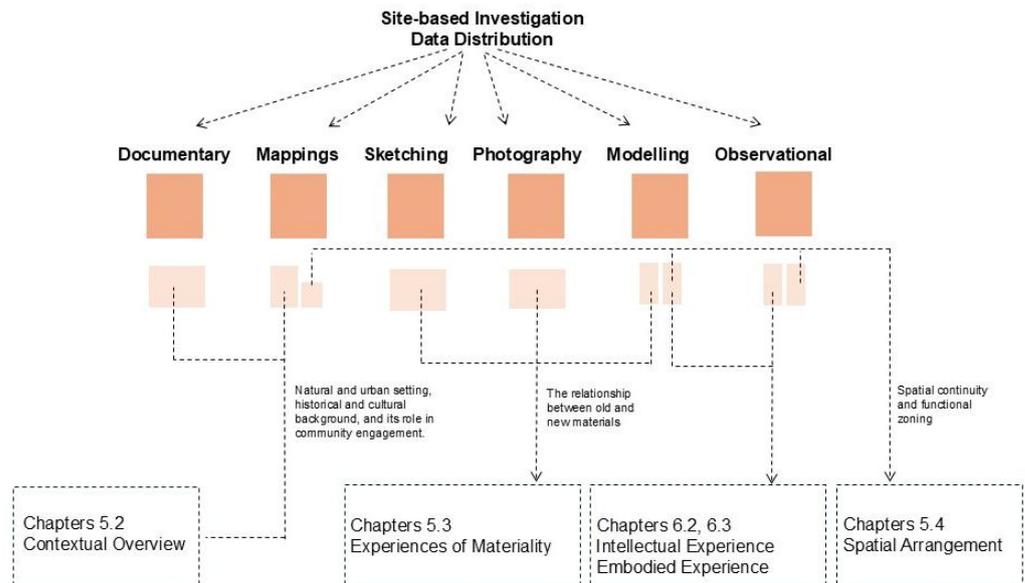
Figure 2 5   The Data Distribution in the Site-based Investigation. (Source: Created by the Author)

2.3.2 User Studies

The user studies with a direct attention to articulate the main research question - enactive visitor engagement. This part of the

study involves two core research methods: phenomenological

observation and opinion collection.

2.3.2.1 Phenomenological Observation

The phenomenological observation method aims to describe the

nature of particular phenomena by exploring lived experiences.

While this approach primarily draws upon the researcher's own

perspective, it incorporates observed behaviours of others to

balance subjective insights with descriptive observations

(Wiedmann 2022b, p.45). In this study, the descriptive

observations were outlined earlier in 2.3.1.2 Spatial Analysis.

In this section, the phenomenological observation focuses on

the lived experience of visitors' time spent, the pattern of

movement (first user group) and behavioural trajectories

(second user group). This data aims to examine the nature of

their experiences within the museum.

Figure 2 6   The Sequence of the User Studies. (Source: Created by the Author)

Time-spent

The measurement of visitors' time spent within the museum is grounded in the time-geographic approach, which is a quantitative method used to analyse temporal behaviours within spatial environments. This framework enables a detailed empirical understanding of how visitors distribute their time across different rooms and zones within the museum. By identifying the 'time cost' associated with specific areas, it becomes possible to assess the spatial, material, and contextual

significance of these locations (Ellegård 2019). This method also lays the foundation for later theoretical discussion, particularly the contrast between *clock time* and *human time*, as explored in 3.4.2 Clock Time and Human Time.

The time-geographic approach offers insights into both spatial and temporal dynamics by quantifying how long visitors remain in specific locations. It conceptualises time as measurable by clocks, providing a systematic basis for interpreting changes in human behaviour over time in social and physical settings (Ellegård 2019). In this study, the method was applied to two visitor groups: local residents and international visitors.

With approval from the MoM, the first user group of visitor studies, mainly residents as natural visitors, time was recorded at the floor level, with visits categorised into three rough durations: short (approximately 5 minutes), medium (20 minutes), and long (1 hour). With approval from the University of Nottingham's Research Ethics Committee, the second user group of the study, 10 recruited visitors who represent occasional international visitors with a fresh experience, a more precise measurement was undertaken. Their Behavioural Trajectories were tracked for up to 45 minutes, with the time spent in each room or area individually recorded.

In summary, time serves as both a practical and theoretical tool to investigate how visitors' location choices reflect their interests and engagements. The resulting data informs an evaluation of the most effective area within the museum, from both architectural design and museum interpretive perspectives.

Table 2 4   Observations for the First Visitor Group, which is the Local Residents, as Natural Visitors. (Source: Summarised by the Author)

No.	Floor	Groups				Days	Duration
		5 min	20 min	1 hour	Total		
1	First Floor	26	3	1	30	Tus	3 hours in between 11:00 and 16:00
2	First Floor	23	4	1	28	Thurs	
3	First Floor	23	3	1	27	Thurs	
4	Second Floor	38	15	2	55	Tus	2023 08/09/10
5	Second Floor	23	3	1	27	Thurs	
Note 1: Item 3 is 55 groups, because this day held a special event involving care home visits.							
Note 2: Tuesday and Thursday are the busiest days in the whole week, and the period between 11:00 and 16:00 is the busiest time of the day.							

Table 2 5   The Demography Survey for the Second Visitor Group, which is the international visitors, was recruited as Occasional Visitors. (Source: Summarised by the Author)

No.	Participant Code	Gender	Age Range	Ethnicity	Frequency of Museum Visit	Learning Experience	Teaching Experience	Date of Interview
1	OV01	F	25-35	China	Once a Year	PGR in Arch	N/A	07.02.2024
2	OV02	F	25-35	China	Once a Year	PGR in Arch	N/A	07.02.2024
3	OV03	M	25-35	China	Once a Year	PGR in Science	N/A	15.02.2024
4	OV04	F	25-35	China	Once a Year	PGR in Arts	5 Years Lecturer	15.02.2024

5	OV05	M	25-35	China	Once a Year	PGR in Arch	2 Years Lecturer	15.02.2024
6	OV06	M	25-35	China	Once a Year	PGR in Eng	2 Years Lecturer	15.02.2024
7	OV07	M	25-35	Indonesia	Once a Year	PGR in Arch	5 Years Lecturer	20.03.2024
8	OV08	F	25-35	Indonesia	Once a Year	PGR in Arch	5 Years Lecturer	20.03.2024
9	OV09	F	25-35	Turkey	Once a Year	PGR in Arch	N/A	20.03.2024
10	OV10	F	25-35	Turkey	Once a Year	PGR in Arch	2 Years Lecturer	20.03.2024

Patterns of Movement

The first user group primarily utilises tracking of movement patterns, shown in the B.1 Tracking movement patterns of the first group. The expression of movement patterns in this study encompasses visual and bodily dimensions.

In this group (residents as natural visitors[2]), visual movement refers to how attention is projected onto museum collections. Visitors' eyes are drawn to specific visual cues, which these often created through exhibition design, generating a sense of spatial progression and anticipation (Ahmadi 2019). This visual attraction shapes how visitors experience space, influencing both where they have been and where they anticipate going (Ching 2014, p.252). In this museum, the exhibition setting becomes particularly significant. Although the MoM occupies a

---

[2] Tuesdays and Thursdays are the busiest days, largely due to school visits and visits from retired people.

flat industrial space with minimal vertical circulation, the strategic use of visual stimuli can enhance visitor engagement, compensating for the lack of multi-level spatial sequencing.

With the bodily dimensions, the movement and circulation are often discussed in relation to exploring spatial flow (Stickells 2010). This study highlights how spatial engagement in a horizontally organised building can still be deeply meaningful. The interaction between visual orientation, temporal investment, and spatial movement is further examined through the theoretical lens of the 3.4.3 Promenade Architecturale. This concept helps to interpret movement-based engagement, particularly among the '1-hour group', whose extended stays suggest a more immersive, exploratory experience.

Behavioural Trajectories

Beyond the general measurement of tracking movement patterns, behavioural trajectories offer a more precise understanding of how visitors navigate the interior spaces of the museum, shown in B.2 Tracking behavioural trajectories of the second group. The reason is that the body can act as a generator of interior space, shaping environments that are responsive to the human scale and conducive to engagement (Penner 2013).

In this study, within the 45-minute visit timeframe, behavioural trajectories of 10 first-time international visitors (from the second group) were recorded in detail. The objective was to examine their attention and engagement with specific exhibitions or rooms, capturing both their spatial choices and the intensity of their interactions.

In summary, these data were then integrated into a preliminary 3D model of the MoM, using colour-coded lines to distinguish the time spent both in the movement pattern and behavioural Trajectories. Simultaneously, data on effective room usage were compiled by calculating and comparing time-spent metrics across both groups.

2.3.2.2 Opinion Collection

To substantiate the results derived from the time-spent measurements and spatial engagement analysis, opinion collection plays a vital role in interpreting visitors' movement patterns and behaviour trajectories. In this study, opinions were gathered through two primary channels: online survey and semi-structured interviews. In addition, a research diary was maintained to record events and observations on-site.

Online Survey

Google Reviews served as the platform for collecting user-generated content, allowing individuals with a Google account to publicly share feedback and assign a star rating (out of five) to their museum experience. Notably, reviewers are required to provide a rating score before submitting their written comments, ensuring that all entries include a quantifiable evaluation.

A sample of 99 reviews was required to be selected from a broader dataset. This sampling was calculated by visitor statistics presented in *The Impact of the Museum of Making – Social Return On Investment* (2023/2024), which reported 102,605 total visitors and 7,313 participants in informal learning activities (Derby Museums, 2024). To enhance reliability and timeliness, 1,599 Google reviews were reviewed on 14 March 2024, near the end of the financial year. These reviews were then organised and coded using an Excel spreadshee**t** for thematic analysis, shown in C.3 Online Survey.

Semi-Structured Interviews

The semi-structured interview served as a primary tool for collecting qualitative insights to complement the behavioural trajectory data gathered from the second user group, as well as to gain perspectives from museum staff.

For phenomenological research, a sample size between 5 and 25 participants is considered appropriate to ensure depth and richness of data (Emmel 2013). Semi-structured interviews were selected due to their open-ended format, which allows conversations to flow more naturally and encourages participants to elaborate on their experiences and reflections (Lucas 2016). This method was particularly suitable given the diverse professional backgrounds of the interviewees, which enabled the collection of multi-perspective insights. Participants included recruited visitors and museum staff[3]. Their varied expertise contributed to a more holistic understanding of spatial engagement, interpretation strategies, and visitor experience.

The semi-structured interview process began with a brief introduction to the research objectives, followed by a series of guiding questions that were introduced sequentially. While these questions provided structure, flexibility was maintained to allow participants to explore themes most relevant to their experience. This format fostered dialogue-led discussions, offering both depth and spontaneity. The first visitor group was focused on

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[3] Bauman Lyons is an architectural practice, and the Creative Core is an interpretation design company; both of them are responsible for the MoM project. Unfortunately, Bauman Lyons scheduled a talk, but it was cancelled due to the three-month flood closure. Although the email interview was initially accepted, there was no further response. The Creative Core has not responded at all.

phenomenological observation, and the second group was conducted to collect more in-depth data. Ten international visitors, recruited from the University of Nottingham. The recruitment criteria for this required an international background and postgraduate research (PGR) students with a subject in architecture (preferred), as they were invited to evaluate the museum architecture later. In addition, a third group of five individuals who naturally attended the museum workshop was included, as shown in Table 2.6. As their feedback directly pertained to the learning experience at the MoM, they were not categorised by any specific ethnic group. Moreover, five visitors from the second group were selected for follow-up interviews three to six months later, with the focus on their learning experience, as shown in Table 2.7.

The data from the above semi-structured interviews with these two groups aims to address the main question:

"How can enactive visitor engagement be achieved through learning experiences in an Industrial heritage museum?"

To answer this, visitors responded to two perspectives. First, they reflected on their personal experiences, evaluating the MoM's architectural aspects, such as circulation, spatial layout, lighting, materials, aesthetic qualities, and historical significance.

Second, they shared feedback on their intellectual, embodied,

and specific learning experiences within the museum. After 3–6

months, selected interviewees were asked more specific

questions about the museum as a 'third learning space,'

comparing their experiences at the MoM with academic learning.

Table 2 6   The Demography Survey for the Third Visitor Group, which was Recruited as Workshop Participants. (Source: Summarised by the Author)

No.	Participant Code	Gender	Age Range	Ethnicity	Frequency of Museum Visit	Learning Experience	Teaching Experience	Date of Interview
1	WP01	F	25-35	UK	Once a Year	N/A	N/A	10.03.2024
2	WP02	F	25-40	UK	Once a Month	N/A	N/A	10.03.2024
3	WP03	M	25-40	China	Once a Month	N/A	N/A	22.06.2024
4	WP04	F	25-40	China	Once a Year	N/A	2 Years Lecturer	27.07.2024
5	WP05	F	25-40	China	Once a Year	N/A	N/A	27.07.2024

Table 2 7   The Demography Survey for the Second Time Interviewees. (Source: Summarised by the Author)

No.	Participant Code	Gender	Return Duration	Frequency of Museum Visit	Learning Experience	Teaching Experience	Date of Interview
1	STI01	F	6 months later	Once a Year	PGR in Arch	N/A	10.03.2024
2	STI02	F	6 months later	Once a Month	PGR in Arch	N/A	10.03.2024
3	STI03	M	6 months later	Once a Month	PGR in Science	N/A	22.06.2024
4	STI04	F	3 months later	Once a Year	PGR in Arts	2 Years Lecturer	27.07.2024
5	STI05	M	6 months later	Once a Year	PGR in Arch	5 Years Lecturer	27.07.2024

For museum staff, the interview questions were designed to understand the MoM's mission. They were divided into three parts: the museum actually to do, the museum tries to do, and the museum can do. The first focused on what the museum has accomplished in the past, the second on its current initiatives, and the third on its potential future directions. Each section of the interview had a distinct focus. The first part explored the museum's cultural uniqueness and how its spatial representation attracts visitors. The second part delved deeper into the spatial factors contributing to visitor engagement and the design approaches employed. The third part examined potential improvements in spatial design.

Additionally, the researcher volunteered at the MoM from July to October 2023, until the museum's three-month closure due to flooding (Slater 2024). Although only one staff member formally responded to all questions, two others initially accepted the invitation but did not provide further input, the researcher attended museum events instead, including *This is US – Derby Museums Team Day* and *Museum of Making Site Induction*. During these events, other staff members shared detailed insights into the MoM through informal discussions. These

discussions align with the MoM's vision for the Expected Scope

Phase, which was outlined in their annual report, as shown in

shown in Table 7 *3* The Early and Expected Scope Phases of

the MoM.

2.3.2.3 Data Distribution
The data gathered from the user studies were systematically

organised to support the evaluation of the museum's spatial

effectiveness and interpretive design. The initial layer of analysis

involved the time-spent measurements, which provided robust

quantitative data to identify the most effective rooms and spatial

zones within the MoM. By comparing results across the two

visitor groups, patterns of spatial engagement, including both

similarities and differences, were established as a foundation for

deeper analysis.

Building on this, the research sketchbook and research diary

were used to contextualise and interpret the time-based data,

and these were visually represented in the 3D digital model of

the MoM. A gradient of green shades was applied to different

rooms, with deeper shades signifying longer visitor engagement.

To enhance the interpretive dimension, the 3D model was

abstracted into simplified spatial forms and overlaid with

keywords extracted from the opinion collection. This approach

allowed for the integration of subjective insights with spatial

performance, bridging quantitative and qualitative methods.

Together, these data sets contribute to a nuanced

understanding of how architectural configuration and exhibition

design influence visitor behaviour and perception. The findings

are presented and critically discussed in: 5.5   Evaluating

Museum Architecture and 6.4 Evaluating Museum Interpretation.
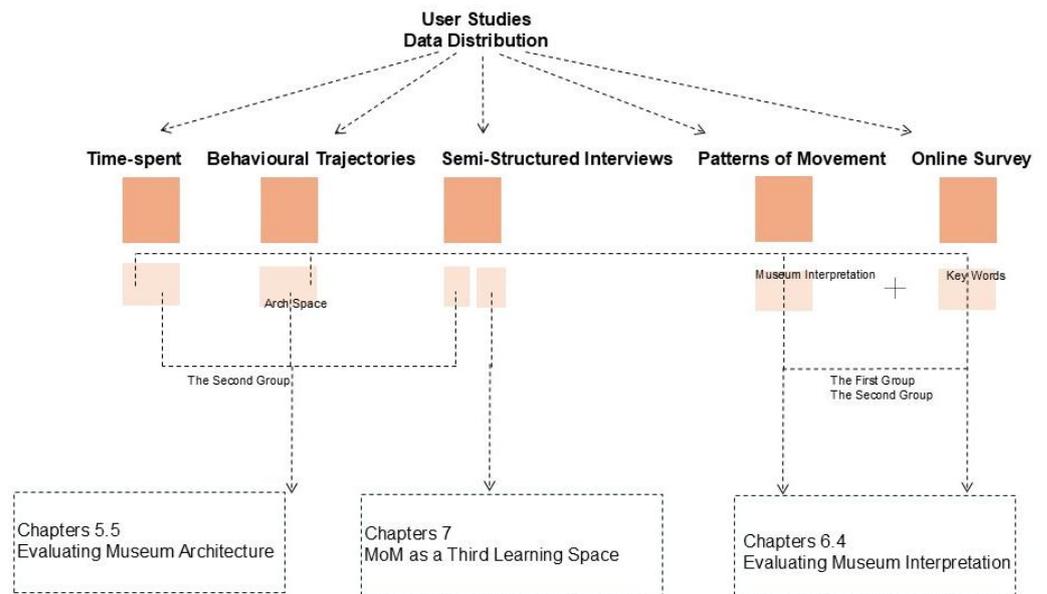
Figure 2 7   The Data Distribution in the User Studies. (Source: Created by the Author)

2.4 Methods for Data Analysis

Following the completion of the data collection process, the

research hypothesis was refined. This study is characterised by

its in-depth investigation into learning engagement within an industrial heritage museum, specifically focusing on the real-life experiences of visitors. The analytical process involved an iterative sequence of interrelated tasks - data collection, data structuring, and data analysis, conducted throughout the research. Ultimately, the findings aim to reveal the essential qualities of phenomena, as understood through subjective consciousness and embodied experience (Groat 2013).

The process of data analysis unfolds across three core steps: open Coding, links and associations and identification of significant categories, shown in Figure 2.8. This methodological structure aims to uncover the essential and underlying characteristics of meaningful learning engagement in the museum context.

The first stage involved open coding, which is a process of identifying and labelling segments of the 'raw' descriptive data drawn from multiple sources: policy/documentary study, spatial analysis, phenomenological observation, and opinion collection. The coding process was carried out using NVivo (version 14), which facilitated systematic data management and allowed for the dynamic refinement of categories throughout the research process (Denscombe 2014). In this stage, quantitative data,

particularly from time-spent measurements, played a crucial role in defining the 'effective areas and rooms' within the museum. A key analytical comparison was made between two visitor groups (local residents and international visitors), based on spatial engagement patterns. This comparative analysis supports the first sub-research question: "*What key elements influence the adaptive reuse of industrial buildings as museums?*" Findings from this step are presented in 6.4.1 Overview of Museum Experience.

The second analytical step focused on identifying links and associations between the MoM and six comparative case studies, each of which was selected for its distinctive architectural focus points, shown in Table 2.3. This comparative method enabled the identification of spatial and interpretive similarities and divergences, thus highlighting what design strategies are effective or ineffective in supporting visitor engagement and learning. This step addresses the second sub-research question: "*How do buildings support the museum experience?*" The results of this stage inform a set of practical recommendations for adaptive reuse and curatorial strategies in museum contexts, which will be presented in **9.3.2 Practical Contribution**.

The final analytical step aimed to define the most significant categories emerging from both empirical data and theoretical frameworks. Here, the research integrated insights from architecture, museum studies, and pedagogy to further interpret how learning occurs through spatial engagement. Specific elements of the museum, such as spatial configuration and interpretive design, were re-examined to frame the concept of the museum as a 'third learning space'. This synthesis directly supports the third sub-research question: "*How do visitors engage with the museum through active learning experiences?*" By connecting empirical observations with conceptual theory, this phase allows for a deeper understanding of the embodied, cognitive, and social dimensions of learning in the museum setting.
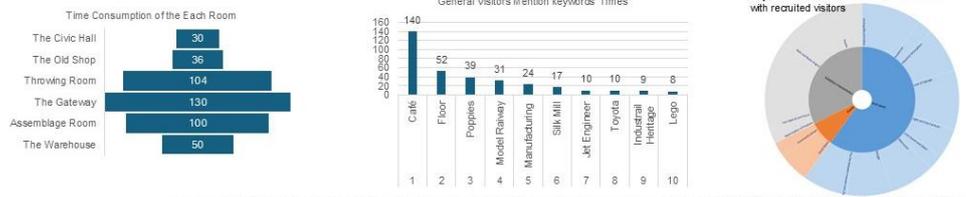
Figure 2 8   The Sequence of the Methods of Data Analysis.
(Source: Created by the Author)

2.4.1 Open Coding for Primary Data

The stage of 'open coding' is used to process quantitative data

as raw material in the form of numbers and its explanation from

online surveys and interviews. In this research, the

measurement of time-spent by visitors is a priority. The time-

spent data comes from two sources: the first (residents as

natural visitors) and the second (occasional international visitors

with a fresh experience) user groups, shown in C.2 Time-Spent

Measurement.

2.4.1.1 Quantitative Data

To measure the first dataset, the raw materials are classified

floor by floor. The MoM is constructed across four floors.

Excluding the café, rental spaces and studios, which are not open to the public, each floor serves distinct functions. As shown in Figure 2.3, the spatial arrangement of the museum is as follows:

Ground Floor: A social space, including the **Civic Hall** and the **Old Shop**.

First Floor: An exhibition space featuring the **Gateway** and the **Throwing Room**.

Second Floor: A storage space with areas open to the public, including the **Assemblage** and Railway Revealed rooms. However, the train in Railway Revealed only operates occasionally.

Third Floor: Limited access to the public, with only the **Warehouse** functioning as a temporary exhibition room.
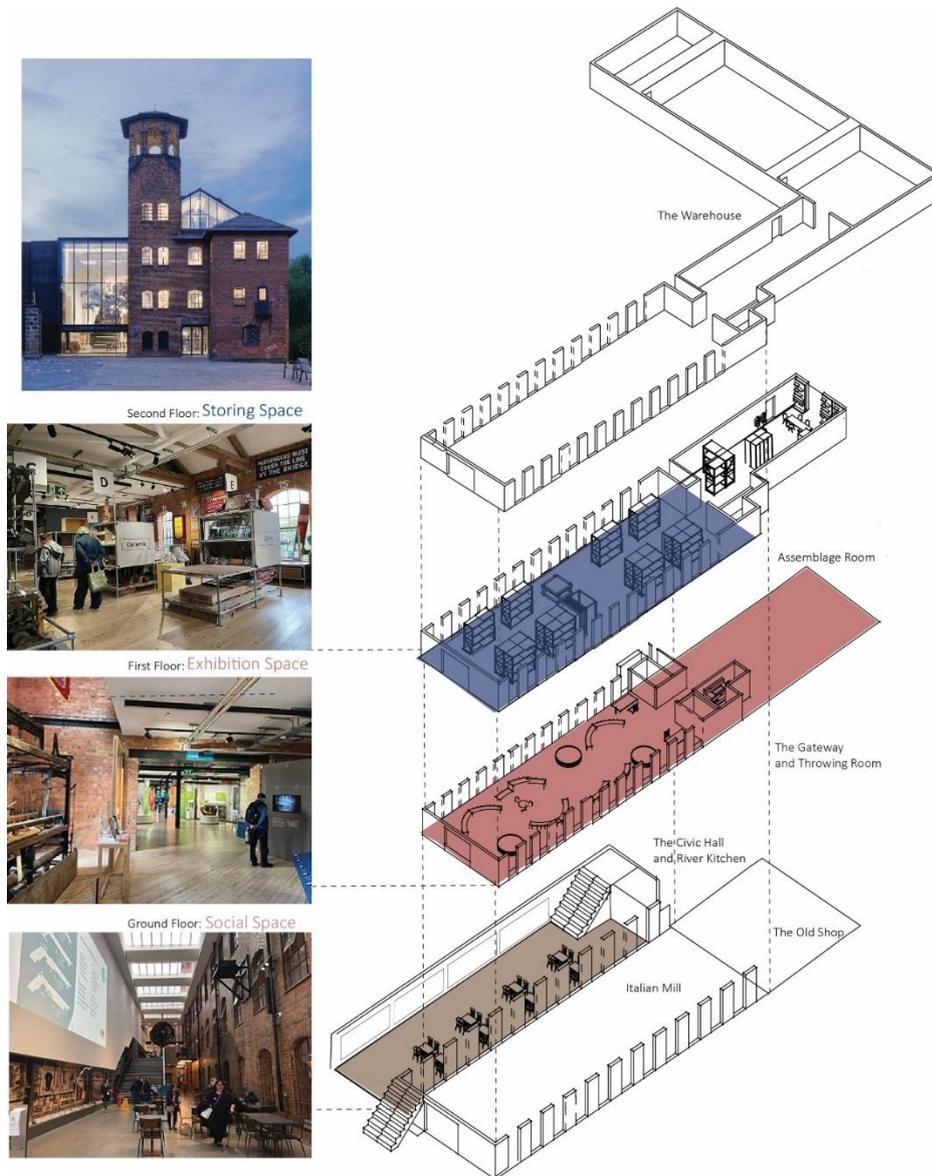
Figure 2 9   Floor Plan of the Museum of Making. (Source: Digital Model created by the Author)

For the first visitor group (residents as natural visitors), observational data focused on their routes and time spent on the first and second floors, which hold the museum's primary functions: exhibition and storage. Their time usage was

categorised into three groups: Short Visit with 5 minutes; Moderate Visit with 20 minutes; Extended Visit with 1 hour. This dataset was analysed to identify specific hotspots, areas of heightened activity or focus, based on visitor preferences and behaviours.

For the second visitor group (Recruited international OVs), as outlined in the information sheet, B.2.2 Participant Information Sheet, 10 recruited OVs were given a 60-minute limit for their visit. Within the first 45 minutes, they could freely choose their paths to explore. This resulted in a total of 450 minutes (10 visitors × 45 minutes) of observed interactions. The six key rooms mentioned above were ranked based on visitor preferences, determining the most 'effective' room within the MoM.

By connecting these two types of quantitative data, decision-making on the most effective room for the second user group and the hotspot areas frequented by the first user group. This study aims to identify the most attractive room and its specific areas. This analysis will establish which spaces and features hold the greatest appeal for visitors.

2.4.1.2 Qualitative Data

The analysis of qualitative data in this study is divided into two sections: general experiences, intellectual and embodied experiences.

For general experiences, key terms frequently mentioned in the online survey were identified, with the aim of contrasting them against the decision-making process regarding the most attractive rooms and specific areas identified by OVs.

Regarding intellectual and embodied experiences, the six key rooms were categorised into 'attention', 'distraction', and 'community', based on Nicholas Serota's theory (Serota 2000, p.8-10). According to Serota, distraction occurs when visitors' consciousness aligns with the curatorial interpretation of the exhibits, representing a form of intellectual experience. Therefore, the Gateway, Throwing Room, and Assemblage Room were categorised as distractions. Conversely, attention is described as an immersive experience achieved through the controlled manipulation of space and light, which promotes embodied engagement. The Warehouse and the Old Shop were categorised as rooms evoking attention. The Civic Hall, as a space fostering social interaction, was categorised under community.

After clarifying these three categories for the six key rooms, qualitative interview data were analysed using NVivo (version 14) to provide detailed insights into OVs' perceptions, strongly supporting their time-spent data. While establishing the NVivo system, raw materials from interviews were organised into three factors: architectural space, museum interpretation, and events (Yaneva 2022). The results, which combine time-spent data with explanatory reasons, are provided in Figure 5.16.

Furthermore, for each category ('attention', 'distraction', and 'community'), a summary of the online survey results concerning exhibition and archive spaces (the Gateway, Throwing Room, and Assemblage Room, categorised as 'distraction') was contrasted with interview data, shown in C.4 Data Analysis. Similarly, the data from the other two categories ('attention' and 'community') were compared between online survey results and interviews.

The intention of contrasting online surveys with interviews, covering both general and specific experiences, is to reduce the limitations of the chosen methodology.

2.4.2 Links and Associations
Building on the preliminary dataset regarding museum evaluation and visitor experience, the 'links and associations'

phase revisits the initial comparative examples. This stage focuses on examining the most 'effective areas and rooms' of the Museum of Making by establishing comparative relationships with six precedent case studies. Studying their design features aims to decode the design language in comparable museum examples, and identify parallels and contrasts to enhance the understanding of the main case (Wiedmann 2022b, p.47). In this phase, six core functional components of the MoM were identified and aligned with equivalent spatial or programmatic features in the selected precedents.

The precedent studies were chosen based on shared typological, architectural, or curatorial strategies relevant to the adaptive reuse of industrial heritage sites. This multifaceted spatial analysis, integrating both site-specific and precedent-based perspectives with serves several purposes: to contextualise the MoM within broader trends in museum design and industrial building adaptation; to evaluate the MoM's effectiveness in supporting visitor engagement, community interaction, educational programming, and cultural preservation; to inform potential improvements or adaptations in spatial

organisation, including the reorganisation of key areas such as the Gateway, enhancing spatial fluidity and user flow.

2.4.3 Significant Categories

The concept of the third learning space was previously introduced and reviewed in the literature. Following the completion of the primary data collection and in alignment with the Museum's vision and its 'Expected Scope in 2023' plan, this phase of the research focuses on the learning experience, specifically explored through semi-structured interviews with recruited visitors. This process aims to identify the most significant and meaningful codes, grouped under broader thematic categories, which will be further analysed and discussed in Chapter 7 – The Museum of Making as a Third Learning Space.

The theoretical framework for this analytical category draws upon Falk and Dierking's theory, which suggests that true learning involves both emotional and cognitive engagement, shown in Table 7 *5* The Integrated True Learning Format. To analyse perceptual learning in the museum context, Damasio's theory is applied across three dimensions: inwardly directed and private experiences; outwardly directed and public experiences that influence the mind; long-lasting emotional impacts that

require consciousness, shown in Table 7 7   The process of perceptual learning in the theory. As captured through interview data, these will be categorised according to these three dimensions. In parallel, Claxton's theory, which emphasises the role of embodied knowledge and memory, is used to interpret data related to cognitive learning processes.

To deepen this investigation, second-time visitors (STVs) were also interviewed. Their insights help to compare and contrast academic learning with museum-based learning, and to explore how these different modes of learning might complement one another. This final phase of analysis reflects critically on the emergent categories and identifies the most significant conceptual components of the study. It aims to offer a theoretical synthesis across architecture, museum studies, and pedagogy. Simultaneously, it integrates empirical findings with relevant theoretical frameworks, refining the sub-research questions and addressing the identified research gaps. Finally, it discusses what the 'real' architectural environment is to support active learning

In summary, these three stages - open coding, links and associations, and significant categories - offer a structured yet flexible framework for exploring meaningful learning

engagement within adaptive reuse museum settings. This comprehensive approach ensures that both visitor experience and spatial design are analysed in depth, contributing to the achievement of the overarching research objectives. As a result, the research findings will contribute to the academic discourse on future museum design, particularly through a critical evaluation of museum typology evolution. Furthermore, these insights may inform spatial improvements, such as the reorganisation of the Gateway Room, to enhance spatial fluidity and visitor flow.

2.5 Ethical Considerations and Methodology Limitations

This study employed several research methods, including systematic observations and interviews, and therefore required ethical scrutiny (Denscombe 2014, p.307). Prior to conducting the formal phenomenological observations, ethical approval was obtained from the Research Ethics Committee at the University of Nottingham, as seen in B.2.1 Ethics Approval. Before starting the formal visitor study, all participants in both the second group (OVs with international background) and the third group (WPs), as well as museum staff, were provided with a participant information sheet and asked to sign a consent form. This process ensured compliance with ethical standards, particularly

regarding privacy and informed consent, and helped prevent any potential deception within the context of social research (Diener and Crandell 1978). The procedure involved a comprehensive protocol, including both oral and written briefings.

Initially, the study also planned to include interviews with members of the MoM's architectural team. However, this on-site visit and discussion were cancelled due to disruptions caused by flooding[4] (Slater 2024). Consequently, the only available sources were relevant documents from the architectural practice's official website and the *RIBA Journal*. As a result, the study lacks direct input from the architects and designers, which could have provided deeper insights into the spatial intentions and design challenges from the consultants' perspective. In addition, due to the MoM only supporting on-site questionnaires for natural visitors using their own survey forms (as a volunteer, the researcher participated in this data collection), the data gathered through this process cannot be used in the current study due to ethical approval limitations. Except for these, an interview with a curator was intended, but could not be

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[4] Derby Silk Mill - Museum of Making site visit and social was organised by the RIBA East Midlands team on 18.10.2023.

conducted because the MoM lacks curators with specialist expertise, primarily due to financial constraints.

Furthermore, although visitor time-spent data was collected in various museum spaces, the study did not incorporate technological tracking methods (e.g., eye-tracking, pulse monitoring, or real-time movement analysis). These tools could have provided a more precise, physiological understanding of engagement levels to conduct visitors' behavioural trajectories. Future research may consider integrating such technologies to enhance the quantitative accuracy of behavioural and emotional responses.

2.6 Conclusion

In conclusion, this chapter has provided a detailed explanation of the research methodology, methods for data collection, and techniques for data analysis. As Figure 2.11 shows, this study adopts a case study approach, enabling an in-depth evaluation of how enactive visitor engagement can be achieved through experiences in an industrial heritage museum. Initially, a total of 59 industrial museums were examined, and six precedents were compared with the main case. Simultaneously, key theories on architectural design and museum interpretation were reviewed to establish a strong theoretical foundation.

To analyse the main case, the research employed a combination of policy/documentary study, spatial analysis, phenomenological observation, and opinion collection as methods for data gathering. The collected data, treated as raw materials, were then categorised into qualitative and quantitative formats. Finally, through the synthesis of key theories, examples, and case studies, the research effectively addressed the three objectives, providing a comprehensive response to the overarching aims and objectives of the study (Figure 2.10).

A: Museum Experience

Chapter 5

Chapter 6

Ground Floor	First Floor	Second Floor	Third Floor
Civic Hall	Gateway	Assemblage	Warehouse
Old Shop	Throwing Room		

'Attention'	'Distraction'	'Community'
Warehouse	Gateway, Assemblage	Civic Hall
Old Shop	Throwing Room	

Online Survey — Quali + Quan — **Time-Spent** — Quali — **Interviews**

Results 1: Effective Space

Arch Design	Museum Interpretation	Events

Literature

Results 2: Crucial Codes (Authenticity, atmosphere, lights, etc.)

Documents & Spatial Analysis

Results 3: Findings

Figure 2 10   The Framework of Data Analysis in this Study.
(Source: Created by the Author)

PART ONE

Chapter 3 – THE STRUCTURALIST TRANSFORMATION OF INDUSTRIAL HERITAGE INTO MUSEUMS

3.1 Introduction

This thesis explores the reactivation of industrial buildings repurposed as museums, with a focus on deep visitor engagement and knowledge acquisition. Chapter Three, the first part of the literature review, examines the temporal and spatial transformation of industrial buildings into museums, as well as their contextual adaptation. The discussion is structured around the following three key themes.

First, structuralism is introduced as a theoretical framework for analysing industrial museums from a historical angle. Case studies – including the Gladstone Pottery Museum, Salts Mill, and Black Country Museum – illustrate how structuralist principles inform museum design and researcher's interpretation (Grondin 1994; Kidder 2012). Second, the lifecycle of industrial buildings is explored through three interconnected aspects: design intervention, cultural continuity, and imagined

community. This section begins by examining how different design philosophies – whether a 'light touch' of restoration (Gladstone Pottery Museum) or adaptive reuse (Museum of Making) – shape spatial transformation. Next, the continuity of industrial culture is analysed through examples such as Derwent Valley Mills and Derby Silk Mill, demonstrating how these sites evolved while retaining their historical significance. Finally, the concept of imagined community is explored through examples of Ironbridge Gorge and Shrewsbury Flaxmill Maltings, highlighting how industrial museums construct collective narratives through layered histories and adaptive reuse. Third, museum time – clock time versus human time – is redefined in architectural and interpretative contexts. Clock time structures museums through spatial organisation and historical sequencing, while human time is shaped by curatorial storytelling and visitor engagement. This distinction emphasises the importance of designing museum experiences that integrate bodily engagement, rather than relying solely on expert-led narratives.

Ultimately, this chapter provides a theoretical foundation for understanding the spatial and temporal transformation of industrial museums, paving the way for the next chapter's exploration of phenomenology and embodied visitor experience.
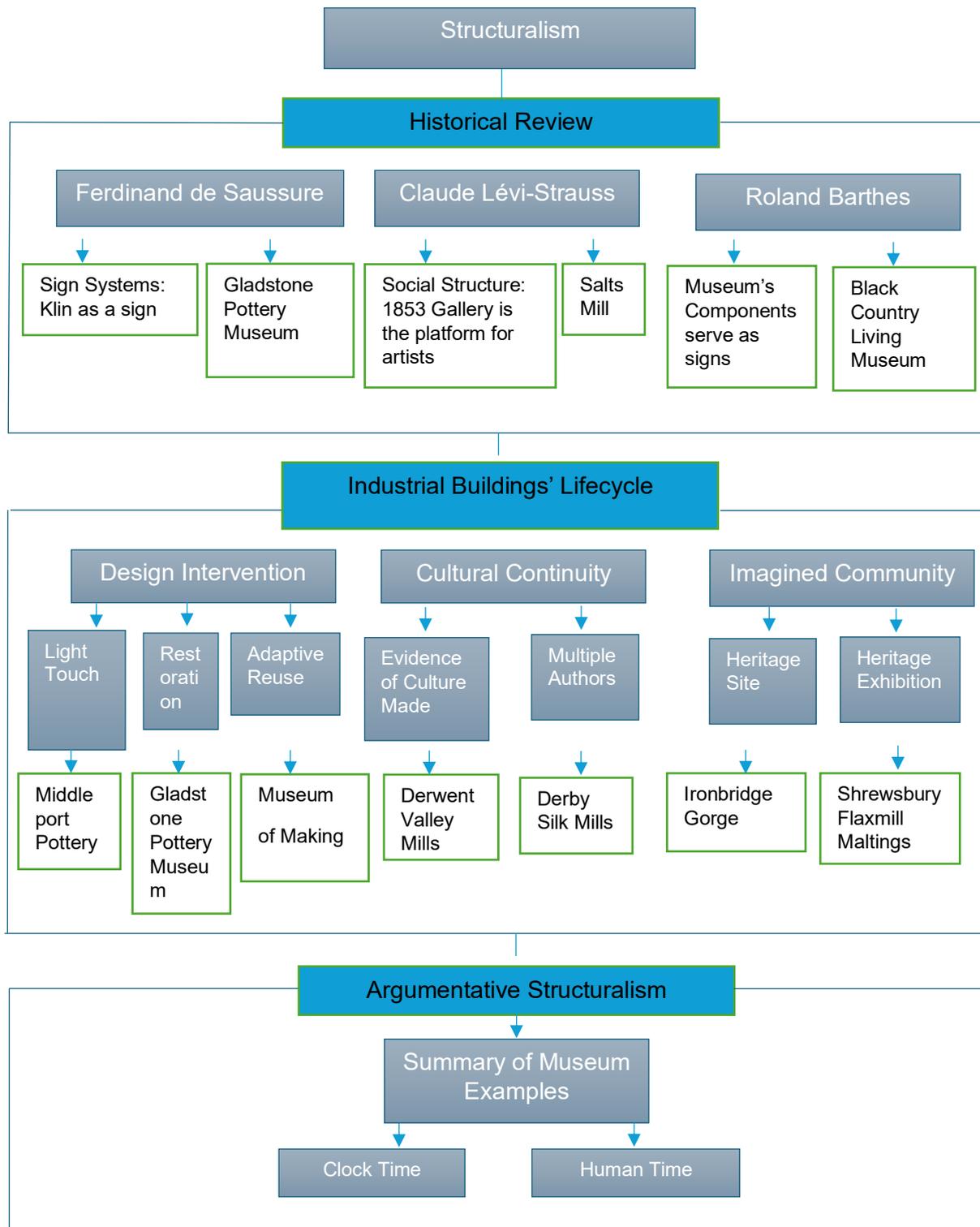
Figure 3 1   The Overview of the Theoretical Framework of this Chapter. (Source: Created by the Author)

3.2 Structuralism as a Theoretical Paradigm

This section examines structuralism as a theoretical paradigm in philosophy to analyse the transformation of industrial architecture into industrial museums. This transformation follows a typical temporal and spatial progression: from raw materials to industrial brick; from industrial brick to mill; from mill to manufactory; from manufactory to industrial ruin; from industrial ruin to adaptively reused building; and, ultimately, from adaptively reused building to industrial museum (Hale 2016). In this study, structuralism functions as a philosophical framework aimed at interpreting the hidden, 'unconscious' temporal and spatial structures embedded within industrial architecture throughout this transformative process.

3.2.1 Structuralism in this Study

3.2.1.1 Influence on Research Methodology

Although structuralism originated in linguistics, it has been applied across various disciplines, including architecture. Traditionally, the architect's role is often emphasised through their individual capacity, education, prior collaborations, and personal traits, presenting these as 'natural' explanations for the resulting design.

However, this approach alone is insufficient. Then, structuralism offers a way to extract meaning from universal structures – underlying and common patterns of human thought. It serves as a bridge in architectural design, facilitating an understanding of shared patterns and relationships within societies. Structuralism's influence on architects is profound, as architectural expressions must account for a broader context beyond the architect's background and characteristics. The broader context of the considerations includes political ideology, scientific theories, and societal norms (Söderqvist 2011). In this study, structuralism is analysed in the context of design thinking through three key aspects that inform the research methodology.

Binary and Distinctive Pairs

Structuralism often conceptualises spaces through oppositional binaries, such as inside/outside and nature/culture (Söderqvist 2011). In this study, this concept was applied to the spatial analysis of the main case study as one of the four data collection methods.

Invariant, Universal, and Collective Structures

Structuralism identifies social patterns, such as 'life on the

street' as meaningful structures or collective memories. By extracting these collective memories, a building extends beyond its physical setting to evoke emotional resonances. This aspect is supported by data collection regarding the opinion collections from visitors in this study, which highlights the emotional experience embedded in the architecture.

Semiology and Sign Systems

Semiology, often referred to as 'sign systems,' interprets architecture within a city as a form of communication (Rossi 1984). In the industrial landscape, each building serves as a sign representing specific functions, such as residential, commercial, or industrial. This aspect is explored further in 3.3.3 Imagined Community, which examines different functions of industrial buildings.

In summary, structuralism helps reveal the temporal and spatial aspects of industrial architecture, linking physical spaces with collective memory and personal experience. This framework also supports understanding how industrial buildings are adapted and reused as museums through processes of change over time and space.

3.2.1.2 Historical Review

Ferdinand de Saussure (1857–1913)

Defined the 'sign' as the relationship between a form and an acoustic image expressed by a human voice (the *signifier*) and a concept or mental idea (the *signified*).

Jonathan Hale

'Building ideas : an introduction to architectural theory / Jonathan A. Hale.'

Earlier linguistics was the bond between sound and meaning is not natural but arbitrary, this two-part structure connects two halves of the sign.

Industrial Museum

The *kiln* functions not just as a preserved artefact but as an abstract symbol representing the identity of the pottery museum.

Claude Lévi-Strauss (1908–2009)

Lévi-Strauss proposed that the collective mind operates largely at an unconscious level, organising the world and structuring societies based on underlying laws.

Jonathan Hale

'Building ideas : an introduction to architectural theory / Jonathan A. Hale.'

Lévi-Strauss emphasised the existence of complex networks of codes and prohibitions that establish order and structure within communities.

Industrial Museum

The 1853 Gallery within the Salts Mill becomes a platform for over 100 artists, student showcases, and school programmes beyond cultural tourism.

Structuralism

Figure 3 2   Summary of Key Thinkers of Structuralism. Source: (Hale 2000, pp.131-170; Leach 1997b)

The three aspects outlined above represent the traditional definitions of structuralism, which are generally applied to architectural studies. Building upon this foundation, this section systematically illustrates the historical development of structuralism and uses industrial examples to demonstrate its application as an approach to exploring architectural issues.

Ferdinand de Saussure (1857–1913) is widely recognised as the primary forerunner of modern structuralism. In 1916, Saussure's *Course in General Linguistics* was published 1916, emphasising

the structure of language over its empirical dimensions, focusing on how language is produced through the structural operations of sign systems rather than its meaning, to be known as *Semiology*. In traditional linguistics, a 'sign' was understood as a name referring to a 'thing'. Saussure, however, defined the 'sign' as the relationship between a form and an acoustic image expressed by a human voice (the *signifier*) and a concept or mental idea (the *signified*) (Kearney 1994). According to Hale (Hale 2000, p.131-170), the argument from Saussure is that earlier linguistics was the bond between sound and meaning is not natural but arbitrary. Language, he posited, operates as a system of differences, with the function of words dependent on their relationships with one another.

Two examples illustrate this distinction: the onomatopoetic word 'cuckoo', which directly mimics the sound of the bird, represents the traditional linguistic model, while the word 'sister', which has no inherent connection between its sound and its meaning, represents Saussure's structuralist model.

In the context of industrial museums, the process of signification is also evident in pottery museums, such as the Gladstone Pottery Museum. As shown in Figure 3.3, traditional pottery

buildings were purposefully designed with a central courtyard surrounded by functional spaces, including a kiln, throwing house, and warehouse (Pragnell 2021). Originally, the kiln served as a practical and essential component of pottery production, symbolising the power-driven nature of the industry. Over time, it has evolved into a defining emblem of pottery museums, bridging the site's industrial heritage with its modern role as a cultural institution. Today, the kiln functions not just as a preserved artefact but as an abstract symbol representing the identity of the museum (Giebelhausen 2006).
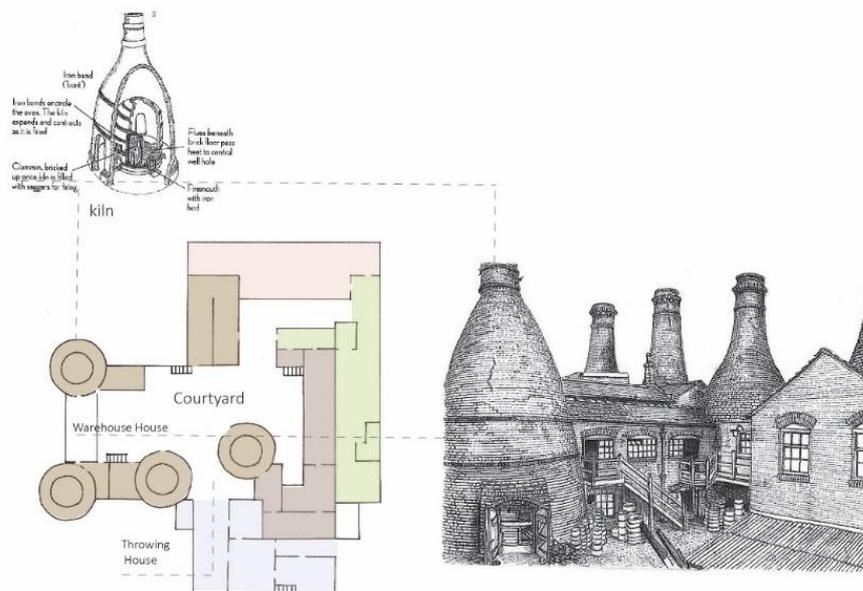
Figure 3 3   Floor Plan of the Gladstone Pottery Museum.
(Source: Drawn by the Author)

Claude Lévi-Strauss (1908–2009) expanded Saussure's model of language into the field of social anthropology, demonstrating its potential for understanding human society. He applied Saussure's linguistic framework to cultural expression, highlighting the role of underlying structures in shaping social behaviour. According to Hale (Hale 2000, p.137), Lévi-Strauss emphasised the existence of complex networks of codes and prohibitions that establish order and structure within communities.

Lévi-Strauss argued that social groups should be understood as collective entities rather than as aggregates of isolated individuals. He proposed that the collective mind operates largely at an unconscious level, organising the world and structuring societies based on underlying laws. These unconscious patterns are encoded in intricate systems of rules that regulate social relationships, providing a cohesive framework including a sense of order and structure for community (Kearney 1994, p.252-267).

In architecture, Lévi-Strauss's insights shift the focus from the physical building to the social structures and collective

memories it embodies. Meanwhile, Michel Foucault[5] clearly

distinguishes between architecture and architectural discourse.

The building itself is a non-discursive entity, while discourse

consists of the words and meanings that surround it (Paul 1993).

Foucault built upon this idea, suggesting that buildings function

as diagrams of power mechanisms, reduced to their ideal form

(Lambert 2013, p.17). Beyond form and function, his perspective

complements Lévi-Strauss's analysis by emphasising that

buildings not only reflect but also reinforce the legal and social

structures of a community, fostering a discourse between the

built environment and the people who inhabit it.

An example of this is Salts Mill in Saltaire, originally constructed

with sandstone and an internal brick and cast-iron framework to

minimise the risk of fire (The Saltaire Village Website n.d.).

Today, Salts Mill serves as a designer showroom for fashion

and furniture and houses the works of David Hockney (Pragnell

2021, p.74). Jonathan Silver, who purchased the mill,

transformed it into the 1853 Gallery by uncovering the original

flagstone flooring and filling the cast-iron-columned ground floor

with Hockney's paintings (North 2022). This transformation

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[5] Michel Foucault's book *The Order of Things*, focused on the general epistemic
structures of historical periods and how knowledge functions as a form of social
power.

regenerated Salts Mill into a cultural beacon, attracting tech

startups while showcasing contemporary art and craft. It has

also become a platform for over 100 artists, student showcases,

and school programmes beyond cultural tourism.
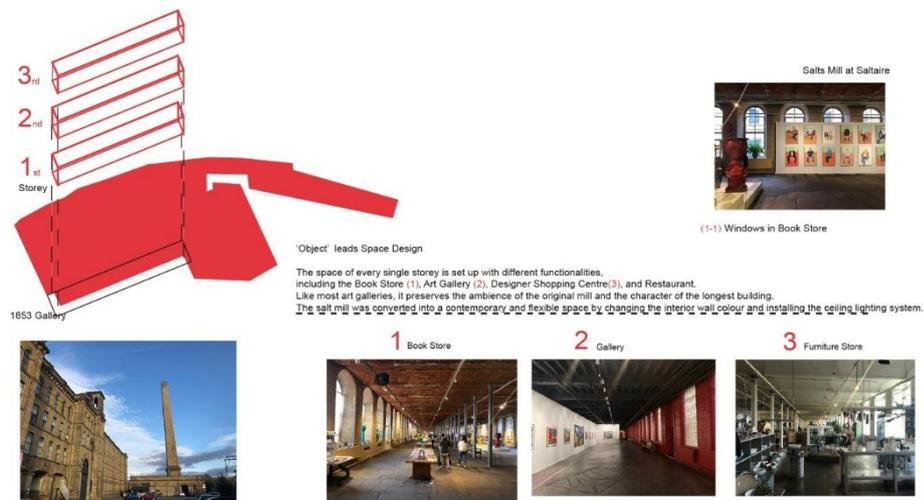
Figure 3 4   The 1853 Gallery within the Salts Mill as a
Community. (Source: Drawn and Photos taken by the Author)

Roland Barthes (1915–1980) extended Lévi-Strauss's

structuralist analysis to contemporary culture, particularly in the

study of sign systems. Often regarded as a 'cultural critic,'

Barthes examined how meaning is constructed and interpreted

in everyday life. In *Rethinking Architecture: A Reader in Cultural*

Theory, Leach explores Barthes's analysis of urban semiology

(Leach 1997b), particularly in *Semiology and the Urban*. Barthes

argues that the relationship between the signifier and the

signified is not fixed. If the city is viewed as a discourse and discourse itself as a language, then the city cannot be understood solely through a functionalist lens - it must be analysed from multiple perspectives (Leach 1997b).

A relevant example of this concept is the museum café, typically located in the museum atrium, which embodies both social and cultural attributes. To cultivate a sociable museum café with a strong cultural identity, several key principles should be followed: 'blending with individual characteristics' (Freire 2005, p.87-124), 'creating a new and effective urban interpretation' (Tzortzi 2016), and 'being a lived space rooted in everyday life' (MacLeod 2020b). By integrating these principles, the museum café can enhance the museum's role as a social learning space, enriching visitors' experiences and fostering a deeper connection to the urban cultural narrative.

Furthermore, Barthes proposed that objects and architecture communicate meaning in two ways: through their categorisation or their position within a system. Developing a trans-linguistic critique of cultural discourse, he outlined three key principles for an interdisciplinary approach: (1) every object in our world functions as a sign; (2) every sign is linguistic or trans-linguistic,

meaning it derives its meaning through structural relationships with other signs; and (3) hidden codes within a language system determine these relationships (Kearney 1994, p.320).

The Black Country Living Museum (Shown in Figure 3.5) provides a compelling illustration of Barthes's concepts, particularly his argument that the relationship between *the signifier* and *the signified* is fluid rather than fixed. As an open-air museum in Dudley, West Midlands, BCLM recreates a vivid representation of village life between 1850 and 1950. By relocating, reconstructing, or fabricating buildings that have been lost or abandoned, BCLM presents an immersive environment reflecting the industrial era.

The museum's various elements function as signs: industrial sites (mines, lime kilns, and metalworking shops) signify labour and production; leisure spaces (a 1930s' street, fairground, and canal) represent social and recreational life; and transportation infrastructure (historic transport collections) conveys mobility and economic exchange. These interconnected signs encode deeper meanings related to industrial heritage, creativity, and the socio-cultural dynamics of the time.

(1) Industrial Sites
(mines, lime kilns, and metalworking shops)

(2) Leisure Spaces
(a 1930s' street, fairground, and canal)

(3) Transportation Infrastructure
(historic transport collections)

(1)

(2)

Visitor Centre

(3)
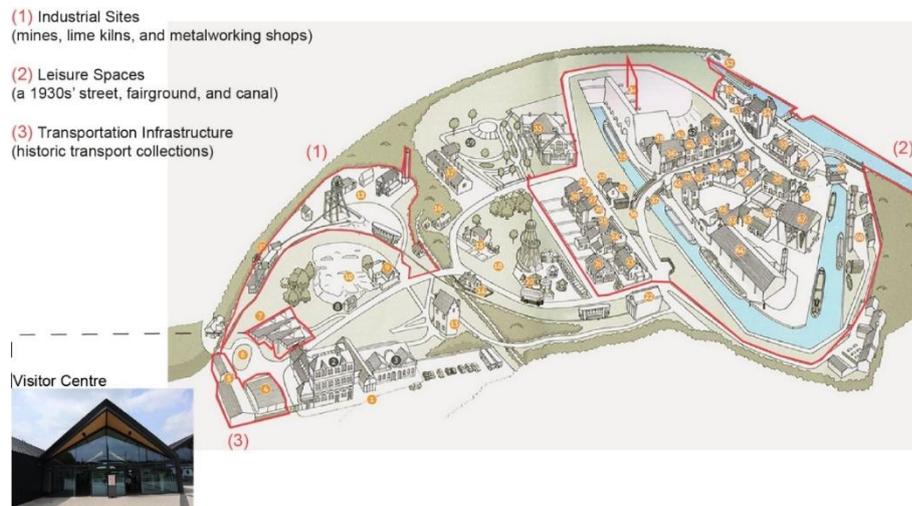
Figure 3 5   Museum's Various Elements Function as Sign within the Black Country Living Museum. Source: (Napier Clarke Architect 2024)

To summarise, echoing Figure 3.2, Figure 3.6 presents a summary of key quotations from major structuralist thinkers, highlighting their connections to architectural theory and examples of industrial heritage museums. These examples are organised within a structuralist framework, encompassing the sign (architecture as the museum), human society (the social structure of the community), and everyday life (a lived space embedded in daily experience).

Theoretical Paradigm

Key Thinkers
1. Architectural Theorists - Jonathan Hale, Neil Leach
2. Museum Function - Michaela Giebelhausen, Léopold Lambert, Suzanne MacLeod

Structuralism in Industrial Heritage
Lisbeth Söderqvist

Jonathan Hale Ferdinand de Saussure (Sign)	Jonathan Hale Claude Lévi-Strauss (Human Society)	Leach Neil Roland Barthes (Everyday Life)
Michaela Giebelhausen (The Architecture is the Museum)	Léopold Lambert (Social Structures of Community)	Suzanne MacLeod (A lived space rooted in everyday life)
Gladstone Pottery Museum – Klin	Salts Mill – Artists Community	Black Country Living Museum – Museum Cafe

Figure 3 6   Key Quotations from the Literature Review align with the Theoretical Paradigms in Structuralism. (Source: Created by the Author)

3.3 Industrial Buildings' Lifecycle

In Great Britain, the Industrial Revolution (1750–1900) marked a period of immense transformation driven by technological advancements. The textile industry was the first to embrace mechanisation, leading to rapid industrial growth. However, since the 1970s, the manufacturing sector has declined, giving way to the expansion of the service and quaternary sectors (Weston 2024; BBC BITESIZE n.d.). As traditional industries waned, many industrial buildings became redundant. Fortunately, adaptive reuse has emerged as a sustainable

approach, not only helping to circularise the flows of energy, raw materials, and human and cultural capital but also playing a significant role in the transition towards a circular economy (Fusco Girard and Gravagnuolo 2024).

This approach allows these structures to meet contemporary needs while fostering community-based partnerships. Industrial buildings have been repurposed for various uses, including workplaces, creative hubs, and commercial or residential spaces. However, converting these structures into museums arguably provides the most effective way to sustain the industrial spirit. Museums can function as mixed-use spaces that integrate tourism with industrial heritage, preserving historical narratives while contributing to economic and cultural revitalisation. Moreover, this impact extends beyond individual industrial buildings to entire historic urban quarters, which increasingly seek to attract new activities, including tourism and associated cultural initiatives (Heath et al. 1996, p. 68-71).

This chapter explores two key aspects of the industrial buildings' lifecycle: design intervention methods for adaptive reuse and the cultural continuity that evolves across the industrial and post-industrial eras. Additionally, the concept of an imagined

community is introduced to highlight its role in supporting and promoting the value of the industrial spirit (Ardalan 2016).

3.3.1 Design Intervention

Through the historical review of the Industrial Revolution (Oevermann et al. 2022), the textile industry was a leading sector in many countries. Notably, the oldest water-powered textile factory (1702) and the first fully mechanised factory (1721) was built in Derby, England. For this type of mill building, a successful design requires a good understanding of production methods, including technological processes, machine layout, power transmission and the latest structural solutions (Oevermann et al. 2022).

In addition, the earliest industrial building, raised at the end of the 18th century, adopted the strong Palladian tradition of local architecture, which was manifested in the use of Venetian windows (Hopkins 2012, p.125). These mills tried to link with classicism, particularly in terms of proportions. While the façade designs were minimal, they were characterised by regular repetition of windows. Two representative mills were built in this period: one is the Masson Mill in Cromford, England, which was built in 1783; the other one is in New Lanark, Scotland, which was built in 1785. Both of the mills were characterised by plain

exteriors based on rules of symmetry, perspective and

proportion (V&A n.d.); it became a simplified classicist design for

textile mills.

By the 1920s, industrial development in Germany emphasised

functionality over form, prompting architects to explore new

forms for industrial architecture, with a design that was

functional and representative at the same time (Oevermann et

al. 2022) (Figure 3.6).

Figure 3 7   Johann Gottfried Brugelmann's Mill near Ratingen,
Germany (an early example of technological transfer) and
GermanyVerseidag complex in Krefeld, Germany (1930).
(Source: The Heritage of the Textile Industry)

From the mid-20th century, particularly after 1947, the

information age was emerging and led to the decline of the

manufacturing sector, resulting in de-industrialisation.

Particularly in Great Britain, 1970 was the mark of the end of the

manufacturing industry decline and was replaced by growth in

the service and quaternary sectors (Weston 2024). Following the decline of the manufacturing industry, many industrial buildings faced three possible fates: to remain unchanged, to be altered, or to be demolished (Scott 2008, p.1-19). Furthermore, the fate of industrial buildings may result in them being abandoned, restored, retrofitted, or adaptively reused, and the distinctions between these terms are outlined in Table 3.1.

Initially, abandoned industrial buildings become ruins that evoke an aesthetic of disorder, surprise, and sensuality, offering ghostly glimpses into the past and a tactile encounter with space and materiality. However, Edensor argues that the danger of eradicating such evocative urban sites lies in policies that privilege homogeneous new developments (Edensor 2005).

Restoration is defined as the act or process of accurately recovering the form and details of a property and its setting as it appeared at a particular period in time, often through the removal of later work or by replacing missing earlier work. This process focuses on preserving historical accuracy. In architecture, restoration involves working with the existing structure of a building, addressing it holistically, and maintaining its original measurements, proportions, and details. This

approach minimises overly mechanical interventions, instead

respecting the building's natural integrity (Wong 2017, p.24). On

the other hand, retrofitting refers to a building that has been

upgraded with new systems, materials, or technologies to

improve performance, often in terms of energy efficiency, safety,

or functionality. Significant savings can be made by opting for

the retrofit approach (Finch 2011).

Finally, while restoration focuses on preserving the past,

retrofitting aims to improve the performance of buildings, often in

terms of energy efficiency, safety, or functionality. Adaptive

reuse seeks to revitalise buildings by envisioning and

accommodating future uses. This approach not only breathes

new life into abandoned industrial structures but also addresses

historical transformations, reinterpreting the buildings to meet

contemporary needs (Wong 2017).

Table 3 1   The Differences among the Terms Abandoned, Restored, Retrofitted, and Adaptively Reused in the Architectural context. Source: (Edensor 2005; Finch 2011; Wong 2017)

Term	Abandoned	Restored	Retrofitted	Adaptively Reused
Definition	Abandoned industrial buildings become ruins, offering ghostly glimpses into the past and a tactile encounter with space and materiality	A building returned to its original condition using traditional materials to preserve historical accuracy	A building upgraded with modern systems, materials, or technologies for better performance	A building repurposed for a new function while maintaining its original structure to meet contemporary needs
Focus	Evoke an aesthetic of disorder, surprise, and sensuality	Historical accuracy and preservation	Functionality and efficiency	Repurposing and accommodating future uses
Example	 Spillers Millennium Mills in London	 Middleport Pottery in Stoke-on-Trent	 Canada House in Manchester	 Tate Modern London

3.3.1.1 Light Touch

As discussed in the previous section, the restoration approach prioritises minimal mechanical interventions, aligning with the architect's 'light touch' philosophy (Feilden Clegg Bradley Studios 2014). In contrast, adaptive reuse is the process of repurposing an existing building for a new function to accommodate contemporary users and revitalise the community.

A prominent example of the 'light touch' approach can be found in the restoration of pottery museums in Stoke-on-Trent, a city historically renowned for industrial-scale pottery manufacturing since the 17th century. The region's abundant coal and clay resources facilitated the growth of the industry, embedding pottery production deeply into its cultural fabric. In these restorations, architects relied on drawings and contract documents to bridge the gap between abstract design conventions and the sensory atmospheres essential to architectural experience. The integration of local customs and cultural heritage plays a vital role in shaping both the preservation of historic structures and the atmospheric qualities of newly adapted spaces, ultimately influencing the evolving built environment (Sharr 2012b).

Middleport Pottery

Completed in 2014, Middleport Pottery (Feilden Clegg Bradley Studios 2024) initially had a fragile, time-worn industrial character. Architects adopted a 'light touch' philosophy, intervening only where necessary, to avoid being lost to over-sanitised heritage commodification. The design concept stemmed from an extensive analysis of the site's existing conditions and a thorough understanding of its history. By quantifying the unique characteristics of the site, architects were able to preserve and enhance its authentic sense of place as an industrial heritage site (Feilden Clegg Bradley Studios 2014).

For instance, on the ground floor, three key abandoned areas were refurbished and repurposed as educational facilities, reconnecting the site with its core industrial heritage – pottery making. As shown in Figure 3.7, all three areas were previously derelict and unused. The first area, originally housing the steam boiler, was restored as a heritage attraction for public engagement and interpretation. The second area, located in the central range and once used for storage, was converted into a pottery-making workshop. The third area, the iconic bottle kiln – a symbolic feature of pottery museums – was equipped with audio-visual interpretation tools.

By carefully reviewing the ground floor layout, the core elements

of the pottery museum, including the engine and bottle kiln, were

adaptively reused to serve museum education. New

technologies for interpretation were integrated, while the central

workshop allowed visitors to engage directly with the pottery-

making process. This blended experience, combining

technology with hands-on activities, was designed to create an

authentic atmosphere that captures the essence of pottery

making.
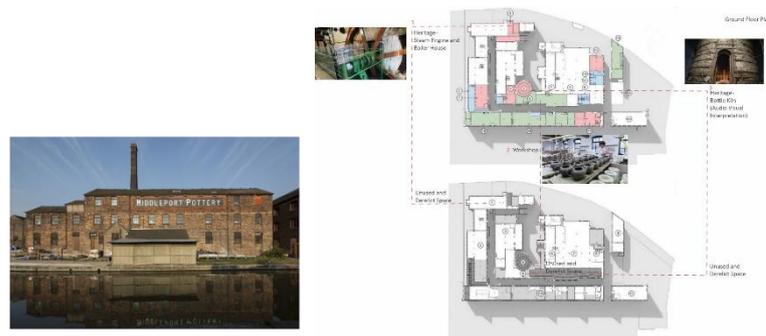
Figure 3 8   The Ground Floor Plan of the Middleport Pottery.
Modified from Source: (Feilden Clegg Bradley Studios 2024)

Remodelling is an adaptive reuse process that involves

fundamentally altering a building (Brooker 2004). Initially,

existing objects are deliberately selected and borrowed,

removed from their original context, and applied to a new setting

(Brooker 2018). During the transformation of the pottery factory

into a museum, architects deliberately avoided contemporary

design approaches that would alter the original appearance of the site. Instead, they conserved the original building fabrics to maintain the industrial atmosphere. The experience of this atmosphere – conveyed through the tones, textures, and patina of the materials – follows the traces left by the building's history, creating what can be described as an industrial form of 'transcendent aesthetics' (Connolly 2010). This outcome reflects the architects' profound understanding of the site's industrial culture.

Moreover, the accumulated traces of tectonic events, repurposed within the industrial building, are imprinted on the building's fabric. On the one hand, these traces represent the 'thickness of time' in architecture, embodying a sense of aliveness within the world's fabric (Hale 2017, p.83). On the other hand, they form a layered and complex perception through the materiality of individual experiences. These traces further enrich the sensorial experience, transforming the space into an imaginative realm for visitors.

3.3.1.2 Restoration with 'Work of Art'

Aligned with the 'light touch' philosophy, restoration with 'Work of Art' was conceptualised by Cesare Brandi (1906-1988) in 1963, emphasising the aesthetic rather than the social dimension. He

proposed that this design intervention not only focuses on aesthetic and historical aspects but also aims to re-establish the potential oneness of the 'Work of Art'[6], thereby producing a particular consciousness recognition and transmission to the future.

Initially, the concept of the 'Work of Art' is closely tied to beauty, which is intended to be appreciated for an object's aesthetic. Within the restoration framework, the 'oneness' of a Work of Art is central, as it creates an emotional, physical, and intellectual engagement with visitors, to enhance the immersive experience. Rather than simply appreciating an object's aesthetic at a surface level, visitors are encouraged to perceive deeper relationships between the artefact and the surrounding world. This perspective aligns with phenomenological principles, where perception is not isolated but shaped through embodied interactions and mental engagement with space.

Within museum space, restoration with the oneness of 'Work of Art' seeks to reinforce authenticity by navigating ontological discourse and self-referential authenticity (Leach 1997a). As one

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[6] A work of art object is an artistic creation of aesthetic value.

of the indicators of UNESCO, authenticity is applied to cultural properties and 'mixed' properties with cultural aspects to examine their outstanding universal value (Glossary 1994).

To achieve authenticity, Brandi differentiates between two levels of restoration: one is the restoration of a manufactured artefact, and the other is restoration with the 'oneness' of a Work of Art. The difference between these two is that one intends to repair its original condition, and the other means that the state of the special product of human activity is called a Work of Art, based on the particular consciousness recognition (Brandi 2005, p.47-50). For the industrial buildings converted into museums, Norberg-Schulz (Norberg-Schulz 1965, p.27-51) states that the general perception can only be grasped at an intermediate level, such as an authentic perception - the restoration of a manufactured artefact; in contrast, emotionally engaged visitors are more impressed at a higher level rather than only appreciating an object's aesthetic at an intermediate level. For instance, to perceive an object, the body is seen as a mediator of 'primordial encounter'; it acts as the vital pivot between the inner world of individuals and the outer world of social and cultural forces. No single perception exists in isolation; rather, perceiving an object inherently involves mental experimentation.

Therefore, restoring an industrial museum while preserving the 'oneness' of a Work of Art proves to be an effective approach, fostering a higher level of engagement and creating immersive, meaningful experiences.

Gladstone Pottery Museum

Cesare Brandi's restoration principles, particularly the 'Work of Art' approach, can be analysed through the example of the Gladstone Pottery Museum. This museum exemplifies a defined design method called imitation, originally introduced by Norberg-Schulz (Norberg-Schulz 1965, p.39) as a process of socialisation. Imitation involves the adoption of cultural elements such as knowledge, beliefs, and symbols. This process aligns with Brandi's idea of reconstituting the authentic context of an artefact or space (Brandi 2005, p.77-78).

The Gladstone Pottery Museum authentically recreates the working pottery experience, immersing visitors in the industrial atmosphere of a bygone era. By reconstructing the historical context of daily life within a pottery mill, the museum allows visitors to experience the past as though they were workers themselves. The narrative structure of the museum invokes the figure of the absent pottery worker as a 'shadow', guiding the

visitor's journey and evoking emotions of nostalgia within the context of impressive architectural interiors and exhibitions. For example, the entrance tunnel (Figure 3.8), which once served as the factory's primary access point, has been restored to evoke its original function. Complete with a notice board instructing pottery workers to 'register your time' at the lodge by 7:30 am, the entrance sets the tone for the visitor's experience. This careful restoration of historical details stimulates the imagination, encouraging visitors to envision themselves as workers in the pottery industry.

Figure 3 9   The Entrance Tunnel and Exterior of the Gladstone Pottery Museum. (Source: Photos taken by the Author, 2021)

Overall, the museum's design further enhances this immersive experience through what can be described as spatial seduction (Mehdi Ait Oukhzame 2021). This approach fosters a sense of industrial cultural continuity, which lies at the heart of the museum's narrative. The narrative is constructed by evoking the

rhythm of a pottery worker's daily schedule, guiding visitors through the space in a way that mirrors the factory's original functions. Movement through the museum follows the trajectory of industrial life, creating a sense of direction and continuity. Visitors journey from the factory entrance to the bottle ovens, then to the workshops, trading offices, and finally, the doctor's house (Figure 3.9). This journey is a carefully orchestrated experience, driven by the imitation of historical workplace phenomena.

In this museum, the spatial seduction allows visitors to experience the museum not only visually but also emotionally and physically. The industrial cultural continuity is communicated through this movement, making the visitor feel as though they are part of the industrial past. By doing so, the museum achieves a 'live performance' of the authentic worker experience, enabling visitors to imagine and empathise with the lives of pottery workers from 1787 to 1970.

By adopting the concept of spatial seduction, grounded in the invisible rhythm of the worker's daily clock, visitors naturally become attuned to the museum's intended value as they progress through the space, evoking a deep sense of nostalgia.

Through this cultural empathy, the 'oneness' of the Work of Art, as the ultimate goal of restoration, is achieved.
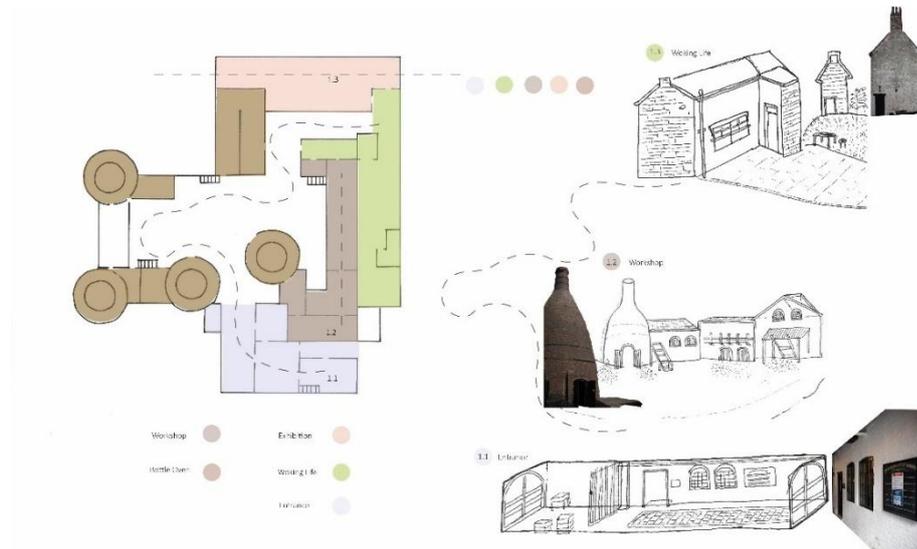
Figure 3 10   The Movement of the Gladstone Pottery Museum. (Source: Drawn by the Author)

Apart from spatial seduction, the Gladstone Pottery Museum embodies a phenomenal reality, one that emerges from a sensory-emotional experience. By engaging visitors in viewing, smelling, touching, and interacting with the industrial environment, the museum creates a dialogue between human beings and their surroundings (Malnar, Joy Monice., and Frank 2004, p.22). This dialogue is enriched by the museum's authentic industrial buildings, extensive ceramics collection, and shared memories of the pottery industry. Together, these elements stimulate visitors' perceptions and evoke emotions of nostalgia, to create a

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deepening experience of the 'place of industry' (Falk and Lynn D. 1992, p.110-114).

3.3.1.3 Adaptive Reuse with Mathematical Symbols

In contrast to the restoration, the other design intervention is adaptive reuse, which means the characteristics of the original building form can be incorporated into new additions by blending old and new structures. This approach extends existing architecture and creates a distinctive industrial atmosphere. By converting mill buildings, changes in size or scope affect multiple aspects of the host structure, including its overall form, property value, relationship with the urban context, and place in the continuum of time (Wong 2017). According to Wong, such interventions can be represented using mathematical symbols to describe design methods (Wong 2017). Table 2.1 presents three industrial museum examples linked to these mathematical analogies.

Table 3 2   Adaptive Reuse with Mathematical Symbols.
Modified from Source: (Wong 2017)

The Mathematics of Reuse					
Mathematics Symbols	Whole Numbers +	Rational Numbers +	Summation ∑	Subtraction −	Absolute Value ∏
Definition	The addition of discrete volumes to an existing host structure. These additions include single elements, dormer to additional stories, but also a new facade or wing.	Naturally, this process pertains most to the semi-ruined or ruined-type hosts, where structures are incomplete.	Pertains to a series of related elements: stairs, walkways, ramps, corridors, steps, and balconies. They are not discrete volumes in and of themselves but are added together to form a unified intervention to a host structure.	It refers to the removal of a part of the host structure.	As a variant of subtraction, this type of intervention does not result in the removal of matter in the ultimate balance and preserves the spirit.
Example	Elbphilharmonie Hamburg	Neues Museum	Castelvecchio Museum	Caixa Forum	Bibliotheca Hertziana
Industrial Museum Example	N/A	West Cheshire Museum	Black Country Living Museum	N/A	Museum of Making

Three industrial museum examples illustrate the use of mathematical symbols as analogies for design methods.

Rational numbers are defined as numbers expressed as the quotient or fraction of two integers (e.g., 3/4 = 0.75). They represent singular units in a universal context. In the context of museum interventions, rational numbers symbolise the addition of new structures to a host building through restoration and renewal. This approach is particularly relevant for semi-ruined or incomplete structures. For instance, at the West Cheshire Museum (Figure 3.10), a glass addition (indicated in blue) connects with the semi-ruined host structure, recovering its original form through a contemporary design intervention (Bandyopadhyay 2010).

Summation refers to the addition of a sequence of elements, which in architectural terms corresponds to incorporating related components such as stairs, walkways, ramps, corridors, steps, and balconies. These elements, though not discrete volumes themselves, are collectively integrated to form a cohesive intervention within the host structure. An example is the Black Country Living Museum (Figure 3.10), where individual discrete volumes were added to form a unified industrial landscape.
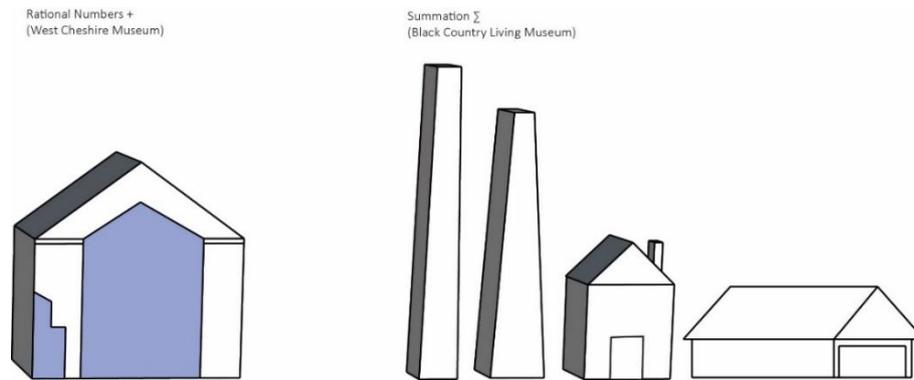
Figure 3 11　Abstract Model of the West Cheshire Museum and the Black Country Living Museum. (Source: Digital Model created by the Author)

The absolute value refers to the non-negative value of a real number, disregarding its sign, as discussed in Section 3.2.1.2. In architectural terms, this analogy represents an intervention that maintains the original building's balance without altering its essential essence. After the adaptive reuse of the industrial building, the intervention ultimately preserves the spirit of the building while incorporating contemporary design elements.

For instance, the Museum of Making inherits the 'making spirit' of the Derby Silk Mill by transforming the space with modern forms and materials, as illustrated in the following section. However, the mill's original typology is preserved as a symbol of its industrial heritage.

Museum of Making

The Museum of Making is not the only example of the absolute value representing the design method of mathematical symbols but also exemplifies the other defined design method called identification, originally introduced by Norberg-Schulz.

Identification means understanding and accepting the mediated values (Norberg-Schulz 1965, p.27-51). In the MoM, an exploratory case, the entire museum space is integrated as a creative space. Here, an analytical standard is brought to the fore, which judges the result of restoration; it is informed imagination (Scott 2008, p.122). In this museum, industrial creativity as the mediated value is re-composed in different forms to represent the informed imagination. Although it is not an authentic 'place of industry', the imagining of the history regarding the 'making' as an inherited spirit is identified and preserved for restoration and informs an experience of a 'museum of industry'.

The design method related to identification reflects the Civic Hall and River Kitchen of the MoM is representing a mixed space with the authentic context restored and contemporary design interventions, and the entire museum space is integrated as a social space.

The Civic Hall within the MoM is a triple-height atrium grafted onto the side of the existing building; it adopts one side brick Mill wall and one side full-height glazed screen, and it is a dramatic welcome space that serves as the arrival and circulation point, in which is a social medium of the City of Derby and a historical medium to connect with past and present.

Without any strong sense of nostalgia or atmosphere, this museum is trying to convey a message through communication – Industrial Creativity. It used to be the first water-powered factory in the world, and today, the museum's atrium features a Rolls-Royce Trent jet engine suspended in mid-air to illustrate that manufacturing in Derby has evolved since its textile days. From a restoration perspective, the industrial wall and multiple-paned windows with elegant arcades were restored; the Edwardian red brick symbolised the overall industrial aesthetic (Pearman 2021).

Functionally, the wall initially serves as an exterior boundary of the silk mill, dividing the inside and outside space. Now, it acts as an interior boundary which separates the flexible and the fixed space. The flexible space, on the right side, is named the Italia Mill for events renting, while the fixed space hosts a series of industrial exhibitions showcasing Derby's industrial history, with a

traditional collection and digital gallery on the ground floor, as Figure 3.11 shows.

Although the ground floor space does not provide a fully chronological display of the cultural narrative, it encourages visitors to engage with exhibits set up along the side of the Civic Hall. Categorised by different material themes and located adjacent to the café, these exhibits offer an optional yet immersive exploration. Overall, much like the jet engine, the industrial wall and exhibitions aim to inspire visitors to connect with Derby's history in a personal and human way.

Figure 3 12   The Ground Floor Plan of the Museum of Making. (Source: Photos taken by the Author)

In the MoM, industrial creativity can be understood as an enduring spirit that transcends different periods of time. Although industrial creativity is an intangible element, it is nevertheless reflected in both the museum's architecture and exhibitions. Furthermore, the transformation of an industrial building into a museum relies on this spirit, which, in turn, organically fosters a new societal structure that sustains and advances industrial creativity over time. Unlike authenticity, which is often defined in relation to established norms, an activated museum prioritises the preservation and development of intangible elements - such as inherited creativity - as a fundamental spirit that shapes the museum experience and strengthens community engagement.

3.3.2 Cultural Continuity

As industrial buildings evolve over time, culture develops uniquely within individuals, profoundly shaping their behaviours and values. Cultural influences are ever-present, continuously shaping and reinforcing our habits and traditions through the spaces we inhabit (Sharr 2007, pp.1-12). Even when a building undergoes several transformations, culture – as an intangible element - can still be inherited and represented through new forms of rebirth.

In the process of architectural rebirth, three attributes underpin the cultural representation of buildings, as explained by Adam Sharr (Sharr 2012, pp.2-10). These are: "(1) 'buildings are evidence of the cultures that made them' (2) 'the building has multiple authors' and (3) 'architecture is anticipated through drawings and contract documents".

Since the third aspect – architecture as anticipated through drawings and contract documents – has already been discussed in Section 3.3.1.1: Light Touch, particularly concerning Middleport Pottery and its role in shaping design culture through sensory experiences, the following section will focus on the first two attributes of cultural representation and the development of cultural continuity within urban permanence.

Firstly, the notion that 'buildings are evidence of the cultures that made them' suggests that architecture functions as a tangible embodiment of cultural values and practices. Buildings carry the imprint of the societies that constructed them, allowing inhabitants and visitors to engage with their historical narratives. Secondly, the concept that **'the building has multiple authors'** emphasises that architecture is shaped by a collective process. Buildings are not static entities, but dynamic spaces that

facilitate interactions between people and their environments, continuously evolving through use and adaptation. Thirdly, the development of cultural continuity within urban permanence, as a spatial dimension, strengthens the relationship between the museum and its host city.

By applying Sharr's first two attributes of cultural representation, the transformation of industrial buildings can be analysed to reveal the enduring relationship between material spaces and the cultural narratives they embody. Two notable examples of industrial heritage landscapes in England - the Ironbridge Gorge Museums and Derwent Valley Mills - illustrate this principle. Industrial museums, in particular, serve as communal spaces that evoke memories and experiences across generations, forging meaningful connections between the past, present, and future.

Additionally, Joseph Wright's works, exhibited in the Derby Museum and Art Gallery, contribute to the promotion of artistic and cultural heritage. These works establish a link between other museums in Derby, further strengthening their connection with the whole city.

3.3.2.1 The Building is the evidence of the culture made

From mill to museum, although the original typology of industrial
buildings persists into the post-industrial era, industrial culture
remains ever-present and continues to evolve through new
social activities. This evolution often leads to the spontaneous
organisation of space by its inhabitants. Rooted in inherited
industrial culture, the transformations brought about by these
new activities maintain a connection to historical contexts,
especially when industrial buildings are repurposed as
museums.

Derwent Valley Mills

Industrial museum architecture is rarely an isolated entity, as it
often retains a strong connection to the urban fabric and the
surrounding natural environment. For example, the Museum of
Making functions as a self-regulating ecosystem, harmonising
with both its natural and urban contexts. Situated within the
Derwent Valley Mills World Heritage Site, the museum is part of
a broader network of seven mills constructed along the River
Derwent in the 18th century. These mills were built to
accommodate new technologies powered by water.

One of the earliest of these, the Derby Silk Mill, was the first factory to harness waterpower for silk thread production. Following its construction, six additional mills – Cromford Mill, Belper Mill, Masson Mill, Nightingale Mill, Darley Abbey Mill, and Leawood Pumphouse – were sequentially developed, as illustrated in Figure 3.12.

The Derwent Valley Mills has been recognised by UNESCO as an industrial landscape of global significance, comprising seven mills that share similar architectural typologies while maintaining unique characteristics. Given the reliance on waterpower, all these mills were situated near the River Derwent. Constructed between 1771 and 1849, the mills exemplify classical architectural styles, characterised by symmetry and harmony in their exterior designs (Hopkins 2012, p.22). Among them, Masson Mill stands out as a representative of simplified classicism in textile mill architecture, influencing subsequent mill designs and the broader culture of industrial construction (Oevermann et al. 2022).
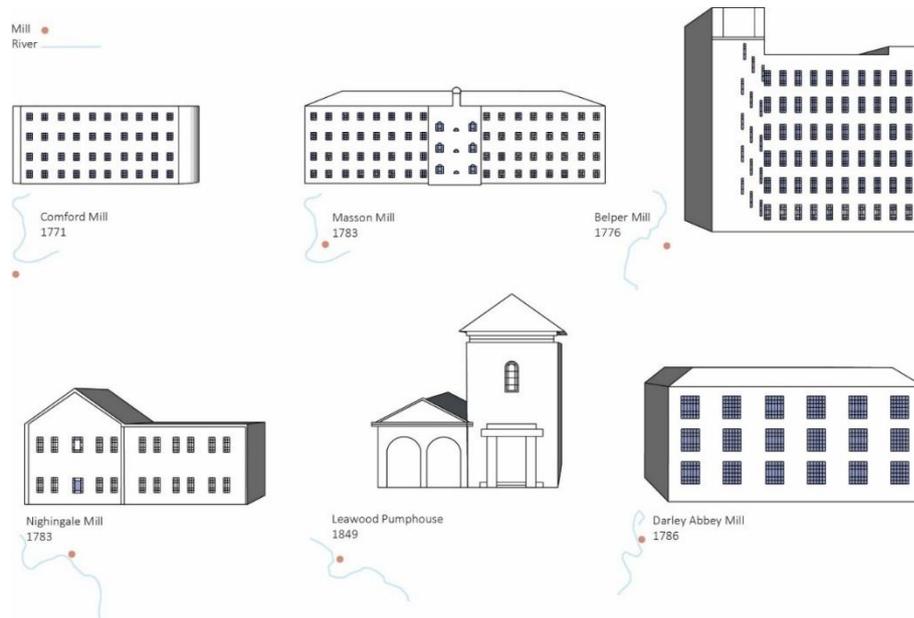
Figure 3 13   The Building Typologies of Cromford Mill, Belper Mill, Masson Mill, Nightingale Mill, Darley Abbey Mill, and Leawood Pumphouse and their connections with the River Derwent. (Source: Digital Model created by the Author)

Derby Silk Mill

As industrial society transitioned to a post-industrial era, some mill buildings were altered to accommodate evolving social activities, while others were abandoned altogether. These changes in use reflect cultural shifts, with existing mill structures serving as evidence of past ways of life.

The Derby Silk Mill, renamed the Derby Industrial Museum (1974) and Museum of Making (2021), is one such example. The Museum of Making was officially reopened in 2021: it

bridges old and new cultural practices, embodying the enduring spirit of making that spans both industrial and post-industrial periods. This industrial spirit represents an intangible cultural legacy, evident in the learning activities that have taken place in these industrial buildings over time. The act of 'making' as a core component of industrial culture, is central to the transformation of such spaces, shaping their purpose across different historical periods (Figure 3.13).

During the industrial stage, the building operated as the Derby Silk Mill. The culture of '*making*' within this environment was highly regimented, with strict discipline ensuring productivity. Women comprised a significant portion of the Silk Mill workforce and were trained to be reliable and efficient. Spatially, the mill's various floors housed different machinery, enabling a production process that was divided into five distinct stages: receiving hanks of silk, winding, spinning, throwing, and tagging (Knight 1843). A vivid account of the mill's operation describes the scene, with girls and women at work accompanied by the rhythmic sounds of machinery, often interspersed with song (Knight 1843). In the post-industrial era, the building continues to serve as evidence of its cultural legacy but presents a markedly different phenomenon. Today, '*making'* activities take

place in the same spaces, featuring the original 12 windows on both sides, but these activities are now part of a broader, more flexible cultural programme. In line with principles of community-based support, the museum's learning programmes are designed to inspire creativity rather than provide vocational training, as Figure 3.11 shows.

Current initiatives emphasise STEAM (Science, Technology, Engineering, Arts, and Mathematics) education (Miller and Rudnick 2010). The museum now hosts significant workshops, events, conferences, and exhibitions in its multi-purpose spaces. This new interpretation of '*making*' fosters social and educational connectivity (Kuhn 2012, p.1-8), offering visitors the opportunity to engage in collaborative and creative encounters in a manner that reflects the building's industrial roots while embracing its post-industrial identity.

Figure 3 14   Weaving in the Derby Silk Mill and the Museum of Making. Source: (Doward 2021) and Photos taken by the Author

3.3.2.2 The Building Has Multiple Authors

The idea that a building has multiple authors refers to a mutually defining process between the organisation of human relationships and the physical organisation of architecture. These processes unfold over time (Sharr 2012b). The layers of building fabric created by multiple authors at different points in history add richness to reoccupied spaces, enhancing the sensorial experience and creating imaginative possibilities for visitors. These accumulated traces of tectonic events, imprinted on the building's fabric, represent two significant aspects of architecture. On one hand, they signify the 'thickness of time', embodying the aliveness inherent in the fabric of the world (Hale 2017, p.83). On the other hand, they form a complex perception through the materiality of experiences for individuals (Mostafavi and Leatherbarrow 1993).

Museum of Gorge

As Figure 3 *18* shown, the Ironbridge Gorge, along with its museum, forms part of an industrial heritage landscape recognised by UNESCO (UNESCO 1986). Through the conservation of historical buildings, structures, and urban and rural patterns, the site presents a distinctive industrial atmosphere. One of its notable buildings is the Museum of the

Gorge. As shown in Table 3.3, this industrial building has served many purposes over nearly 200 years, from the late 19th century to today.

Initially, the Coalbrookdale Company built and used the building as a warehouse in the 19th century. During this time, river transportation was essential for transporting goods. However, with the decline of river transport and its replacement by railways in the 1860s, the warehouse's purpose diminished. The building then became a facility for supplying soft drinks to local shops and pubs, owned by the Crystal Works Soft Drinks Factory until 1908. Following this, it was converted into a garage and filling station, which also housed shops. Eventually, the industrial building was repurposed as the Museum of the Gorge, preserving its historical significance while adapting it for modern cultural and educational use (Oliver Architecture 2024).

Table 3 3   Three Users of the Museum of Gorge. Source: (Ironbridge 2025)

Long & Co., a mineral water company, 1904 (2)	A Garage and Petrol Station, 1972 (3)	The Museum of Gorge 1977 (4)

	Year	Users	Functions
1	Late 19c-1860c	CoalBrookdale Company	Warehouse
2	Until 1908	Crystal Works soft drinks Factory	Supplying drinks to local shops and pubs
3	1960s	Fill in Station and Shops	Garage
4	1977 - Today	Ironbridge Gorge Museums	Severn Warehouse as Museum

Within the building, evidence of its multiple uses remains clearly visible. For example, the breeze blocks along both sides of the wall were added during its time as a garage but were later removed when the building was repurposed as a museum. Another notable feature is the door facing the riverside, which was originally used for loading barges and trows with goods. This door was subsequently filled with glass windows, now displaying marks that indicate the heights and dates of historic flooding events (Figure 3.14).

Figure 3 15   Accumulated Traces in the Building Fabric of the Museum of Gorge. (Source: Photos taken by the Author)

In the Museum of the Gorge, despite its history of multiple uses, the riverside door retains its original purpose as a significant piece of historical evidence, representing the 'thickness of time'. This element of material history enhances visitors' sensory and imaginative engagement with the space, allowing them to recognise its initial use for loading goods while also appreciating its transformation into a feature that documents past flooding events. The door does not merely exist for visual perception; it embodies the memory-infused life of human experience (Connolly 2010, p.181). Its materiality provides a profound spatial experience that conveys the layered history of this site.

3.3.2.3 Urban Permanence

As the above two sections describe, when an industrial building undergoes multiple transformations, it ultimately becomes a museum. Beyond the building itself, cultural evidence is preserved through various artefacts, including drawings by multiple authors, representing cultural continuity in the temporal dimension. Another crucial element is cultural continuity in the spatial dimension, which strengthens the relationship between the museum and the city.

To connect with urban cultural history, the museum and its exhibitions provide a 'mnemonic bridge' between the past and present. This 'mnemonic bridge' serves as a medium of temporality and engagement, creating a link between historical and contemporary contexts (Savenije and de Bruijn 2017). Within the museum, this bridge manifests in various forms, such as the display of artefacts, practices of imitation, and emphasis on location to enhance engagement (Tomlinson 2021). An example of this will be illustrated in Figure 5.3. Therefore, it is essential to establish a discourse between the museum building as an artefact and its broader urban context. The *promenade*

architecturale[7] may extend beyond the museum, potentially beginning and continuing throughout the city, even reaching beyond its walls (Hanks 2015). The city, as a platform of collective artefacts, embodies the spirit of place, drawing from diverse inspirations across local, regional, and national scales (Hanks 2010).

For instance, in the city of Derby, the Derby Museum and Art Gallery - one of Derby's key museums-holds the largest and most comprehensive collection of Joseph Wright's (1734–1797) paintings, drawings, and letters (Diamond 2013). The curator utilises these collections to promote cultural heritage by exhibiting Wright's original paintings on permanent display at the Derby Museum and Art Gallery (Shown in Figure 3.15), showcasing digital recreations of his work by artists at the Museum of Making, and co-producing narratives of Wright's legacy at Pickford's House (Phillips and Bamford 2023). Here, architecture transforms into urban artefacts across different locations in the city, fostering urban permanence through spatial continuity (Rossi 1984, p.63).

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[7] The promenade architecturale is a concept developed by Le-Corbusier referring to the implied itinerary of a built environment. This concept will be illustrated in Section 3.4.3.

Figure 3 16　Joseph Wright's Painting in DMAG, and the Digital Recreation version in the MoM. (Source: Photos taken by the Author)

The artistic aspect of urban artefacts is closely tied to a city's identity, including its uniqueness and quality (Rossi 1984, p.32). The artistic spirit of Joseph Wright, as curated in various museums based in Derby, forms a coherent narrative, as his work itself acts as a 'mnemonic bridge', inspiring new generations of artists. This artistic spirit, integral to local and regional identities, enriches the city. Over time, it acquires both physical and symbolic significance, contributing to the city's identity. A city, as a larger-scale place, is an identity that comprises three fundamental elements: physical appearance, activities, and meaning (Relph 2008, p.48). In this case, the physical appearance includes the city of Derby, individual museum buildings, and Wright's works; the activities involve exhibitions and co-production events related to Wright; and the meaning is embodied in Wright's artistic legacy. These three elements together sustain cultural continuity in both temporal

and spatial dimensions, ultimately constituting urban

permanence.

3.3.3 Imagined Community

Applying Barthes's exploration of the fluid relationship between

the signifier and the signified to large-scale sites, museum

design and spatial organisation reveal their role in shaping

perceptions of history. Museums function as signifiers that

construct and reinforce an official historical narrative, ultimately

contributing to the formation of an 'imagined community'

(Marstine 2006, p.124). This section explores two types of

industrial examples that demonstrate structuralism in practice.

This section examines two industrial case studies that illustrate

structuralism in practice, demonstrating how museums, as

curated spaces, mediate cultural memory and historical

interpretation.

3.3.3.1 Museum Heritage Site

Lévi-Strauss's concept of social structures and collective

memories, embodied in the physical building, aligns with

Barthes's proposition that objects function as signs that

establish meaningful relationships. This framework allows for an

analysis of the 'imagined community' through the lens of a

museum heritage site – Ironbridge Gorge. Recognised as a

UNESCO World Heritage Site, Ironbridge Gorge exemplifies

industrial heritage through its architectural ensemble, comprising

monuments, tunnels, villages, houses, and factories (Figure

3.16). These elements, when considered collectively, serve as

signifiers of historical context, reflecting Barthes's principle that

every object in the world functions as a sign.
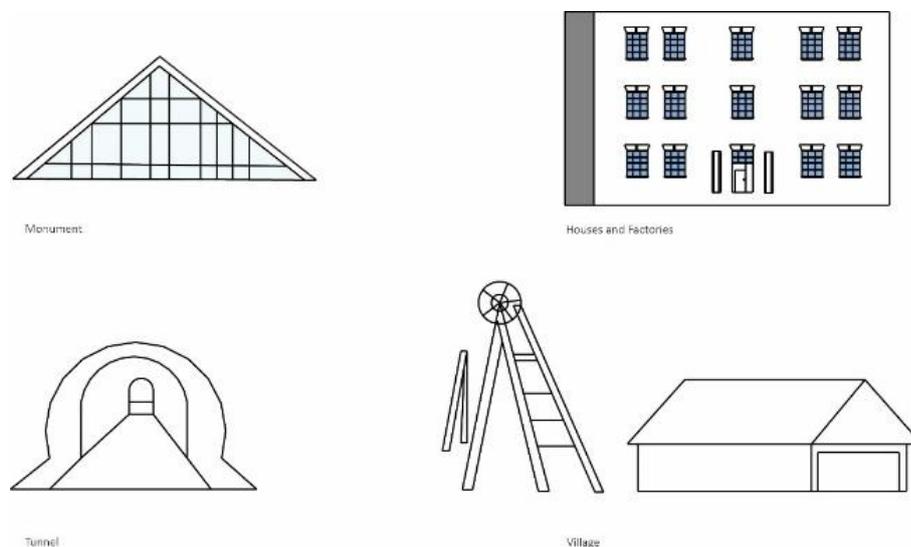
Figure 3 17   Four Building Typologies of the Ironbridge Gorge.
(Source: Digital Model created by the Author)

In addition to serving as individual historical markers, these four

building typologies collectively contribute to the construction of

an imagined historical community (Block 2018), aligning with

Barthes's third principle, that hidden codes within a language

system determine relationships. The architectural composition of

Ironbridge Gorge encapsulates an authentic industrial

phenomenon, allowing visitors to experience its industrial past

through a linear journey across its diverse physical sites. This immersive arrangement enables an understanding of various historical periods as an interconnected whole, rather than isolated moments in time. As illustrated in Figure 3.17, the Old Furnace – the heart of Ironbridge – has been preserved as a catalyst of industrial transformation. Adjacent to it, the former factory, now repurposed as the Museum of Iron, along with Darby House, represents the core innovation hub of Coalbrookdale. Further along, the Iron Bridge and its Tollhouse, originally a station, symbolise the advancements in production and engineering that marked Ironbridge as the birthplace of the Industrial Revolution. Expanding beyond this central core, additional sites such as Broseley Pipeworks, Jackfield Tile Museum, Coalport China Museum, and Blists Hill Victorian Town (housing) provide insights into Victorian-era industrial and domestic life. Echoing Barthes's fluid relationship between the signifier and the signified, in Section 3.2.1.2, the hidden structural logic of Ironbridge Gorge establishes a network of relationships between individual buildings and the site as a whole. The spatial arrangement presents a cohesive narrative, linking the origins of the Industrial Revolution to its evolution and societal impact (Red Circle 1 & 2). Simultaneously, it emphasises the human and social dimensions of industrial

heritage (Red Circle 3), reinforcing the interconnectedness of

industry, community, and lived experience.

Figure 3 18   The Hidden Structural Logic of Ironbridge Gorge.
(Source: Drawn by the Author)

3.3.3.2 Museum Heritage Exhibition

The restoration of the Shrewsbury Flaxmill Maltings began in

2014, and a new visitor experience, including the mill exhibition,

was established under the concept of a 'factory of ideas'

(Shrewsbury Flaxmill Maltings 2024). The mill exhibition is

located on the ground floor of the Main Mill, offering both digital

and hands-on activities designed for all age groups. In particular, audio technology enhances the accessibility and engagement of the exhibition (Hadley and Rieger 2021). Visitors access the exhibition by passing through the museum café.

Following the structuralist framework, the exhibition is organised chronologically, reinforcing the idea that meaning is derived from ordered relationships within a system. Aligning with Barthes' third approach, the thematic divisions function as 'hidden codes', structuring the interaction between exhibition content and visitor movement in a self-guided tour. As illustrated in Figure 3.18, the exhibition is divided into five thematic sections: Town and Transformation, Engineering and Build, People and Process, Adaptation and Change, and Legacy and Impact. Curated using expert-led exhibition design methodologies (MacLeod 2020, p.46-65), the exhibition constructs a logical and structured narrative, facilitating layered engagement with industrial heritage through both physical artefacts and digital interpretation. For instance, within the theme 'Engineering and Build', the exhibition features textual information as its primary visual guide, supplemented by physical materials such as a wooden spindle and a metal plate. These elements illustrate how materials were adaptively reused within the malting mill. Conversely, the theme

'Town and Transformation' employs digital technologies to showcase the historical evolution of the surrounding urban context through a user-centred design approach. One notable feature is an interactive digital panel, which categorises the urban context into community, housing, industry, transport, and neighbourhood. For instance, the 'neighbourhood' category invites visitors to explore and compare historical maps of the site from 1832, 1882, and 1927.
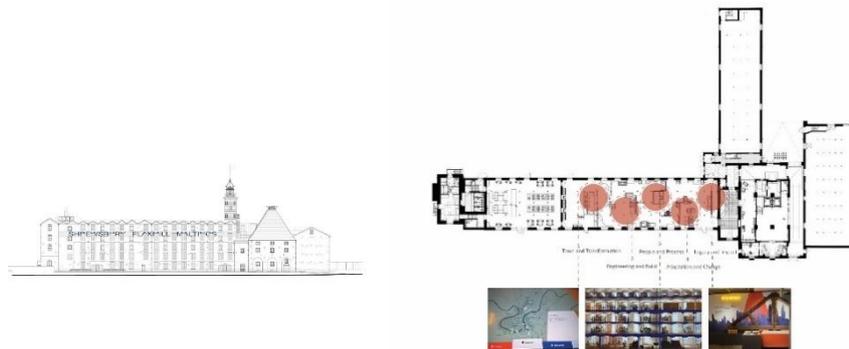
Figure 3 19   Five Thematic Sections in the Exhibition of the Shrewsbury Flaxmill Maltings. (Source: Drawn by the Author)

To summarise, Figure 3.20 presents key thinkers in relation to the industrial building lifecycle, focusing on three important aspects: the chronological development of building transformation, the scale relationship between landscape and artefact, and natural perception.

Industrial Buildings' Lifecycle

Key Thinkers
3. Design Approach - Cesare Brandi, Graeme Brooker; Liliane Wong
4. Building Transformation - Adam Sharr, Aldo Rossi, William Connolly, Janet Marstine
5. Museum Experience - Jonathan Hale, Christian Norberg-Schulz, Fred Scott, Leslie Kavanaugh
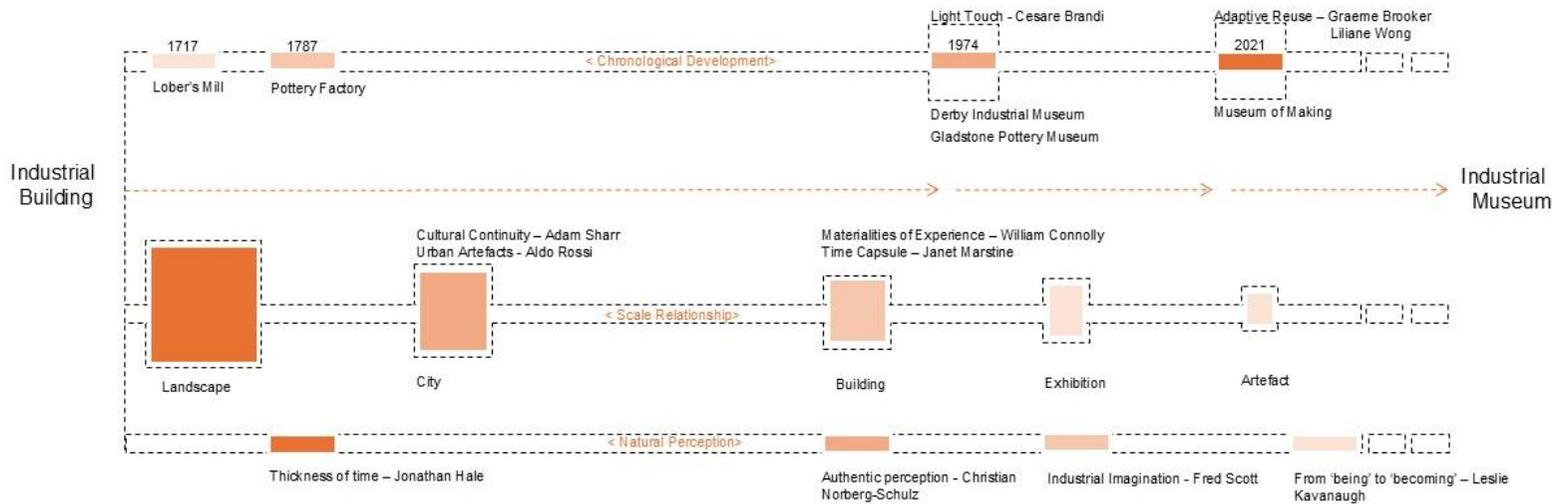
Figure 3 20   Key Quotations from the Literature Review align with the Industrial Buildings' Lifecycle. (Source: Created by the Author)

3.4 Argumentative Structuralism in Design Intervention

3.4.1 Summary of Museum Examples

The two case studies – museum heritage sites and exhibitions – demonstrate how individual architectural elements function as 'signs', interconnected through a logical structural system. Simultaneously, human activities within these spaces establish dynamic relationships (Rovelli 2022), animating them through both mental and physical engagement, a phenomenon conceptualised as 'memory by structure'. This interplay aligns with traditional 'object-thinking' approaches, such as those in Newtonian natural philosophy, which perceive the universe as a collection of discrete entities (Kavanaugh 2013).

However, in architectural discourse, Leslie Kavanaugh (Kavanaugh 2013) critiques this Newtonian framework of static, object-based thinking. Instead, she advocates for a relational approach, drawing from Gottfried Wilhelm Leibniz, who viewed space and time as interdependent, rather than absolute. When applied to museum design, this perspective suggests that museums should be conceptualised not as fixed collections of objects, but more 'accessible' as interconnected systems of relationships - a shift that enhances spatial accessibility and experiential depth.

This relational approach is particularly significant in the conceptual design stage, where visitors are not simply 'being' in the space but are 'becoming' part of an evolving spatial-temporal network (Kavanaugh 2013). Here, visitors emerge as integral participants, shaping the interplay between space, time, and human interaction. Within structuralist thought, Roland Barthes interprets architectural language as a system of signs, where meaning emerges through functional relationships that generate collective memory. However, Umberto Eco[8] critiques Barthes's concept of the 'free play' of signifiers, arguing that users often reinterpret architectural spaces in ways beyond the designer's intent (Brooker 2016). Eco emphasises that while architects and designers establish primary functions, they must also embrace open-ended interpretations to be communicative, allowing users to redefine spatial meaning through engagement (Leach 1997c). This tension between structure and interpretation will be further examined in the following discussion on the interplay of time within museum spaces (Silverman 1991), including clock time and human time, and users'

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[8] Umberto Eco was an Italian medievalist, philosopher, semiotician, novelist, cultural critic and political and social commentator.

embodied experiences in *Promenade Architecturale*, which will

be introduced in Section 3.4.3.

3.4.2 Clock Time and Human Time

Time, as a fundamental measurement, plays a crucial role in

shaping both architectural experience and historical

interpretation. However, its definition varies based on context –

most notably between clock time and human time. The

distinction between these two lies in their nature and perception:

clock time is a quantitative measurement, while human time is

qualitative, shaped by lived experiences (Shown in Figure 3.19).

Clock time is defined by regular, measurable intervals of a fixed

length. By contrast, human time is event-driven, shaped by

specific occurrences and individual experiences. Its perception

is fluid, often expanding or contracting depending on the depth

of engagement with an event, with its duration shaped by

specific events or incidents (Abbott 2008, p.4).
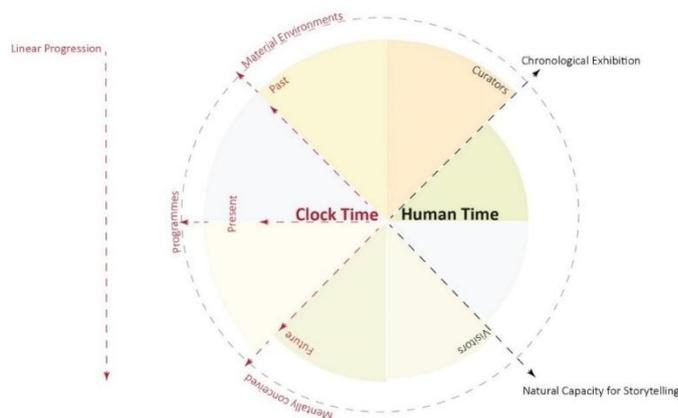
Figure 3 21   The Difference between Clock Time and Human Time. Modified from Source: (Abbott 2008, p.4)

Clock Time in Museum Architecture

Clock time is embedded in the physical world, manifesting external signals that align with internal experiences, enhancing life's rhythm to explore how the relationship between the internal and external might become life-enhancing (Lynch 1972, p.1). Within museum architecture, clock time is evident in historical preservation and adaptive reuse, marking transitions from past to present. For example, as discussed in Section 3.3.3.2, the Shrewsbury Flaxmill Maltings has undergone multiple transformations: from an industrial mill to maltings, to temporary barracks, back to maltings, and now a museum and office space. This series of adaptations embodies clock time, as material changes in the building reflect its evolving function across historical periods.

However, experiencing museum architecture extends beyond mere habitation or aesthetic appreciation; it involves a temporal journey from 'being' to 'becoming', integrating time with space. Museums physically represent the past through built structures, material environments, institutional narratives, and curated artefacts. Yet, visitors engage imaginatively, completing

narratives, interpreting gaps, or creating personal meanings. Simultaneously, the future is envisioned, as past experiences and present conditions inform future trajectories. Lynch (Lynch 1972, p.92) describes this interplay as an evolving timeline, shaped by cognitive perception, attitudes, and experiences.

This linear progression of time aligns with Claude Lévi-Strauss's structuralist theory, which argues that social groups should be understood as collective entities rather than isolated individuals. By engaging with museum spaces, visitors integrate their individual experiences into a collective historical narrative, reinforcing the relationship between time, memory, and cultural identity.

Human Time and the Museum Interpretation

In contrast, human time is subjective, and shaped by personal engagement and social structures. Museums function as mediators of human time, where curators organise chronological exhibitions, not merely as a means of measuring history but as a tool for constructing, challenging, or redefining cultural narratives (Jørgensen et al. 2021). On the one hand, curators structure human time through thematic exhibitions, guiding visitors through a sequential experience. For example, as

detailed in 3.3.3.2 Museum Heritage Exhibition. The Shrewsbury Flaxmill Maltings exhibition narrates the site's journey from industrial prosperity to modern preservation, presenting human time as an orchestrated experience. This curated storytelling frames historical transformation, highlighting the first iron-framed building's role in architectural heritage (Shrewsbury Flaxmill Maltings 2024). On the other hand, visitors themselves construct human time through personal storytelling. Narrative is a natural human faculty, enabling individuals to interpret and make sense of events (Hale 2012). Within the museum, each visitor's temporal experience differs, depending on movement, attention, and emotional engagement.

Beyond its functional role, the museum also offers spiritual enrichment, providing an immersive space where time is experienced not as a fixed metric but as a fluid continuum of perception and interaction (Kim and Kwon 2020).

Visitor Agency in the Temporal Experience
Umberto Eco emphasises that users reinterpret museum experiences in unpredictable ways, asserting that designers cannot fully control meaning. Instead, museums should facilitate open-ended interactions, allowing visitors to navigate time on

their own terms. Rather than following a fixed, linear narrative, visitors engage bodily with the space, experiencing time subjectively.

A striking phenomenon within museums is the perception of 'slowing time'. Unlike the rapid passage of time in daily routines, museum visits are often felt as elongated experiences, as visitors become immersed in historical contemplation. This effect mirrors Albert Einstein (1897-1955)'s principle of relativity, where time appears to slow down based on an observer's frame of reference. In a metaphorical sense, walking through four centuries of history within a museum presents a cognitive contrast to the physical act of walking 13,000 steps through the same space.

In summary, representing time in architecture requires embracing a relational approach, as conceived by Leibniz, rather than adhering to static object thinking. Museums should not merely serve as repositories of fixed historical moments but should activate visitors' engagement with time, transforming their experience into a process of discovery and self-reflection. At the conceptual design stage, museum spaces should be designed to immerse visitors, allowing them to lose track of time

through spatial and material experiences (Nathania and Wahid 2022). This prevents museums from becoming static environments or overly didactic timelines. Instead, museums should foster a dynamic interplay between memory, materiality, and temporality, where light, artifacts, movement, and architectural form coalesce into an evolving narrative (Carpo 2001). Within this framework, visitors do not simply 'exist' within museum spaces – they 'become' part of an ongoing historical dialogue, continuously shaping and reshaping time.

3.4.3 Promenade Architecturale

Umberto Eco proposed that users should actively engage with a space rather than merely inhabit it. Architects such as Le Corbusier (1887–1965), Peter Zumthor (1943 - present), and Juhani Pallasmaa (1936 -present) have responded to this idea by emphasising the embodied experience in architecture, focusing on subjectivity.

Embodied experience within the *promenade architecturale* is a progressive sensory journey that may begin within architecture but can also extend far beyond its walls (Hanks 2015). As individuals move through a space, their emotions are first subtly engaged, then deepened into feelings, and finally transformed into a sense of connection or empathy with the environment

(Mallgrave 2018b). According to neuroscientist Antonio

Damasio, emotions arise from the body's response to external

stimuli, influencing how individuals perceive and internalise

architectural spaces (Pontin 2014). Architecture, therefore, plays

a fundamental role in shaping human consciousness and

emotional states.

The initial concept developed by Le Corbusier refers to the

'Architectural Walk' (*promenade architecturale*), which he

described as a walk of perception - an implied 'itinerary' through

a built environment, making a significant contribution to the

modern movement (UNESCO 2016). One of his representative

projects, *Maison La Roche* (1923–24), exemplifies the *Jacob's

Ladder*-type promenade[9] (Samuel). In this project, movement

through space follows a structured rhetorical sequence that

enhances embodied experience: **(1) Threshold:** The transition

into the main space is often muted in lighting, providing a focal

point after the 'mental silence of the street'. **(2) Sensitising:**

This space, akin to the *milieu*, unfolds routes from darkness to

light, such as the entrance hall leading into the living space. It

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[9] Jacob's Ladder is a staircase leading to heaven, which appeared in a dream to Jacob. In his vision, he saw it stretching from heaven to earth, with angels ascending and descending upon it. The 'Jacob's Ladder promenade' symbolises a journey from darkness to light, with the staircase serving as a supportive element for the ascent.

sets the scene, compelling the visitor to engage, focus, and participate. **(3) Questioning:** This occurs on the first inhabited floor, which, particularly in the case of piloti buildings, is highly free-form in design. **(4) Reorientation:** Visitors may have noticed the staircase at the beginning of the promenade or already ascended one circuit of the ramp, but the enticement of distant horizontal light and the view upon entering the main living level draw them further into exploration before guiding them back onto the promenade. **(5) Culmination:** The journey concludes on the rooftop, completing the spiritual axis of the building. Under ideal weather conditions, visitors are greeted with a thrilling view of the sun or moon.
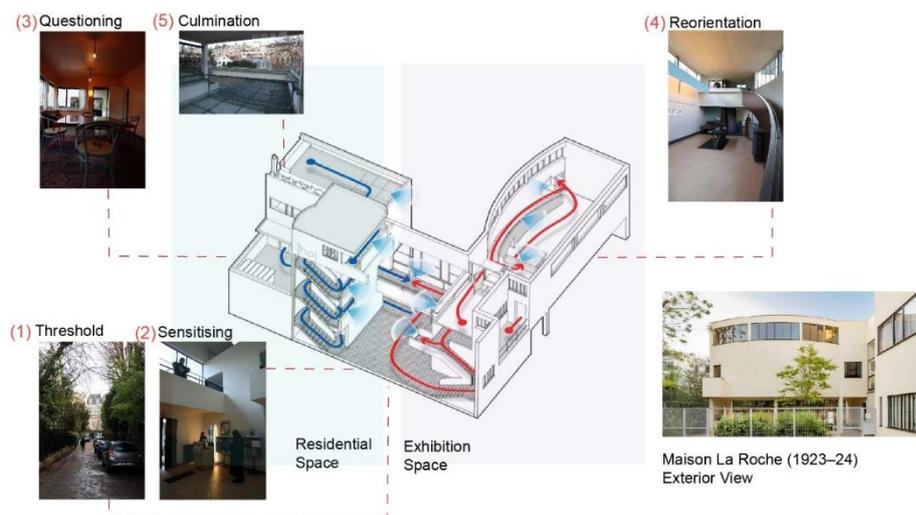
Figure 3 22　Movement through Space follows a Structured Rhetorical Sequence that Enhances Embodied Experience in

Maison La Roche. Source: Author and (Heritage architecture 2024)

This carefully curated sequence transforms movement into an experiential narrative, making architecture an immersive and emotionally resonant medium. With its functional duality, *Maison La Roche* is a pure assemblage of interlocking spatial volumes that accommodate both residential and exhibition spaces (Edwards 2011). Here, the *promenade architecturale* plays a crucial role in connecting these two programs through spatial sequencing (Etlin 2010). As one moves through these spaces, bodily movement and emotional engagement define the perceived spatial experience, enriched by imagination and deliberate path-making (Jones 2014).

Le Corbusier was particularly inspired by the sequencing of spaces and the direction of movement. Within *Maison La Roche*, movement unfolds from the entrance to the open rooftop space, transitioning from a private apartment to a gallery and library. Two staircases, concealed behind walls in the foyer, lead to distinct areas of the house (Gibson 2016). One of these is symbolised by the curved ramp leading from the art gallery to the first-floor library. While staircases serve a simple practical function - facilitating movement between levels (Robson and

Posingis 2019) - they also create a dynamic interplay between vertical ascent and horizontal circulation. As one ascends step by step, the shifting interplay of natural light unfolds, reinforcing the lived experience of the *promenade architecturale* (Steane 2011, p.12). The movement through space creates an anticipation of the journey ahead, making circulation a perceptual thread that links different levels through light and form, ultimately shaping the visitor's spatial experience (Ching 2014).

Beyond Le Corbusier, Peter Zumthor and Juhani Pallasmaa further explore the emotional and sensory dimensions of architecture. Zumthor defines architectural quality as a building's ability to evoke deep emotional responses. In *Atmospheres: Architectural Environments, Surrounding Objects*, he emphasises the importance of atmosphere in shaping emotional sensibility, stating that we perceive atmosphere through our emotional sensibility (Zumthor 2006, p.17-24). Similarly, Pallasmaa, in *The Eyes of the Skin: Architecture and the Senses*, argues that architecture should not be seen as an isolated artefact but rather as an experience integrating sight, touch, sound, and movement. He asserts that architecture directs attention beyond itself, shaping human perception and

existential experience. When engaging with architecture, individuals rely not only on their eyes but also on bodily presence and sensory awareness. Through this constant interaction, architecture reinforces a sense of reality, allowing users to form deep, intuitive connections with their environment (Pallasmaa 2012). As individuals navigate through architectural spaces, their mental perception is shaped by the visual and spatial qualities of the environment. Pallasmaa further argues in *The Embodied Image* that architecture's mental impact arises significantly from its imagery, which serves as a crucial vehicle for imagination, perception, thought, language, and memory (Pallasmaa 2011).

3.5 Conclusion

This chapter has established structuralism as the theoretical framework for examining the temporal and spatial transformation of industrial museums throughout their lifecycles. By analysing structuralist principles applied to different industrial heritage museums, this study has illustrated how design interventions, cultural continuity, and imagined communities shape their evolution.

A key argument was developed around the relationship between clock time and human time, distinguishing two distinct

approaches, while also emphasising the role of architectural promenade. Clock time structures museum spaces through a logical, linear progression, reinforcing historical narratives through architectural restoration and spatial organisation. In contrast, human time, shaped by curator-led storytelling and visitor engagement, facilitates meaning-making through subjective interpretation and participatory experiences. Beyond this, the *Promenade architecturale* offers an embodied experience, granting visitors the freedom to reinterpret spaces through movement rather than following a fixed, linear storyline. These themes were explored in two case studies - museum heritage and exhibition design, examining the process of adaptively reusing industrial buildings to activate industrial museums. These interventions highlight how visitors engage bodily and cognitively with industrial heritage sites, transforming them into dynamic cultural spaces rather than static historical relics.

Industrial buildings in Great Britain have undergone two distinct phases: the industrial stage, characterised by active production; and the post-industrial stage, beginning in the 1970s, when 28 out of 44 industrial museums in this study's database were established.

Drawing from Saussure's semiotic theory, this study interprets industrial museums as signs – abstract representations of past industrial functions, such as the Kiln and Pottery Museum. Meanwhile, Lévi-Strauss's structuralist perspective reveals social structures embedded in physical buildings, emphasising the interplay between material heritage and collective memory. Expanding on this, Barthes argues that collective memory, though intangible, imbues industrial buildings with cultural meaning, reinforcing their historical significance. Consequently, the relationship between the physical environment and social structures has played a pivotal role in repurposing industrial sites as museums and introducing new social activities while preserving their industrial legacy. Furthermore, this chapter has identified three critical insights into design interventions for industrial heritage museums. **Design Intervention**: The philosophy of Design Intervention – whether a 'light touch' of the restoration, aligning with the 'Work of Art' perspective) or adaptive reuse, conceptualised through mathematical symbols) – determines the nature of spatial transformation. **Cultural Continuity**: Industrial culture is not static. it evolves within modern society. Museums serve as interactive spaces, allowing visitors to engage in collaborative and creative encounters with inherited industrial culture. **Imagined Community**: Museum

functions and historical narratives contribute to the formation of imagined communities. Industrial buildings, through their multi-layered historical transformations, accumulate tectonic traces of past interventions, creating a 'thickness of time' that reinforces collective identity and historical imagination.

By synthesising structuralist theories and their applications in industrial museum design, this chapter has provided a rigorous analytical framework for understanding the relationship between physical space, cultural memory, and visitor engagement. Significantly, aligning with Eco's perspective, this study advocates for visitor agency in museum experiences through movement. Instead of strictly following curator-led narratives, visitors navigate human time, engaging with space through personal movement and interpretation. The architectural promenade plays a crucial role in activating industrial heritage sites, transforming them into immersive, intellectually stimulating environments that foster deep engagement and knowledge acquisition. Building upon this structuralist foundation, the next chapter will introduce phenomenology as a complementary theoretical paradigm, further exploring the embodied experience of museum visitors.

Chapter 4 – ENHANCING MUSEUM EXPERIENCES THROUGH PHENOMENOLOGICAL APPROACHES

4.1 Introduction

The primary objective of this thesis is to explore visitor engagement in activated industrial museums, emphasising that learning serves as an important museum function to engage with visitors. Chapter 4, as the second part of the literature review, examines the evolution of museum typologies from historical to contemporary, guided by Nicholas Serota's perspective that the modern museum was becoming a historical book rather than the 'cabinet of treasures'. The chapter explores this concept through three main themes.

First, phenomenology is a theoretical framework. This section introduces phenomenology as a tool to analyse visitor engagement within industrial museum spaces. Using case studies from Great Britain – Preston Mill, Weavers' Cottage, and New Lanark. This section illustrates how phenomenology offers insights into a deeper relationship between buildings and experiences. In addition, the concept of the 'body-in-action' emerges as vital to understanding lived and inhabited spaces.

Secondly, the section delves into the origins of museum interpretation through two foundational models, the Theatre of Memory and the Cabinet of Curiosity. It explores how these two historical models shape the spatial arrangement and museum interpretation, using examples like the Palazzo Medici Riccardi and the German *Wunderkammern*. These two examples highlight the importance of heritage localities within situated environments as effective tools for deeply engaging visitors' senses. Thirdly, two modern museum cases as integrated learning spaces are analysed: the first is the Heineken Experience, which adopts the spirit of the Theatre of Memory by blending monumental architecture, immersive storytelling, and interactive design. This approach transforms brand identity while engaging visitors on multiple sensory levels. The second is the Prince Philip Maritime Collection Centre, functioning as a 'living library', integrating public space and inhabited areas for archives and internal work. The behind-the-scenes tours are set up, offering visitors participatory experiences, focusing on educational purposes to improve engagement.

Through an extensive review of historical and contemporary cases, Chapter 4 offers theoretical and practical insights into museum interpretation, particularly in relation to learning

activities. The application of phenomenology underscores the importance of understanding lived space and inhabited space to reinforce the role of embodied engagement. Ultimately, the chapter contributes to the ongoing discussion on museum interpretation and highlights how historical evolution can inform future museum design. By emphasising engaged embodied experiences, the findings advocate for developing a museum interpretation approach to enhance the learning experience.
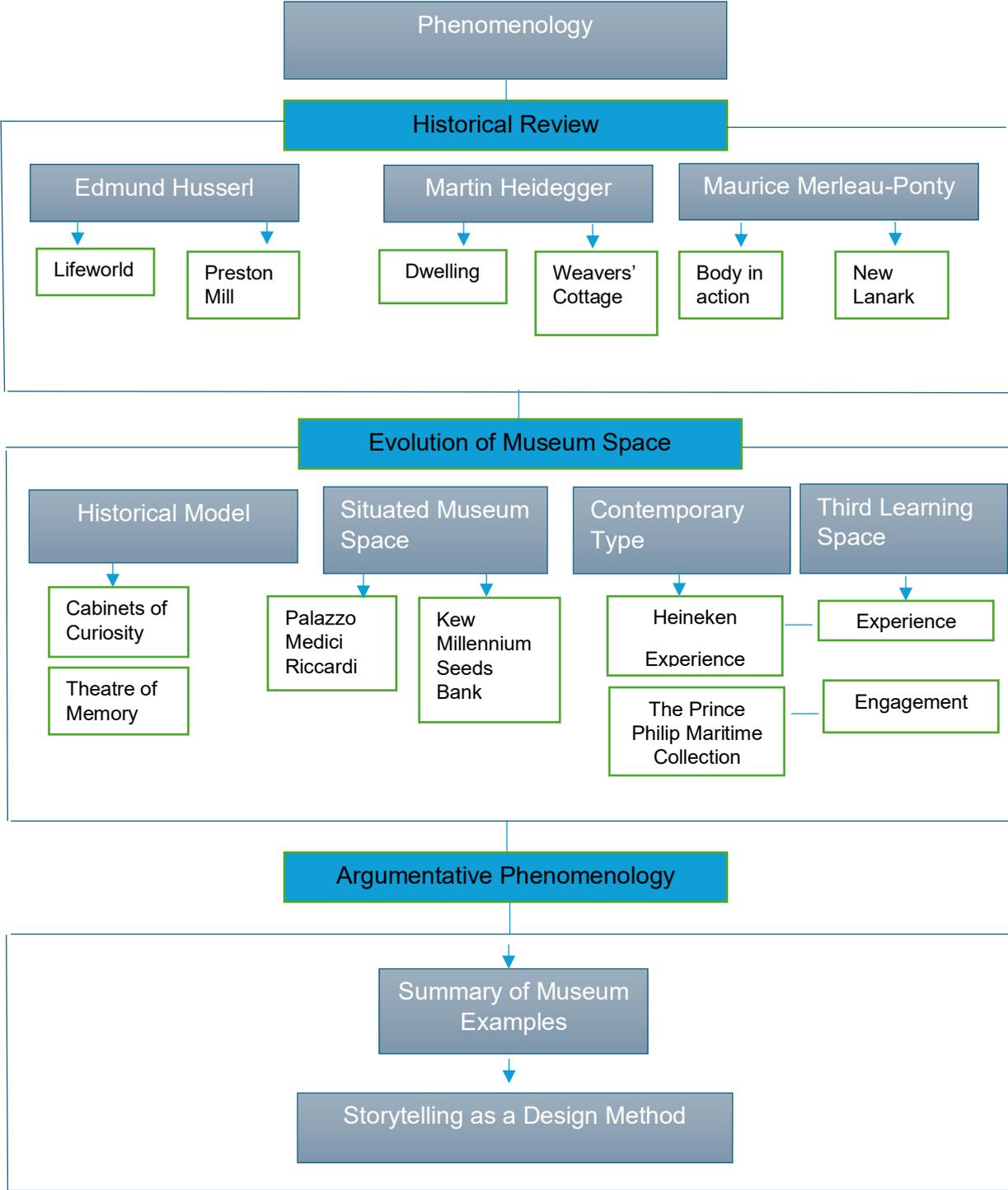
Figure 4 1   The Overview of the Theoretical Framework of this Chapter. (Source: Created by the Author)

4.2 Phenomenology as a Theoretical Paradigm

This section explores the theoretical paradigm of phenomenology in philosophy to examine the transformation of two historical models into two modern types of museum spaces. Unlike structuralism, phenomenology emphasises human consciousness and constitutes meaning through pre-reflective acts of perception, imagination and language (Kearney 1994, p.13). In architecture, phenomenology is adopted to reinterpret human experiences and behaviours by analysing sensory influences (Mitrovic 2011). This approach recognises that lived experiences are a primary source of self-knowing, fostering richer and more authentic perspectives through emotions, sentiments and memories (Poon 2018).

In this study, phenomenology serves as a philosophical framework to examine museum interpretation, aiming to create a compelling experience (Norberg-Schulz 1980). As Nicholas Serota states (Serota 2000, p.7), "The modern museum can be viewed as a Cabinet of Treasures rather than a historical book." This concept aligns with the museum's origins as a Theatre of Memory and a Cabinet of Curiosity.

4.2.1 Phenomenology in this Study
4.2.1.1 Influence on Research Methodology

As discussed in 3.4 Argumentative Structuralism in Design
Intervention, Structuralism as an approach is insufficient.
Phenomenology, therefore, serves as a complementary
perspective, emphasising human consciousness and meaning
derived from pre-reflective acts of perception, imagination and
language (Kearney 1994).

In architecture, phenomenology establishes a philosophical
paradigm for interpreting human experiences and behaviours
through analysing sensory influences. This approach
acknowledges that subjective lived experiences are a primary
source of self-awareness, enriching perspectives through
emotions, sentiments and memories (Poon 2018).

In this study, phenomenology is applied in the main case: the
Museum of Making. Observations involved two groups of
visitors: general visitors and recruited participants. To address
the limitation of subjectivity, the 'lived experiences' were
analysed from two perspectives: those of the researchers and of
the recruited visitors.

Researcher's perspective

'Being' in the space highlights inhabitation and experience. The initial round of phenomenological observation focused on natural museum visitors, with data collected during two scheduled periods. The first schedule was conducted over the weekend, while the second mainly targeted Tuesday and Thursday (Table 2.4, the two busiest museum days. The aim was to document the natural duration of visits and visitors' routes through the museum.

Data from Recruited Occasional Visitors

To balance the researcher's perspective, data from recruited visitors were used to examine a more intimate relationship between the 'body-in-action' and the museum space. With a time limit of 45 minutes, recruited visitors were encouraged to engage with the museum in ways that fulfilled their specific interests (B.2.2 Participant Information Sheet). This approach aimed to capture the ongoing flow of experience within the space.

In summary, phenomenology provides a theoretical foundation to explore both the shallow and deeper levels of the 'lived experience'. At the deeper level, particularly with the data collected from recruited visitors, phenomenological analysis

uncovers human consciousness, constituting meaning through

pre-reflective acts of perception, imagination, and language.

4.2.1.2 Historical Review

Edmund Husserl (1859–1938)	Husserl's key concept, *lifeworld*, emphasises the importance of examining concrete situations of lived experience.
Tao Sule DuFour *'A Phenomenological Ethnography of Space'*	The *lifeworld* refers to the everyday world of experience, shaped by affectivity, intersubjectivity, and historicity.
Industrial Museum	Preston Mill
Martin Heidegger's (1889–1976)	Heidegger distinguishes between *building* (construction) and *dwelling* (cultivation), arguing that these two elements must be intimately interconnected
Adam Sharr *'Heidegger for architects / Adam Sharr.*	A farmhouse, for example, stands 'on the earth' and 'beneath the sky', and is not just a built structure but a mediator between its inhabitants, their lifestyle, the locality, and the natural environment.
Industrial Museum	The Weavers' Cottage

Phenomenology

Figure 4 2   Summary of Key thinkers of Structuralism. (Source: (DuFour 2022; Sharr 2012a; Hale 2017))

The two aspects outlined above represent two key perspectives of this study, applying phenomenology as a philosophical paradigm. To build upon this foundation, the next section systematically explores the historical development of phenomenology by drawing on one particular element from three philosophers. This element is then reflected in architectural writings, and here, industrial museum examples are used to demonstrate its application as an approach to exploring architectural issues.

In 1900, Edmund Husserl (1859–1938) published *Logical Investigations*, a seminal work that laid the foundation for phenomenology. Although Husserl's work is not widely known in architecture, his phenomenological orientation influenced later architectural theory, particularly through the contributions of Martin Heidegger and Maurice Merleau-Ponty, whose works underpin architectural discourse (DuFour 2022, p.1-17). One of Husserl's key concepts, *lifeworld*, emphasises the importance of examining concrete situations of lived experience. Unlike scientific or abstract analysis, the *lifeworld* refers to the everyday world of experience, shaped by affectivity, intersubjectivity, and historicity. This type of experience is vividly processed by the human right brain. Furthermore, a shared *lifeworld* – where individuals experience the world together – reflects essential relationships between consciousness and experience (Parada and Rossi 2021). In the context of museums, visitors engage with space in unique ways based on their personal histories, bringing their own *lifeworld* to interpret and construct new narratives within the museum environment.

In 3.3.1.2 Restoration with 'Work of Art', the Gladstone Pottery Museum serves as an example of the 'lived world' of spatial phenomena, emphasising spatial seduction. Another Industrial

Museum case, Preston Mill in Scotland, illustrates Husserl's concept of concrete lived experience. The mill's picturesque setting captivates visitors, artists, and photographers, particularly due to the unique conical red pantile roof of the kiln, which represents a Dutch-style conical roof (Figure 4.3). In addition to the unique feature – the roof's distinctive character – the mill is notable for its waterwheel, which was added in 1909. Although the original mill has existed on this site since the 16th century, the current building dates to the 18th century. Until 1959, it operated commercially, producing oatmeal powered by water from the River Tyne (National Trust for Scotland n.d.).

As Husserl emphasised, experience is shaped by the transduction of environmental stimuli into images. At Preston Mill, visitors immerse themselves in the historical environment with diverse intentions, stepping back in time to observe the mill's mechanisms in action. The surrounding natural landscape acts as a stimulus, triggering cultural metaphors and personal interpretations that resonate with different categories of visitors.

Figure 4 3   Preston Mill and Its Natural Surroundings (Source: Drawn by the Author)

This concept of the *lifeworld* can be broadly linked to Martin Heidegger's (1889–1976) philosophy, particularly in relation to the Weavers' Cottage, which represents a space of inhabitation. Heidegger, drawing inspiration from Husserl, shifts the focus from mere aesthetics to the experience of *being* in a space, emphasising inhabitation over aesthetic priorities. Notably, he distinguishes between *building* (construction) and *dwelling* (cultivation), arguing that these two elements must be intimately interconnected. According to Sharr (Sharr 2007, p.36), these activities reflect human presence within a space, demonstrating that *building* and *dwelling* can also be understood through the relationship between place and habitant. In *Building, Dwelling, Thinking* (1951), Heidegger explores the interplay between people as thinking individuals and objects as physical entities,

asserting that true dwelling extends beyond structural configurations to encompass lived experiences (Holst 2014). He further explains that a farmhouse, for example, stands 'on the earth' and 'beneath the sky', and is not just a built structure but a mediator between its inhabitants, their lifestyle, the locality, and the natural environment (Sharr 2007, p.68).

The Weavers' Cottage embodies Heidegger's notion that *building* and *dwelling* are inseparable acts of construction and cultivation. This dwelling is a typical example of a mixed-use space, combining both living and working areas (Shown in Figure 4.3). Traditionally, the lower floor was used as a living space, while the upper floor housed the loom shop. The Weavers' Cottage in Scotland, a historic Kilbarchan weaver's cottage, was once integral to the woven textile industry. Between 1774 and 1840, the weaving industry in the village expanded significantly, growing from 180 to 900 looms. Over the 19th century, multiple families resided together on the main floor, while the upper workspace housed a 200-year-old loom, which remains on display today to illustrate historical working conditions. Now restored as a visitor attraction, the cottage has been adapted to reflect the living and working environment of a 19th-century handloom weaver (Shown in Figure 4.4).

Simultaneously, it serves as a cultural space that fosters

connections between the local community and its weaving

heritage (National Trust for Scotland n.d.).

Figure 4 4   The Interior of Weaver' Cottage in related to building and dwelling. Source: (The British Land Company PLC 2024).

By prioritising inhabitation over aesthetics, the Weavers' Cottage

exemplifies Heidegger's argument that *dwelling* is not merely

about physical structures but about the lived experiences within

them (Shown in Figure 4.5). The cottage showcases how living

and working conditions were deeply intertwined before the

Industrial Revolution, reinforcing the idea that architecture is not

just a visual or functional construct but a reflection of human

existence in time and place.

Figure 4 5   The Architecture and Habitation in the Weavers'
Cottage. (Source: Drawn by the Author)

Maurice Merleau-Ponty (1908–1961) developed Heidegger's
idea of rediscovering the experience of *being*. However, while
Heidegger emphasises *dwelling*, Merleau-Ponty focuses on the
structures and contents of consciousness, particularly how
things in the world appear *for us* rather than how they might
exist *in themselves*. He articulates a primordial unity between
consciousness and being, proposing that the human body as the
living centre for intentionality actively shapes reality rather than
passively receiving it (Kearney 1994, p.73-74). Like many
phenomenological thinkers who view consciousness as
inherently intentional, Merleau-Ponty asserts that *bodily
intentionality* provides an initial grasp of a sense of situation,
allowing individuals to engage with their surroundings through

the ongoing flow of experience. According to Hale, Merleau-Ponty offers significant insights into the intimate relationship between the *body-in-action* and the spatiality of the world in architecture (Hale 2017, p.12-14).

New Lanark exemplifies this bodily engagement with space through its interactive and educational experiences (Shown in Figure 4.6). For example, replica toys serve as tactile tools that connect visitors, particularly children, to historical narratives. A hands-on session allows participants to physically interact with historical toys, comparing their materials and craftsmanship to contemporary ones. In addition, New Lanark also prioritises educational activities tailored to diverse audiences, including preschoolers, school-aged children, college or university students, and researchers. Its collections and publication resources are accessible to the public, reinforcing the site's role as a space for embodied learning (Muroi 2022).

Beyond archival materials, New Lanark provides a range of experiences that reflect Merleau-Ponty's *body-in-action* framework. Visitors engage with the site through house tours, textile machinery exhibitions, outdoor activities such as picnics and play areas, and scenic walks along the River Clyde. These

multisensory experiences facilitate a deeper connection to industrial history, transforming learning into an embodied practice rather than a purely intellectual pursuit.

Founded in 1785 as a purpose-built, water-powered cotton mill, New Lanark aimed to improve living conditions for mill workers. Recognised as a UNESCO World Heritage Site in 2001, it became a benchmark for 19th-century industrial communities. The village comprises cotton mill buildings, workers' housing, an educational institute, and a school, reflecting the humanistic values of its founder (National Trust for Scotland n.d.). New Lanark's built environment retains its original design, incorporating traditional materials and craftsmanship. For visitors, this embodied architectural experience fosters a primordial unity between consciousness and being (Varela 2017), aligning with Merleau-Ponty's phenomenological principles. By respecting the historic fabric and preserving the site's integrity (UNESCO 2001), New Lanark provides an immersive experience where architecture, history, and sensory perception converge.

Figure 4 6   New Lanark and its Built Environment. Modified from Source: (National Trust for Scotland n.d.) and (Pragnell 2021)

To summarise, phenomenology argues that objects exist not solely as traditional categories of 'substance', but as entities defined by the category of 'relation' (Kearney 1994, p.13). However, this relational aspect must be supported by the substance of an object, such as materiality, whether the building fabric or a replica toy, thereby producing the transcendent imagination[10]. Phenomenological thinking critiques structuralism, which, as discussed in Chapter 3.4.1, interprets architecture as a system of signs related to function. However, as Umberto Eco argues, users should interpret these signs in their own ways rather than through rigid, predetermined meanings (Leach 1997c).

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[10] In the lecture of *Kant's Critique of Pure Reason* from Professor Dan Robinson, he explains Immanuel Kant's (1724–1804) claims our experience must be supported by the substance of an object, such as materiality, thereby producing the transcendent imagination.

Furthermore, phenomenological thinking establishes a deeper relationship between buildings and experiences through materiality, surpassing the limited perspective of viewing architecture merely as a system of signs. Heidegger, for instance, explains that human presence is not just about physical occupation but about lived experience, such as the farmhouse and the actions associated with them. He further elaborates that the act of dwelling integrates both living and working, as seen in Preston Mill.

Merleau-Ponty expands on this by proposing that we perceive the world through 'structured wholes' – coherent patterns of experience – rather than isolated sensory data. His concept of *bodily intentionality* suggests that our physical presence actively shapes our understanding of the sense of the situation in space. This is evident in New Lanark, where visitors engage with history through hands-on experiences, such as comparing the materials of historical and modern toys. Here, the materiality of objects becomes a bridge between the human body and the site's history, deepening engagement beyond mere observation. By prioritising material experience over abstract symbolic interpretation, phenomenology offers a more immersive and meaningful approach to architecture and museum studies than

the structuralist view of buildings as mere systems of signs

(Norberg-Schulz 1988). Moreover, it establishes a longstanding

relationship between phenomenology and psychoanalysis

(Adamiak and Pokropski 2018).

Echoing Figure 4.2, Figure 4.7 presents a summary of key

quotations from major phenomenological thinkers, linking their

ideas to architectural theory and the museum experience. These

examples are organised within a phenomenological framework,

encompassing consciousness and experience, inhabitation, and

interactive engagement.

Theoretical Paradigm

Key Thinkers
1. Architectural Theorists - Tao DuFour, Adam Sharr, Jonathan Hale
2. Museum Experience – Nicholas Serota

Phenomenology in Museum Experience
Nicholas Serota

Tao DuFour
Edmund Husserl –
Lifeworld

Adam Sharr
Martin Heidegger – Building
and Dwelling

Jonathan Hale
Maurice Merleau-Ponty
– Bodily Intentionality

4E-Cognition
(Consciousness and
Experience)

Mix-use Space
(Inhabitation)

Body-in-action
(Interactive Experience)

Preston Mill – Natural
Landscape

Weaver's Cottage –
Dwelling

New Lanark – Replica Toy

Figure 4 7   Key Quotations from the Literature Review align
with the Theoretical Paradigms in Phenomenology. (Source:
Created by the Author)

4.3 Evolution of the Museum Space

Although contemporary museums heavily rely on the curator's narrative, Nicholas Serota argues that museums should reduce their didactic functions to encourage personal experiences that allow visitors to develop their interpretations, rather than depending solely on curatorial guidance (Serota 2000, p.10). This concept recalls the museum's origins as a Theatre of Memory and a Cabinet of Curiosity.

4.3.1 Historical Models

While the term 'museum' originally referred to a vast repository of knowledge, including libraries, artworks, and scientific artefacts from ancient Egypt in the third century BC, its influence on contemporary museum types is minimal. Instead, renaissance memory theatres and baroque cabinets of curiosity – two Enlightenment-era typologies – have had a profound impact on modern museum design, particularly in the context of environmental contextualism (Marotta 2012). Without curator-led narratives, these historical models emphasise bodily engagement and experiential interaction (Skolnick 2012).

4.3.1.1 Theatre of Memory

The Theatre of Memory originated during the Renaissance in Italy (mid-15th century) as a private space for wealthy collectors and humanist scholars to display collections based on artistic

value. These theatres were part of private residences, palaces, or gardens and were limited to select invitees, typically scholars and experts (Tzortzi 2015, p.13). Conceptualised by Italian philosopher Giulio Camillo, the Theatre of Memory was envisioned as a circular, enclosed space large enough for individuals to enter. The structure consisted of seven levels symbolising the stages of creation, arranged into a grid of forty-nine places. Each level housed images that served as visual mnemonics connected to textual information stored in small drawers or pigeonholes (Aurasmaa 1970).

Although termed a 'theatre', Camillo's design functioned as a microcosm of the universe. It combined geometry and astrology in a hierarchical structure linked to celestial bodies, from the Moon to Saturn. By conceptualising time as a mathematical dimension akin to space, this theatre sought to predict and understand the universe's patterns (Aurasmaa 1970). Visitors experienced this space as a journey of personal and spiritual growth. Wealthy collectors and scholars moved from material understanding to abstract comprehension, gaining intellectual control (Figure 4.7).
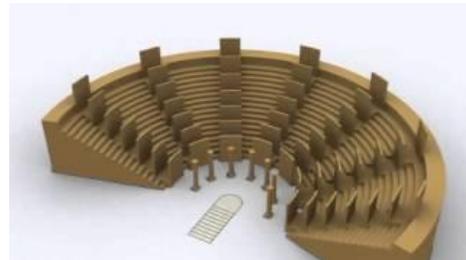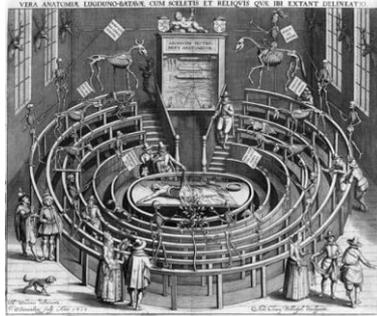
Figure 4 8   The Conceptual Framework of the Theatre of Memory, Source: (Seip 2020, pp.18-32)

Later, the Palazzo Medici Riccardi, built in 1444, became an expository space and an early example of a European museum (Tzortzi 2015, p.13). Today, it serves as a museum, a seat of the Metropolitan City of Florence, and a library complex. The Palazzo's rich original decorations foster aesthetic interactions between the building, its collections, and its visitors. This intimate engagement offers a unique encounter with both the artworks and the historic environment.

The Palazzo Medici Riccardi was converted into a museum in 1974, consisting of the Palace, the Marble Museum and the Moreniana Library. The Palace is the shelter of masterpieces, and is one of the hallmarks of Florence; the Marble Museum exhibits the Riccardi family's passion for collectables, including busts and ancient sculptures; the Moreniana Library can only be

visited for study and consultation, and since it was opened to the

public in 1942, historically significant collections of manuscripts

have been continually added (Palazzo Medici Riccardi n.d.).

4.3.1.2 Cabinets of Curiosity

The German *Wunderkammern*, or Cabinets of Curiosity,

emerged by the late 16th century as repositories of

miscellaneous knowledge and the theatre of nature, attracting

scholars and physicians. These cabinets sought to encapsulate

a comprehensive model of 'universal nature made private'

(Tzortzi 2015, p.14) (Figure 4.8).

Unlike the structured organisation of the Theatre of Memory,

Cabinets of Curiosity lacked a clear order and more closely

resembled workshops (Marotta 2012). In this type of space, all

the latest curiosities and early machines were accumulated in

this room. Hence, the word 'cabinet' was defined as two levels

of meaning: one is the collections, such as minerals, fossils and

preserved animals; the other is the containers, like shelves with

open designs to showcase objects.
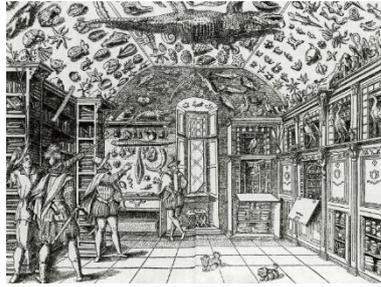
Figure 4 9   Cabinets of Curiosity and the World in Box from Pitt Rivers Museum. Modified from Source: (Marotta 2012) and (Pitt Rivers Museum 2019)

Today, the Kew Millennium Seed Bank reflects a modern evolution of this concept. Its design integrates open laboratories with public exhibition spaces, creating a dynamic 'museum space' where visitors engage intellectually with seed collections while observing scientists at work. Located within the Wakehurst Place gardens, the Seed Bank offers a 'behind-the-scenes' experience, blending private scientific workspaces with public educational facilities. The Kew Millennium Seed Bank is housed in the Welcome Millenium Trust Building located in the gardens of Wakehurst Place, and it provides a private 'behind-the-scenes' tour and presentation for visitors. The Seed Bank can be either a private working space for scientists or a space for public viewing. In March 2023, they were seeking a new exhibition designer who can design to stimulate visitors' intellect

and emotions through Kew's scientific, horticultural, and cultural assets (Bamford 2023).

4.3.1.3 Summary

These early concepts of 'original museums', represented by the Theatre of Memory and the Cabinet of Curiosity, limited intimate encounters between objects and learners to elite standards; it was an active engagement based on visitors who hold a certain level of knowledge standards (Impey and MacGregor 2001), with the support of the museum building. Nowadays, the Palazzo Medici Riccardi and the Kew Millennium Seed Bank have evolved these two concepts of 'original museums' to support engaged experience. On one side, even though the Palazzo Medici Riccardi is open to the public, the Moreniana Library within its building provides a private, tactile and immersive experience for studying; on the other side, the Kew Millennium Seed Bank, as a private working place, offers a level of museum experience which connects with their valuable assets.

The early models of the Theatre of Memory and Cabinets of Curiosity offered elite, intimate encounters between objects and learners, emphasising active engagement supported by architectural space (Impey and MacGregor 2001). Modern

interpretations, such as the Palazzo Medici Riccardi and the

Kew Millennium Seed Bank, adapt these concepts to create

engaging, contextually rich experiences. While the Palazzo

provides a tactile and immersive study environment, the Seed

Bank combines intellectual stimulation with geographic and

ecological awareness. In both cases, visitor experience remains

at the heart of the museum's design, aligning with the new vision

of museums shifting from static history books to dynamic

'cabinets of treasures'.

4.3.2 Situated Museum Space

Situated architectural theory emphasises the importance of local

context and socio-cultural systems, enhancing design through

community interaction (Miller and Rudnick 2010, 62-74). In

museum spaces, this theory highlights how heritage locations

and buildings respond to specific moments and situations,

creating unique experiential milieux. Furthermore, this is the

core value of the heritage museums. Even though historical

models like Cabinets of Curiosity and Theatres of Memory lack

curatorial presence, they demonstrate how architectural space

evolves through the accumulation of collections over time.

These situated environments enable meaningful engagement

between visitors and collections by embedding experiences in

their physical and temporal contexts (Chang and Gao 2018;
Legacy 2020). Hence, understanding the museum as a situated
phenomenon is an effective way of engaging with museum
collections, which could create a compelling social-cultural
milieu[11].

4.3.2.1 Temporal Layers

To echo the temporality of industrial culture, particularly in the
case of the Museum of Gorge in Section 3.3.2.2, the situated
museum space of the Palazzo Medici Riccardi benefits from its
original architecture (Lumley 1988). The whole spatial
atmosphere within the building is created because the Medici
family initially resided here as a hallmark of Renaissance civil
architecture. Today, this architecture is well preserved, and the
original spatial atmosphere contributes the most to visitors'
primitive perception.

For instance, the Column Courtyard (Number 3 of Figure 4.9), is
the heart of the whole Palace with a linear and balanced layout.
In 1519, a sculpture as the hallmark was created, offering
harmony and pleasing balance; in the 18th century, this place

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[11] The people, physical and social conditions and events that provide the environment
in which people act or live.

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was converted into a sort of museum of antiquities, by adding ancient busts and fragments of sculptural reliefs, urns, sarcophagi, and inscriptions. Over time, the whole atmosphere in this courtyard was cultivated by the aesthetics of neoclassicism, allowing visitors in this situated milieu to gain a unique understanding of the artworks of a specific period.

The Medici Garden (Number 2 of Figure 4.9), dating from 1540, was devoted to other functions and later remodelled by the Riccardi family. It became a luxuriant garden decorated with various artworks, including some ancient and contemporary masterpieces. Viewing these artworks and experiencing this garden, visitors acquire an opportunity to appreciate this type of aesthetic pleasure connected by the time and the situated place. The Ground-Floor Gallery (Number 1 of Figure 4.9), in the Mid-15th century, had not yet been walled up, only functioning for important events, such as the wedding banquet in 1469. In 1691, it was turned into a veritable antique and sculpture gallery. Today, it is used for holding temporary exhibitions (Palazzo Medici Riccardi n.d.). From 1444 until now, the Palazzo's 580-year history enriches its layered temporal environment, offering

visitors an authentic connection to its accumulated heritage.
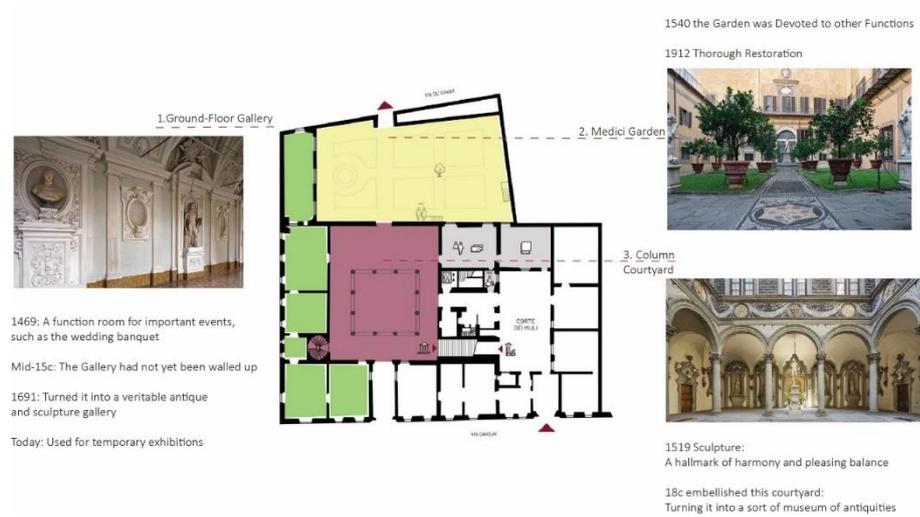
Figure 4 10　The Ground Floor Plan of the Palazzo Medici Riccardi. Modified from Source: (Palazzo Medici Riccardi n.d.)

4.3.2.2 Spatial Layers

The other type of museum space, the situated environment of the Kew Millennium Seed Bank exhibits fully equipped laboratories for botanists and geneticists who study seeds (Figure 4.10). This is a real workplace for the work of the scientists while encouraging visitors to engage in it, and the function of the whole site includes housing seed collections from 97 countries. It is a workspace for research and conservation such as laboratories, visitor centres, residential, and educational facilities. Beyond this, the new design brief expects visitors to engage with a captivating virtual experience connected with seeds, and visitors can continue to engage with Kew following

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the visit. The situated environment of Kew Millennium Seed Bank is significant for a reason: it is located in Kew Gardens, which holds the largest and most diverse botanical and mycological collections in the world, and provides a worldwide simulated climate and soils for visitors to appreciate.

Space plays a vital role in the Kew Millennium Seed Bank. Although this site is purpose-built, its design emphasises geographic and ecological connections, displaying films and simulations of the seeds' native climates (Royal Botanic Gardens n.d.). By exhibiting the film with real climate scenes of seeds in the botanic garden, the visitor experience could be enriched and developed to connect with the recalled memories from other countries. This spatial networking encourages visitors to develop intellectual and emotional ties to the global significance of the seed collections.

Figure 4 11   The Conceptual Plan of the Kew Millennium Seed Bank. Source: (Stanton Williams 2000)

4.3.2.3 Summary

Both the Palazzo Medici Riccardi and the Kew Millennium Seed Bank demonstrate how heritage locality and situated environments foster meaningful connections between visitors, collections, and architecture. One is the repository of artworks, and the other one is the container of exhibitions. Temporal and spatial layers enable the preservation of memory and emotional engagement, distinguishing these spaces from modern museums focused on passive visuality. To summarise, the perception of the whole physical space influences visitors' self-identity, which is seen as an emotional dimension, thereby affecting the ability to gain knowledge in the museum (Falk and

Lynn D. 1992, p.110-114). Embodied experiences within the Palazzo Medici Riccardi or Millennium Seed Bank evoke primitive emotion but are represented in different ways. Unlike the emphasis of the modern museum on passive visuality, visiting the Palazzo is an emotional aesthetic journey, and visiting the Seeds Bank is an ecological intellectual journey.

4.3.3 Contemporary Types

Building on the historical models of the Theatre of Memory and Cabinets of Curiosity, contemporary museum spaces have evolved into experiential environments. The Heineken Experience, referred to as the Theatre of Memory was a concept for the emergence of new paradigms of knowledge creation focusing on the performative and the participatory (Seip 2020); it was envisaged and built as an embodied encyclopaedia. The Prince Philip Maritime Collection Centre, referring to the Cabinets of Curiosity was established to house collections of all kinds, in rooms like workshops in which were accumulated the latest curiosities and early machines, although they were not always systematically displayed (Marotta 2012, p.1-18). Each represents an innovative interpretation of traditional museum concepts, fostering unique visitor experiences.

4.3.3.1 Heineken Experience

The Heineken Experience in Amsterdam, Netherlands, is a modern space that embodies the spirit of the Theatre of Memory, blending performative and participatory elements. Originally built in 1867 as the first Heineken brewery, the facility served as the company's primary brewing site. In 1991, part of the building opened to the public while still functioning as a brewery. By 2001, it was renamed the Heineken Experience and became a visitor centre. The transformation from brewery to historical landmark innovatively redefined the spatial experience to align with the Heineken brand identity. Compared with other industrial museums, the Heineken Experience offers a blend of traditional and modern elements, real and virtual environments, and tactile and taste sensations to narrate its brand story.

Remodelling Old Brewery

The architectural transformation of the Heineken Brewery into the Heineken Experience demonstrates how historical spaces can be reimagined to reflect cultural evolution over time. The design retains the brewery's heritage while integrating contemporary elements, offering visitors a tangible journey through the past and present.

As discussed in Chapter 3.4.2, time is a powerful social tool that shapes various understandings of existence. The Heineken Experience exemplifies how a building serves as evidence of the culture shaped by time. Based on a monumental building, the historical brew room, a clear distinction is visible between the old and new in the facade, showcasing the exterior of the architecture (Figure 4.11).

Externally, modern windows featuring large glass panes and steel frames expose the brewery's internal workings, forming the main entrance. In contrast, another section of the wall retains traditional Dutch windows (Hopkins 2012, p.40), preserving the historic façade. This duality preserves the historical façade while allowing glimpses of the building's interior processes. Internally, the use of monumental tiles provides continuity between modern and traditional spaces, while the walls reflect their respective time periods. This combination of textures and colours (Mijksenaar n.d.) creates a unique and inviting social-cultural environment for visitors. Additionally, the brewery's restored copper kettles have become a symbolic representation of the Heineken tradition.

This combinational space, blending historic and modern design, engages visitors in a sensory experience that resonates with Merleau-Ponty's concept of *bodily intentionality*. The tactile and visual connections to the past, represented by the monumental tiles and copper kettles, create an environment where visitors can perceive and internalize the site's historical and cultural significance.
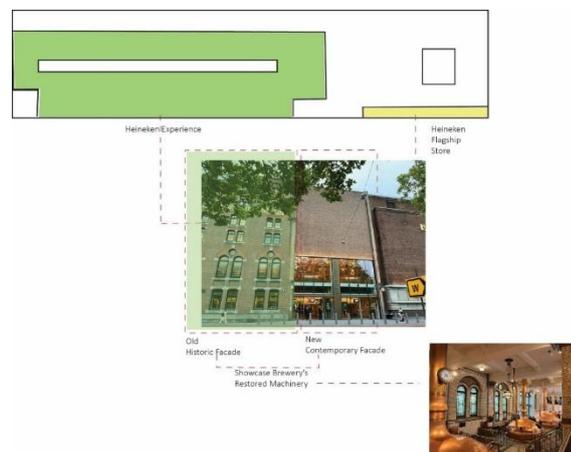
Figure 4 12   The Transition Zone Between the Historic and Modern Façades of the Heineken Experience (Source: Drawn by the Author)

Furthermore, the Heineken Experience exemplifies situated architecture, where the spatial design and navigation are integrated with the storytelling elements of the experience (Nielsen 2017). The journey through the space is not linear; instead, it challenges the natural orientation of visitors by

strategically navigational interweaving exhibitions, interactive moments, and entertainment activities (Mijksenaar n.d.).

This dynamic layout introduces navigational complexities, particularly at junctions where bottlenecks could disrupt the visitor flow. To address this, strong navigational interventions were implemented, ensuring a seamless progression through the space. These interventions complement the overall narrative, guiding visitors intuitively while maintaining the balance between exploration and immersion. This interplay between spatial orientation and storytelling enriches the visitor experience, as the architecture itself becomes part of the narrative (Psarra 2009). By challenging and then reorienting the visitor, the Heineken Experience fosters a deeper engagement, making the journey through its spaces an integral aspect of its performative and participatory approach.

Experience Design

The experience design of the Heineken Experience revolves around reconnecting visitors with the process of beer-making and the history of Heineken, engaging multiple senses – sight, touch and taste – to create a comprehensive and immersive journey. The design is strategically structured across four levels:

the old Brewery foundation, product exploration, sampling, and interactive exhibits.

The first level is the old Brewery foundation, which reserves the architectural essence of the old brewery, showcasing its unique industrial characteristics. This level serves as the foundation for the visitor's journey, grounding the experience in Heineken's historical roots. The second level is the product exploration stage, and begins with an introduction to the history of the Heineken brand, from two perspectives: one is from brewery workers, the other one from brewery owners. The original factory machinery used in beer production is displayed alongside immersive video scenes. A notable design detail is the workers' portraits on the walls, which, when the lights are off, resemble real people standing by, turning the space into a cinema-like environment. After exploring the factory's history, visitors delve into the branding history, entering the world of the Heineken family business through various time periods. This part of the experience includes displays of advertisements, beer bottles, and even a virtual family member who narrates the story. Both parts of this exploration stage effectively combine real objects with virtual storytelling, much like the blending of old

and new in the architecture, stimulating visitors' visual senses (Figure 4.12).
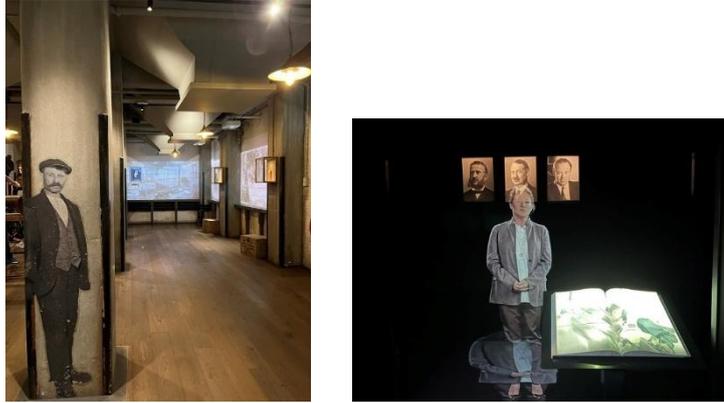
Figure 4 13   The Visual and Virtual Display of the Brewery Worker and Owner. (Source: Photos taken by the Author)

The last two levels – sampling and interactive exhibits – focus on engaging visitors through touch and taste. This part of the experience introduces raw materials, allows for hands-on attempts at brewing, and features interactive exhibits and entertainment activities. In the raw materials exhibition, visitors have the opportunity to feel the quality of the malts and try their hand at the brewing process. They can also customise beer bottles in the interactive exhibits and enjoy free samples of beer during various entertainment activities.

Through the seamless combination of architectural preservation, storytelling, and sensory interaction, the Heineken Experience exemplifies how a visitor centre can effectively transform brand identity into an immersive and participatory journey (Figure 4.13).

Figure 4 14   Sampling and Interactive Exhibit in the Heineken Experience. (Source: Photos taken by the Author)

4.3.3.2 The Prince Philip Maritime Collection Centre

The Prince Philip Maritime Collection Centre, part of the Royal Museums Greenwich, exemplifies a modern museum space designed as a 'living library'. Its primary function is to store collections from the Royal Museums Greenwich while offering visitors unique behind-the-scenes experiences. Comparable to the Kew Millennium Seed Bank, this centre provides opportunities for visitors to engage with hidden treasures that are typically inaccessible, through initiatives such as behind-the-

scenes tours and Saturday Superstore tours (Royal Museums Greenwich n.d.).

The journey of the behind-the-scenes tours is an exclusive way to allow visitors to see conservation in action and learn first-hand about their collections' voyage from store to exhibit. In addition, in the journey of the Saturday Superstore tours, apart from museum collections, visitors have opportunities to access museum archives on their site and to explore the intriguing stories relating to *Titanic, Antarctic Expeditions, and Naval Battles* as well as some lesser-known narratives (Royal Museums Greenwich n.d.).

The Prince Philip Maritime Collection Centre draws inspiration from the historical model of the Cabinets of Curiosity, which traditionally presented rare and curious objects in workshop-type spaces. Modern museum spaces have evolved this concept into systems of order, where parts of the space are selectively open to the public. Unlike the Heineken Experience, which focuses on immersive experience design, the Prince Philip Maritime Collection Centre emphasises principles of spatial interpretation. Two interpretational approaches are central to its design: *classification* and *framing* (Tzortzi 2015b). The *classification* in

the museum means the object configuration is organised through the geographic location, such as the British Museum. At the Prince Philip Maritime Collection Centre, *classification* is evident in the archival spaces, where artefacts are systematically arranged for exploration beyond mere visual display. *Framing* refers to integration, where the whole museum is interpreted as an entire cultural representation, such as the Museum of Liverpool, which aims to exhibit the whole civic history of Liverpool. At the Prince Philip Maritime Collection Centre, framing manifests in the workshop-type spaces, designed with clear social intentions to engage and educate visitors, akin to the collaborative and exploratory nature of historical workshops.

From a knowledge transmission perspective, *classification* and *framing* offer distinct methods of organising and presenting museum collections, traditionally following a monologue style. *Classification* provides structured, categorised spaces while *framing* integrates objects within broader narratives to create holistic cultural representations. Beyond this, the Prince Philip Maritime Collection Centre encourages visitors to engage in conversations with staff working in different studios, adopting a more interactive, dialogue-based approach. In this museum, the

learning model shifts from monologue to dialogue, increasingly replacing one-way communication with two-way interaction in modern museum practice (Johansen 2022). Both approaches are thoughtfully implemented at the Prince Philip Maritime Collection Centre to enrich visitor engagement and deepen their understanding of maritime heritage.

Living Library

The function of the Prince Philip Maritime Collections Centre within Royal Museums Greenwich is quite close to that of a library, which emphasises the vitality of the act of reading (Olley 1995). Traditional library design typically revolves around standardised book storage and reading devices. However, the new idea proposed by Louis Kahn in 1956 indicated two fundamental characteristics of space for human concern, one for people and one for books, where books and readers do not connect in a static way (Kohane 1990). Kahn proposed that books and readers do not merely connect statically but engage dynamically, an idea that resonates in the Centre's design.

In the context of contemporary museums, this principle is reimagined to focus on the relationship between visitors and objects. While the Prince Philip Maritime Collections Centre

does not permit direct physical interaction with the collections,

the behind-the-scenes access creates a close and intimate

experience akin to the Cabinets of Curiosity. Visitors can

observe the care, categorisation, and storage of historical

artefacts, fostering a deeper connection through visual and

narrative engagement (Figure 4.12).
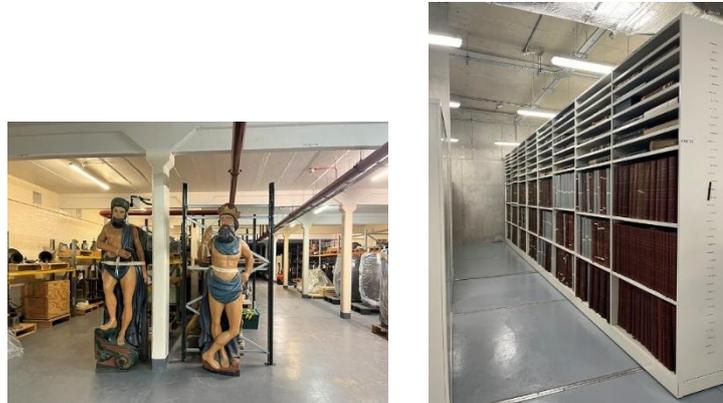
Figure 4 15   The Collections and Archive in the Prince Philip
Maritime Collection Centre. (Source: Photos taken by the
Author)

Engagement Design

The Prince Philip Maritime Collections Centre exemplifies a

living library by merging archive and workplace typologies to

create an integrated space that invites public interaction. The

design delineates public spaces and inhabited areas (Figure

4.13), balancing engagement with the practical requirements of

conservation, photography, display, and storage spaces.

Public spaces host activities such as stakeholder engagement meetings, educational programmes, and guided tours. These areas aim to inspire curiosity and facilitate dialogue between visitors and staff. The inhabited area serves as the active workplace where conservation, documentation, and storage processes occur. These areas are generally inaccessible to the public, though guided tours provide glimpses into these behind-the-scenes operations. By combining these functions, the collection centre transcends the traditional didactic approach to museum education, offering visitors a participatory and inspiring experience. Rather than solely teaching knowledge, the Centre invites visitors to explore and reflect on maritime history through a dynamic and interactive framework.

As a model of integration between public space and inhabited areas, the Prince Philip Maritime Collections Centre represents a unique *living library*. While most of its operations occur away from public view, select learning sites are accessible to visitors during guided tours, creating situated spaces for sharing knowledge and expertise (Goulding et al. 2018). These interactions enhance the visitor experience, fostering a greater appreciation for the museum's conservation efforts and the narratives embedded in its collections.

By providing an immersive and inspiring environment, the

Maritime Collections Centre achieves its goal of blending public

engagement with the preservation of maritime heritage. This

type of publicly accessible site is very engaged in providing

situated places for sharing their knowledge and experience in

terms of the museum's conservation work (Royal Museums

Greenwich n.d.).

Figure 4 16   Public Space and Inhabited Areas in the Prince
Philip Maritime Collections Centre, Modified from Source: (Stride
Treglown 2018)

4.3.4 A Third Learning Space

Modern architecture focuses on the senses of the eyes but often

lacks the pungent personality that varied and pleasant odours

can give (Tuan 1977, p.11). However, the Heineken Experience

and the Prince Philip Maritime Collections Centre exemplify a

new integrated museum typology, positioning the museum as a 'third learning space'. This model complements traditional academic learning in universities and practical apprenticeship learning in workplaces by offering an engaged and sensory-rich educational experience.

In contrast to the traditional didactic teaching-learning method, both the Heineken Experience and the Prince Philip Maritime Collections Centre are representative examples of institutions which provide a strong engaged experience.

On the one hand, the Heineken Experience emphasises the experience design with three distinct layers. The first layer is visual communication, the fusion of old and new architectural elements that visually stimulate visitors. By blending traditional copper kettles and monumental tiles with modern materials, the space triggers a sense of historical depth while showcasing contemporary relevance. The second layer is the interactive exhibition, where visitors engage with Heineken's brand history through interactive storytelling and participatory displays. Immersive elements, such as portraits that light up to simulate real figures, provide an entertainment-infused learning experience. The third layer is a hands-on activity, where visitors

experience haptic and olfactory sensations by observing malt

extraction, feeling raw materials, and tasting beer samples. This

multisensory approach deepens knowledge retention by

connecting environmental stimuli to the brewing process. By

combining layers of sensory engagement, the Heineken

Experience offers not only environmental information but also a

distinct sense of place and event, fostering a memorable

learning encounter.

On the other hand, the Prince Philip Maritime Collections Centre

creates an *authentic milieu* referring to the museum archive,

which can connect to some intriguing stories, thereby

encouraging visitors to explore their interests. During the

process of exploration, visitors travel from one studio room to

another, the new site of concern is applied and influenced, and

new concepts like gaining new knowledge become easier to

accept because the situated place has the power to allow

visitors to transform and understand new concrete situations

(Doucet and Frichot 2018).

With strong engaged experience, both museum examples

represent the 'third learning space' that challenges traditional

didactic methods by integrating sensory, participatory, and

situational learning. It transforms museums into environments where visitors actively engage, explore, and connect with knowledge through the senses, architecture, and interactive storytelling.

Echoing Figure 4.2, Figure 4.17 presents a summary of key quotations from major phenomenological thinkers, linking their ideas to architectural theory and the museum experience. These examples are organised within a phenomenological framework, encompassing consciousness and experience, inhabitation, and interactive engagement.

Evolution of the Museum Space

Key Thinkers
3. Historical Model - Kali Tzortzi, Robert Lumley
4. Contemporary Type - Jane K. Nielsen, John Olley
5. A Third Learning Space - Isabelle Doucet

Historical Model

Theatre of Memory – Kali Tzortzi
Temporal Layer – Robert Lumley

Cabinets of Curiosity – Kali Tzortzi
Spatial Layer

Contemporary Type

Heineken Experience
Jane K. Nielsen

Tradition/Modernity

Tactility/Taste

Real/Virtual

Prince Philip Maritime Collection Centre

Living Library
John Olley

Sharing Knowledge and Expertise

Social Intention

A Third Learning Space
Isabelle Doucet

Monologue to Dialogue
Anja Johansen

Figure 4 17   Key Quotations from the Literature Review align with the Evolution of Museum Spaces. (Source: Created by the Author)

4.4 Argumentative Phenomenology in Museum Interpretation

Experience inherently carries a connotation of passivity, described as something a person undergoes or endures (Tuan 1977b, p.9). From Husserl's concept of the *lifeworld* to Heidegger's *being in space* and Merleau-Ponty's *bodily intentionality*, phenomenology emphasises individuals' subjective experiences, encouraging the creation of more impactful and meaningful spaces. Thus, crafting compelling experiences within a museum space requires an integration of museum interpretation supported by museum architecture.

As proposed in 3.4 Argumentative Structuralism in Design Intervention, an essential argument for structuralism is to encourage visitors to focus on movement guided by their internal sense of time, which is referred to in 3.4.3 Promenade Architecturale, rather than a curator-led narrative. By reviewing both historical and contemporary museum models, this study combines phenomenology with the advantages of structuralism. While museums offer a complete and engaging experience, the architecture in this context serves as a static supportive element, shaped by design interventions. Museum interpretation, however, supported by the architecture, remains

flexible and dynamic, achieved through a blend of curator-led narratives and bodily engagement.

For visitors, the personal experience is paramount. The physical setting of the museum, inclusive of architecture and exhibition, plays an important role in engaging with embodied, sensory and emotive forms of knowledge (Tzortzi 2017). Together, the theoretical perspectives of structuralism and phenomenology inform the development of future industrial museum typologies, demonstrating how such museums can serve as active forums for discovery, creativity, and civic participation, as illustrated in Figure 4.18.

Figure 4 18   Summary of Two Theoretical Paradigms for Considering Future Industrial Museum Typologies. (Source: Created by the Author)

4.4.1 The Uniqueness of Heritage Architecture

Heritage architecture, particularly cultural heritage, possesses a unique artistic and historical value. As a 'living' artefact, it physically embodies the passage of time, and its material fabric conveys a sense of vitality (Rossi 1984; Hale 2017). This uniqueness can be approached as a 'work of art' achieved through restoration, whether by returning a building to its original condition or through adaptive reuse for contemporary society. In such cases, the building is not only preserved but also curated, particularly for its form, materials, and spatial qualities, all of which can be deliberately framed to convey meaning actively. This artistic, in return, shapes how visitors perceive and inhabit the space, transforming their encounter from a purely visual appreciation into an emotional, embodied, and intellectual engagement, as same as Tzortzi has discussed in the previous section (Brandi 2005, 47-50).

Merleau-Ponty's philosophical concept of bodily intentionality offers a useful perspective for exploring this. Visitors, he argues, do not merely pass through a museum but become part of it. The human body, as the living centre of intentionality, can actively shape reality rather than passively receive it (Kearney 1994, 73-74). This shift from 'being' to 'becoming' within space and time (Kavanaugh 2013) highlights the importance of

creating environments that can fully express the uniqueness of heritage architecture and evoke emotional responses. One example like design philosophies such as the 'light touch', which was used at Middleport Pottery and discussed in 3.3.1.1 Light Touch. By intervening minimally, architects preserve the existing material and spatial qualities that invite bodily exploration and interpretation. This allows visitors to navigate, touch, and perceive the site in ways that actively shape their own understanding of it, precisely the participatory relationship between body and space that Merleau-Ponty describes.

This approach at Middleport Pottery illustrates how individual design interventions operate within a larger cultural process, where preservation decisions both influence and are influenced by the ongoing creation and reinterpretation of meaning in heritage sites. In this sense, cultural heritage should be understood not merely as a physical place, but as the product of social activities, memory-making, and the continuous making and remaking of meaning through established socio-cultural patterns (Kamel-Ahmed 2015).

Bowring Norberg-Schulz's theory identifies two types of cultural heritage modification within this process of socialisation: imitation and identification (Norberg-Schulz 1965) (see Section

3.3.1.2 and 3.3.1.3). Since 2020, identification has been a particularly common strategy in the adaptive reuse of industrial buildings, as seen in the Museum of Making in Derby and Shrewsbury Flaxmill Maltings. By contrast, during the period between 1971 and 2000, restoration practices often prioritised maintaining a site's aesthetic integrity. Interior spaces were sometimes preserved with original manufacturing conditions and tools to enhance authenticity and evoke the resonance, or reimagining of the industrial past. As Scott observes, in such contexts, the ruin becomes incidental within a spatial continuum, its transparency revealing the traces of its former function (Scott 2008b).

This understanding of ruins (abandoned buildings) as part of a spatial continuum suggests that authenticity is not a static quality confined to material survival, but a relational one, shaped by the intersection of past and present meanings. In this context, the 'power of the real' offers a framework for evoking deeper emotional responses by establishing a rational model for evaluating these relationships. Such a model depends on recognising and accepting mediated values, rather than focusing on interpretation solely in the past (Moore 2000; Norberg-Schulz

1965). Consequently, authenticity can be redefined as a form of striking uniqueness that extends beyond physical remains alone.

Beyond understanding and accepting mediated values, the spirit of the past can be carried forward to future generations through processes of re-making. This enduring capacity is what distinguishes heritage architecture from purpose-built environments. In this way, heritage architecture fulfils its role as a living artefact, one that not only preserves the material traces of the past but also evolves through the embodied experiences, cultural reinterpretations, and mediated values that keep it alive for generations to come.

4.4.2 Narrative and Embodiment in Spatial Engagement

Narrative is a fundamental approach to museum communication, widely adopted in interpretation practices due to its reliance on narrative as a core structural element (Nielsen 2017). It typically involves two main strategies: constructing a coherent story through a structured narrative and enabling visitors to see themselves reflected within that narrative (Genette 1983).

On the one hand, curated museum experiences such as the *Heineken Experience* demonstrate how a strong brand narrative, supported by the integration of historic and modern

design, enhances visitor engagement. Within this remodelled historical building, visitors follow an intangible yet carefully structured storyline crafted by curators, combining real and virtual exhibits to convey the brand's history. Even for visitors unfamiliar with the historical context, a well-structured narrative reshapes their experience and transforms it into a memorable phenomenon. Beyond aesthetic stimuli, such as the juxtaposition of old and new facades or the refurbished brewing facilities, the immersive exhibition engages both mind and body through a sequence of orchestrated events. However, once the brewery was transformed into a museum, there was potential to offer more opportunities for visitors to imagine the events that historically took place on this site, allowing deeper personal connections rather than positioning curated events as the primary focus (Tschumi 1994).

In this case, narrative is integral to communication because it provides a structure that stimulates memories, emotions, and curiosity (Nielsen 2017). Hence, the importance of embodied, sensory, and emotive forms of knowledge rooted in personal experience also needs to be emphasised (Tzortzi 2017). Historically, museum experiences contributed to the building of an individual's knowledge repository, and earlier museological

approaches prioritised processes over outcomes. Echoing this, contemporary practice emphasises that engaging with the historical trace requires exploring complex relationships and multi-layered hierarchies of meaning, rather than merely generating perceptual stimulation (Hooper Greenhill 1992; Hooper-Greenhill 2000).

On the other hand, when visitors are encouraged to create their own stories, a coherent narrative can transform a general museum visit into a deeply engaging one. Nevertheless, the building itself remains critical, influencing the extent to which visitors are integrated into the experience. As Husserl emphasises, examining the *lifeworld* is fundamental, while Heidegger's notion of building and dwelling underscores the need for space to be cultivated. The *Prince Philip Maritime Collection Centre*, for instance, invites visitors to pursue their interests through observation and discussion without relying heavily on sensory stimulation. Yet it is purpose-built and lacks certain architectural heritage features that could further support engagement, instead depending largely on visitors' intrinsic motivation. In such cases, the capacity to foster personal connections with the space depends on how effectively the design activates memories, emotions, and curiosity.

Insights from these two case studies highlight the tension between event-led exhibitions and hands-on activities. In a heritage museum, enhancing visitor engagement and enabling them to construct their own narratives cannot depend solely on curated programming or individual interest; the body itself plays a pivotal role in engaging with the original building. Furthermore, Merleau-Ponty identifies two dimensions of bodily intentionality that contribute to memory recall through the re-enactment of spatial experience, particularly in learning contexts. The first, *situational memory*, is triggered by the specific context in which knowledge was first acquired or encountered. The second is *knowledge with an emotional charge* (Hale 2017, p.20-21), referring to memory intertwined with emotional resonance. By fostering bodily engagement, museums can transform static spaces of situated memory into dynamic sites of memory and relational connection (Maleuvre 1999).

Beyond curated events and individual attitudes, bodily engagement enables visitors to link passages or episodes across a sequence of spaces, rather than solely focus on events. This spatial navigation brings latent memories to the surface, generating re-imagined experiences and reinforcing

connections between the visitor and the museum's spatial narrative.

4.4.3 Act of Reading in a Third Learning Space

As Nicholas Serota observes, the modern museum has evolved into a history book, rather than a historical definition – a Cabinet of Treasures. Unlike early museums - 'Cabinets of Treasures' filled with eclectic collections lacking clear order, modern museums incorporate *classification* and *framing* as two dominant interpretative approaches (Tzortzi 2015a). While these strategies provide structure, they can sometimes constrain visitors' ability to engage in a more fluid, intuitive act of 'reading' the museum space. From 1980 onwards, digital integration of discourse became powerful and was frequently used in museum communication. However, this could be another kind of threat to authenticity (Parry and Sawyer 2005).

In the context of the GLAM[12] sector, museums increasingly function as third learning spaces, complementing formal and informal education. These spaces combine the traditional roles of collecting, preserving, researching, interpreting, and exhibiting (National Museum Directors' Council 2006), providing access to a wide range of materials, including historical artefacts, books,

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[12] The GLAM sector is a term for the combined cultural heritage institutions of Galleries, Libraries, Archives, and Museums.

documents, and artworks. Similar to this approach, architect Louis Kahn (1901–1974) emphasised the act of reading and the centrality of books as a medium for discovery in library design. In his Exeter Library project, he identified two fundamental spatial elements: one for people and one for books. He argued that books and readers should not connect in a static way, but rather through dynamic interaction, promoting discovery and engagement (Kohane 1990). Like a museum, Kahn's library underscores the importance of designing spaces that facilitate meaningful engagement between the visitor and their environment (Colomina 2009).

This perspective highlights the value of spatial engagement in heritage museum design. Well-situated spaces allow visitors to immerse themselves in historical narratives, fostering a deeper understanding and personal connection to cultural heritage. Beyond curated events or individual attitudes, this process involves reimagining the knowledge repository, enabling visitors to actively construct meaning as they navigate the space (Doucet and Frichot 2018). The design of the building, much like Kahn's libraries, becomes a medium for 'reading', where visitors interpret and interact with history in an embodied and participatory way.

Ultimately, the act of reading in a third learning space shifts the focus from simply consuming curated content to engaging dynamically with the spatial, historical, and emotional dimensions of the museum. By designing environments that support exploration, reflection, and personal interpretation, museums can transform static collections into living narratives that resonate with diverse audiences, bridging past and present through active engagement.

4.5 Conclusion

This chapter began by examining the evolution and typology of contemporary museum spaces through the lens of phenomenology, drawing on historical models such as the Theatre of Memory and the Cabinet of Curiosity. These models illustrate how museums engage visitors by combining intellectual and embodied experiences. The chapter concludes with the concept of a 'third learning space,' positioning the museum as an alternative to traditional academic and workplace learning. This space blends features of museums and libraries to create an embodied educational environment that fosters hands-on activities, participatory design, and situational learning.

Importantly, effective museum interpretation extends beyond curated or participatory experiences. Industrial heritage architecture and its site itself function as static yet facilitative elements, enhancing bodily engagement and shaping the visitor's experience. Echoing Louis Kahn's vision of library design, the interaction between people and objects should be dynamic rather than static. Applied to museum spaces, this principle encourages a reconfiguration of the relationship between visitors and collections, fostering meaningful connections and deeper engagement. Industrial heritage architecture not only guides spatial navigation and interaction with exhibits but also contributes to the re-imagination of historical narratives, allowing visitors to construct personal and contextual knowledge.

Certainly, Phenomenology provides a valuable theoretical framework for understanding both the historical origins and contemporary development of museum spaces. Balancing Nicholas Serota's observation that modern museums resemble historical books, this study argues for a renewed focus on museums as 'Cabinets of Treasures' that facilitate individual participatory experiences. Achieving this requires moving beyond didactic functions toward designing environments that

prioritise engagement, interactivity, and authentic, embodied learning experiences.

This approach reflects a broader transformation in contemporary heritage museums, where learning is active rather than passive, experiences are multisensory rather than purely visual, and museums function as adaptive, dynamic spaces responsive to visitor active participation. By foregrounding embodiment, spatial engagement, and personal narrative construction, museums can enhance knowledge transmission and foster enduring connections with their audiences.

PART TWO

Chapter 5 – THE ARCHITECTURAL SPACE OF THE MUSEUM OF MAKING: EVOLUTION, INTERPRETATION, AND ENGAGEMENT

5.1 Introduction

This chapter of the thesis examines the Museum of Making, specifically the historical transformation of the Derby Silk Mill into the Museum of Making. It provides an in-depth analysis of the museum's broader context, materiality, and spatial arrangement. Additionally, incorporating visitor feedback, this chapter evaluates the museum's architecture floor by floor, offering an objective insight into the case study.

The contextual analysis of the MoM includes its natural and urban setting, historical and cultural background, and community engagement from the past to the present. The Silk Mill, historically powered by the River Derwent's abundant water resources, played a crucial role in the Industrial Revolution and contributed to Derby's urban development. This historical continuity positions the museum as a 'time capsule', seamlessly connecting past and present. The spirit of making, deeply

embedded in Derby's cultural heritage, has evolved from the industrial era to the post-industrial era, fostering a strong sense of community.

Materiality serves as tangible evidence of the building's transformation. The exposure of both old and new building materials not only testifies to the site's history but also enhances the visitor's perception of spatial progression. This embodied engagement enriches both visual and spatial experiences. From an objective perspective, this chapter examines the MoM's exterior and interior, analysing its institutional role within Derby Museums as well as its individual spaces. With strong spatial continuity and effective functional design, each room within the MoM is assessed in detail. Additionally, visitor feedback - gathered from online surveys and recruited participants from the university - offers valuable insights into the visitor experience.

In conclusion, this chapter serves as the first part of the case study, presenting a key debate regarding one of the most architecturally significant spaces – the Civic Hall and River Kitchen. While general visitors, primarily local residents, appreciate this area as a social hub, recruited visitors expressed concerns that it detracts from the museum's primary function.

5.2 Contextual Overview

Derwent Valley Mills, along the River Derwent, was created to accommodate the new technology for spinning cotton in the 18th century as the first modern factory, and it was recognised as a UNESCO World Heritage Site in 2001. Waterpower was first introduced to England by John Lombe at his silk mill in 1704. In 1910, although the Silk Mill was destroyed by fire, the three-storey new building was rebuilt to the same height instead of five and remains today. In 1974, this site opened as Derby Industrial Museum. In 2016, as part of a £17 million redevelopment scheme, the museum started to redevelop. In May 2021, the museum was reopened with a new name, 'The Museum of Making' designed by Bauman Lyons Architects, located in the city of Derby and adjacent to the River Derwent (Appendix C.1).

5.2.1 Natural and Urban Context
5.2.1.1 Derby Silk Mill and River Derwent

Water as a natural resource was first adopted by John Lombe in his Silk Mill in 1704, and it became the most important engineering power for Lombe's Mill. This mill was built on an island downstream and located on the west bank of the river in Derby, and harnessed the waterpower from the river Derwent to run the silk throwing machines (Figure 5.1). Soon after Lombe rented this little island, he built up an old long brick building with

four hundred and eighty multiple-paned windows (Knight 1843).

In the 18th century, Lombe's mill was not only the ancestor of all

factories but also a regular framed skeleton construction for the

best modern buildings. Along with the Industrial Revolution, in

early 1802, a three-horsepower steam engine was introduced in

this content. Later, in 1849, the machinery in the mill was

powered by the waterwheel and steam engine, which suggests

a dual system at that time (Butterton 2004). When the Derby Silk

Mill was converted into The Museum of Making, which opened

in 2021, the trace of a part of the river Derwent was retained and

designed with special floor tile colours to underline its

importance (Derbymuseums 2023a) (Figure 5.1).
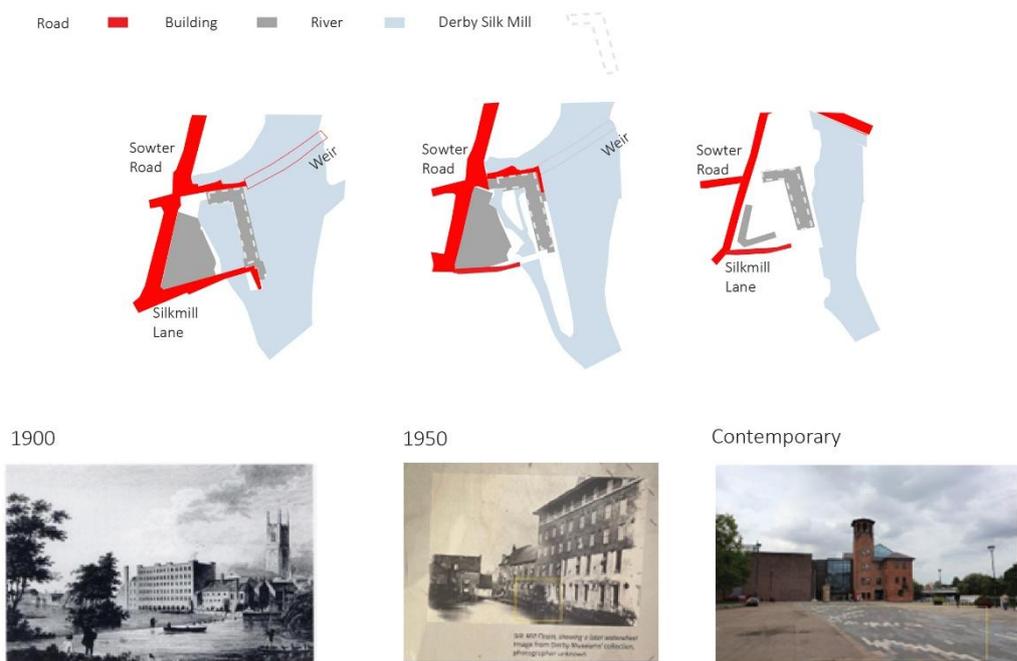
Figure 5 1   The Relationship between River and City Derby & Mill Building. (Source: Drawn by the Author)

Initially, when Lombe's factory began operation, a chimney stack of Cotchett's old mill was replaced by a new bell tower connected to the roof in 1704. In the same year, waterpower was first introduced to England. The old, long brick building with its four hundred and eighty multiple-paned windows had remained on the little island when Lombe rented it (Knight 1843).

In this period, English Baroque building was an important trend in the English architectural scene (Butterton 2004). From the beginning of the enthusiasm for new machinery until the burning down of the mill, the mill building validates a series of historical events. Along with the appearance of industrial technology, unfair employment practices led to the Labour movement in the 19th century, such as the 'Derby Lock Out' in 1833 (Swan 2016).

5.2.1.2 Urban Development

Water was not only a natural resource, but also an accelerator of urban development in Derby. Initially, Derby was a market town. During the industrail era, it rapidly grew up because it was home to Lombe's mill. Its success was aided by Derby's location, as a town of streams and rivers, and the mill could borrow waterpower from these. As a successful Silk Mill, the design of Lombe's mill inspired later cotton manufacturers in this area. Lombe's idea regarding using a large waterwheel to drive a whole series of manufacturing processes spread throughout the whole Derwent Valley Mills. One of the most famous examples is Richard Arkwright's Mill in Cromford, built in 1771; subsequently, other mills were built (Swan 2016).

The line between water-driven and steam engines was very clearly divided into two periods of the industrial era: the mill was built in 1771 to the mill adapted by steam engineers in 1802, and from 1802 the mill was twice set on fired in 1910. As Table 5.1 shows, the population rapidly expanded in the second period. In 1811, was 13,043; in 1891, it was 94,146, in 1901, it was 114,848. Hence, the majority of historical buildings were built in the second period, between 1802 and 1910 (Census 2021 2022).

Before these two periods, Derby Cathedral was a cathedral church with a Gothic and neoclassical style that was built around the 16th century. In the first period, St Mary's Bridge was identified as a special architectural feature that is preserved today. But in the second period, a series of buildings were built, including St John the Evangelist's Church (1826), St Alkmund's Church (1846), Derby Central Library, Derby Museum and Art Gallery (1879), The Strand (1881), Former Education Offices (1893), and the Midland Railway Institute Building (1896) (Heritage Schools 2024; British National Grid 2024).

Table 5 1 Timeline of the Derby Silk Mill Development, Historical Building Construction, and Derby's Population Growth. (Source: Created by the Author)

Year	Derby Silk Mill	Derby Population	Historical Buildings
1771	Water-driven Silk Mill		
1802	Steam Engine		
1811		13,043	
1826			St John the Evangelist's Church
1846			St Alkmund's Church
1849	Dual System (Water wheel and Steam Engine)		
1853	First Fire		
1879			Derby Museum and Art Gallery; Derby Central Library
1881			The Strand
1891		94,146	
1893			Former Education Offices
1896			Midland Railway Institute Building
1901		114,848	
1910	Second Fire		

As Table 5.1 shows, The Strand (1881) forms a terrace of classical-style buildings as a typical Victorian town centre development; the Former Education Offices (1893) was built in Renaissance style; Derby Central Library (1879) was a red brick building in Gothic style; and the Midland Railway Institute Building (1896) was made of iron as the metal architecture which served as a cultural and educational centre for railway workers. Over the past hundred years, as shown in Figure 5.2, two streets - St Mary's Gate and Iron Gate - have remained on this site despite multiple changes to the surrounding land. Additionally, St Alkmund's Church, as an urban artefact, serves as a testimony to urban permanence (British National Grid
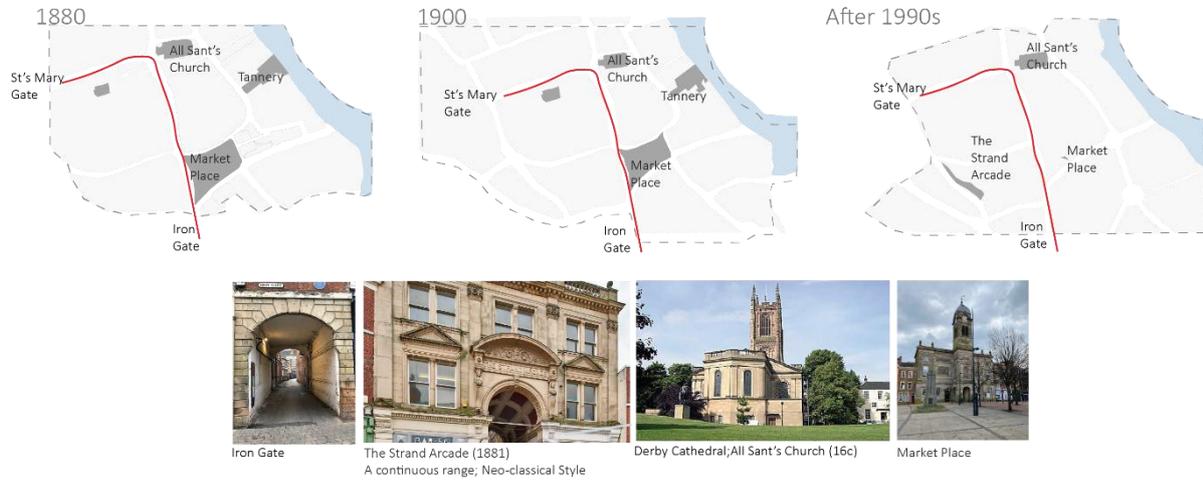
2024).

Figure 5 2   The historical changes of the land in the City of Derby spanning over 300 years. Source: Author and (British National Grid 2024)

5.2.1.3 Time Capsule

Therefore, the Derby Silk Mill was not the sole heritage building located in this city; the whole urban context in Derby contained a rich heritage culture, demonstrating a changing architectural narrative in terms of urban permanence (Rossi 1984).

The first example is that the building characteristics located at 41-47 Waldwick still retain their original cornice and pilasters, and the shop fronts are also reinstated with timber and glazed brick stall risers (Historic England 2018). The second example is the Strand, whose design was heavily influenced by the

Regency-era Burlington Arcade in London as a neo-classical

arcade. It was purpose-built as a premier shopping destination

in the industrial era.

Jane Martine mentioned in the *new museum theory*, that the

museum embodies the official story of a particular way of

thinking at a particular time for a particular group of people; it is

a time capsule (Marstine 2006). It is not just The Museum of

Making, that is a time capsule for recording the industrial history

of Derby through products; its neighbouring areas, including the

entire industrial heritage site (Derwent Vallery Mills) and the rich

urban heritage (City Derby), also inform the time capsule (Figure

5.3). As with museum collections, the well-preserved building

materials historically reflect the physicality of the materials in the

city, they interact with the museum collections. The physicality of

materials can involve an individual image of times past, evoking

experiences and texturing horizons of urban places through

memory (Sharr 2012b).
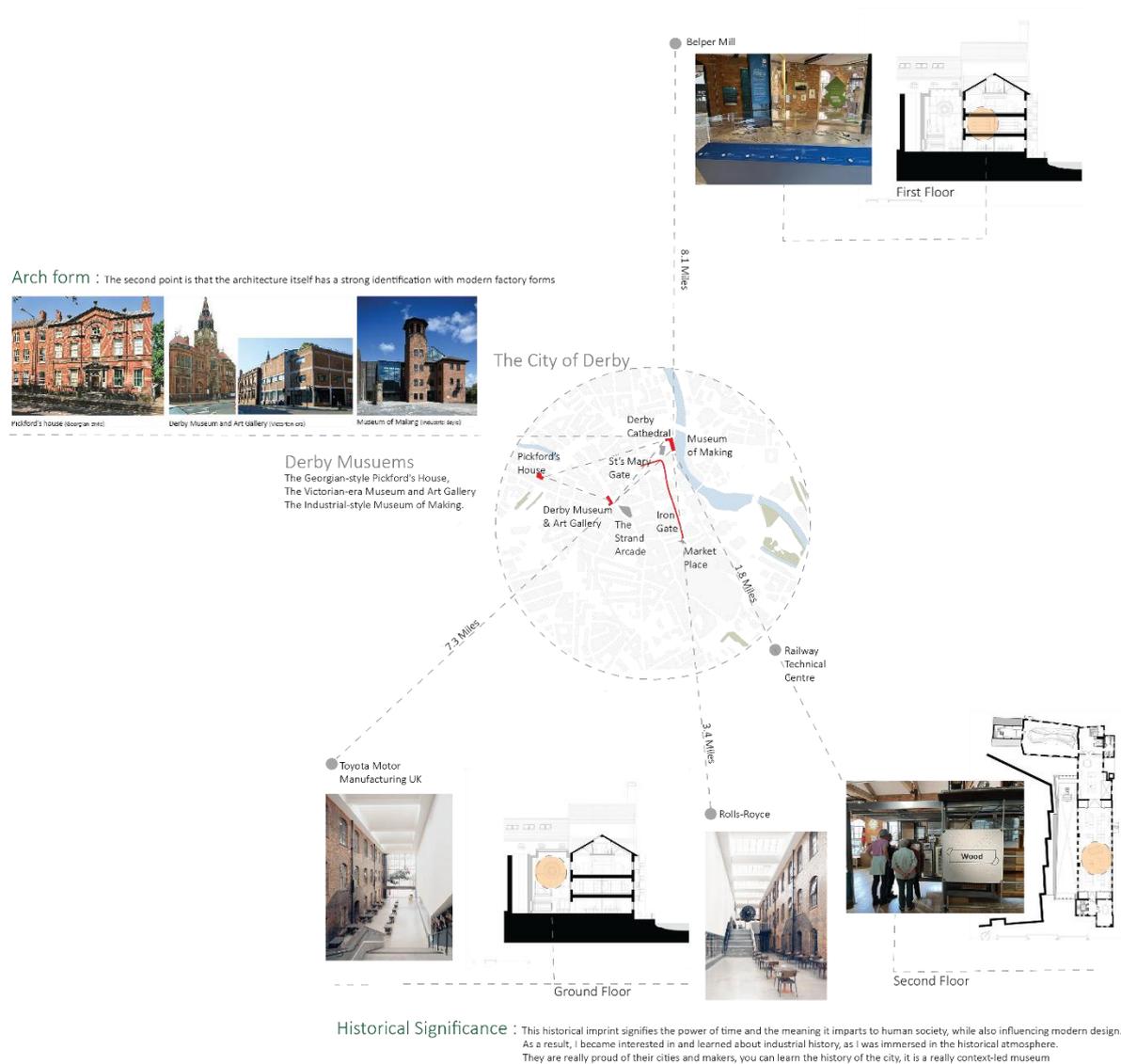
Figure 5 3 MoM as a Time Capsule for Recording the Industrial History of Derby. (Source: Drawn by the Author)

5.2.2 Historical and Cultural Review

5.2.2.1 Historical Events

The city of Derby has a strong historical connection with the

MoM and has experienced four major development stages. They

are Market Town, Lombe's Mill, British Rail Industry, and Engine Manufacture.

The initial market town was established in 1157, and this place still exists today; in 1771, Lombe's Mill was established, and the initial building has been burnt down twice; currently, it functions as the Museum of Making; in 1839, the arrival of the railways in Derby helped the city transform from a market town into an industrial centre. Derby has a long history of building trains which continues today; in 1908, Rolls-Royce established its headquarters in Derby, this luxury car manufacturer also made aircraft engines during the war (Heritage Schools 2024).

Today, these four important stages have been recorded in the MoM through tangible and intangible formats.

At first, in the market town, the museum held an event called the 'assemblage' on 23rd Oct 2021. In this event, the owner brought their products to sell local handicraft products within and outside of the museum. It is a market held by the museum (Derbymuseums 2021). Although it is a trade and displays the heritage value of traditional crafts, it is an intangible format that presents the earliest historical value as the market town.

Secondly, Lombe's Mill is the first fully mechanised factory in the world, as the waterwheel is the modern power for running the Silk Mill, the trace of the water wheel was preserved and presented as a dark circle as the historical evidence. Thirdly, the physical connection of the establishment of the home of British Railways was the area of the open gallery in the Assemblage room, where many old photographs connect residents' memories regarding their workplace. The fourth important historical element is regarding Rolls-Royce: its exhibition area is on the shop floor, from the big-scale Rolls-Royce Trent 1000 to some smaller engines, illustrating the many ways in which the company connects with this city's industrial history.

5.2.2.2 Cultural Heritage

The Culture Strategy for Derby aims to create an experience based on its heritage as a city of innovation, creativity, and making. The City Council would like to establish a 'creative quarter', which means this city is expected to be the first choice for artists and creative people (Derby City Council 2022). To restore the vibrancy of the existing historical buildings, creative industries, artists' studios, and maker spaces will be alongside building users, including bars, restaurants, galleries, workshops and residential. The city of innovation originates from Lombe's

Mill, which developed along with British Rail and engine

manufacture. In the nearly 300 years of history, the major

innovation has been the creation of engines to improve

the productivity of making, from making silks to making railways

to making cars and aeroplanes.

Today, the MoM still offers various opportunities for local artists

and designers to develop their inherited 'making' spirit, within

the 'maker-in-residence' scheme (Higgins 2022). These various

opportunities include setting up the room of the Workshop

(Ground Floor), exhibiting the video wall to promote local artists'

studios in the Throwing Room (First Floor), inviting artists to

exhibit their work in the Warehouse (Third Floor), and selling

artists and designers' work in the Hub (Third Floor) and Shop

Floor (First Floor).

On the ground floor, the Workshop room is the 'engine' of the

museum. In this room, unfinished and finished furniture, shelving

and fixtures are made; residents can book the place to create

but are guided by professionals (Derbymuseums 2023a). On the

first floor, the video wall is embedded into the curved form of the

exhibition; it consists of 24 small screens instead of just one. In

front of the video wall, a chair is placed. The whole area looks

like a small cinema to attract visitors. On the third floor, the Warehouse is used to exhibit the temporary exhibitions and normally changes twice a year. On 21st October, a 12.3 square metre Lego model of the Lake District was displayed and also the artist was also invited to come and talk with visitors (Derbymuseums 2024).

To summarise, from the City of Derby to the MoM, from the past until today, the inherited 'making' spirit is deeply embedded into the city's lives and lively spaces, both urban and natural. As Gregory Bateson, the English anthropologist states, making a separation between man and nature is not a good idea, the reason being that the 'unit of survival' is organism plus environment (Ballantyne 2016). Here, the environment is not just indicated by nature; it is a milieu, consisting of the people, physical, and social conditions and events that provide the environment in which people act or live. The Museum of Making as an example represents how to establish connections between people's lives and their environment, from 1157 until today.

5.2.3 Community Engagement

To create a high-quality museum space that authentically represents local traditions, a place-making approach must go

beyond a simple historical and cultural review. It is essential to

consider the engagement of the local community and how it

integrates into the overall visitor experience (Morse 2021; Block

2018). With different occupiers of the industrial building -

whether as the Derby Silk Mill or the Museum of Making - both

iterations have been facilitated by local involvement, a

contribution that has been acknowledged by the City of Derby.

5.2.3.1 Industrial Era

During the industrial era, schools were developed as highly

controlled environments to drill people for the economy (Kuhn

2012). Within the Silk Mill, various floors of the building are

occupied by machinery, and the production process is roughly

divided into five parts, including hanks of silk being brought to

the factory, winding, spinning, throwing and tagging (Knight

1843).

As Figure 5.4 shows, a large number of employees were

females, and they were trained to provide a reliable and

productive workforce. In mill rooms where girls and women were

engaged in their work, a song would be a not infrequent

accompaniment to the clacking, thumping and humming of the

machinery (Knight 1843). This type of training system was

locked in this era in a specific space and time. Working in the

Silk Mill, the programme might involve children who learnt subsistence skills from their same-sex parent or a specialist. The story of social activities like a linear sequence happened in the mill, whether from a household or silk business perspective. As time passed, the new workers grew up from children to become parents themselves; the raw materials were passed into the assembly line from winding to tagging, becoming textiles. Until 1833, from the evidence of factory inspectors about child labour, the dire economic pressures impinging upon their parents led them to collude with mill owners to break the restrictions upon the employment of their children (Butterton 2004). The labour dispute between factory owners and workers lasted six months in the same year, and the whole country was astir with the development of the trade union movement. Outside of the museum, there is a pub called the Old Silk Mill, and its external wall shows a featured mural that depicts this conflict (Figure 5.4).

Figure 5 4   Photography for the employees of the MoM in 1908 and a mural shown in the Old Silk Mill. Source: (Doward 2021) and Photos taken by the Author

5.2.3.2 Post-Industrial Era

In the Post-Industrial Era, to attract both regular users and occasional visitors, the industrial building – now repurposed as the Museum of Making – functions as a spatial agent, offering a dynamic environment for a variety of workshops and activities. To convert the Derby Silk Mill into the Museum of Making, architects chose to use a present-day language with historical structure and materials, deliberately working directly with the existing environment (Brooker 2018).

This approach allows for creative reinterpretation, where traces of the past blend seamlessly with new uses, offering visitors a layered and immersive experience.

Regular Users

Regular users attend the museum's workshops and events, which focus on STEAM (Science, Technology, Engineering, Art, and Mathematics) (The National Lottery 2022). With guidance from professional technicians, participants can choose courses at varying skill levels, from beginner to advanced. The Workshop Room, located on the ground floor, is specifically designed to accommodate machinery and equipment, while also displaying unfinished and finished projects on shelves and walls. This open space, illuminated by 12 original windows, subtly echoes the past, where training programmes were once highly controlled environments that prepared workers for the industrial economy (De Certeau 1984).

Occasional Visitors

Occasional visitors fall into two categories: event attendees at the Italian Mill, and museum visitors. The Italian Mill functions as a flexible event space (Forty 2000), available for hire for various occasions, including weddings, award ceremonies, conferences, and live performances, and a bar is installed nearby for catering needs. The River Kitchen, located at the back of the Italian Mill, serves locally sourced food and drinks. Visitors can meet

friends, relax, or socialise, making the museum more than just a place for exhibitions – it becomes a community hub.

From the Derby Silk Mill to The Museum of Making, from mill workers to modern-day makers, an inherited culture – the spirit of 'making' – still remains embedded in the fabric of this 300-year-old industrial building. At the same time, the meaning of culture today is shaped by a continuous dialogue between past and future, across different communities, encouraging people to become active participants rather than passive observers (MS01 2024). These dynamics reinforce the relevance of making in both historical and contemporary contexts.

5.3 Experiences of Materiality

After reviewing the overall context of the main case, this section introduces the exposure to temporal building materials to perceive the unity and simultaneity of space. As mentioned in Chapter 3.3 Industrial Buildings' Lifecycle, materials serve as distinct evidence of its transformation, embodying the thickness of time. Focusing on the main case – The Museum of Making – this section highlights three key aspects to interpret the historical and modern materials.

First, the restoration stage - involving architects, civic and

structural engineers, and contractors. Second, contemporary

reading – relating to the visual perception of materials. Third, the

relationship between materials and occupied space.

5.3.1 Restoration Stage

As a regeneration project, the site, originally known as Derby

Silk Mill, operated as the Derby Industrial Museum until 1974.

The new project commenced in 2016 and reopened under the

name The Museum of Making in 2021.

Table 5 2   Roles and Responsibilities of Architects, Engineers, and Contractors in the MoM Project (Source: Created by the Author)

Consultant	Architect	Civil and Structural Engineer	Contractor
Company	Bauman Lyons	GCA Consulting	Speller Metcalfe
Early Stage	2015- Ground Floor was refurbished	Conceptual Design	Redevelopment of the Ground Floor
Formal Stage	Experimental phases	Physical Investigation	Strip out and renovate the remaining four floors
	Prototyping with audiences, volunteers and partners	Retention of existing first and second Floors	Create an additional mezzanine level to provide a state-of-the-art new museum, which is completed by the new Civic Hall extension

	Furniture, fixtures and fittings; programme events and activities	Design a thin-profile ground floor to encapsulate the existing asbestos	

According to the architect, civic/structural engineers, and contractors, the project unfolded in two stages. The first, occurring before 2016, involved the redevelopment of the ground floor; later, engineer consultants contributed to the conceptual design. The second, the formal stage, followed a people-centred and participatory approach, as mentioned by Suzanne Macleod (MacLeod 2020a). She noted that this project could be considered the first major museum to adopt people-centred and participatory methods. To align with this participatory framework, the project incorporated three levels of involvement (UK Goverment 2024), ranging from light-touch involvement, such as consultation, to structured deliberation including citizens' assemblies, as shown in Figure 5.5.

1. Adapted from the International Association for Public Participation; see https://cdn.ymaws.com/www.iap2.org/resource/resmgr/pillars/Spectrum_8.5x1_Print.pdf
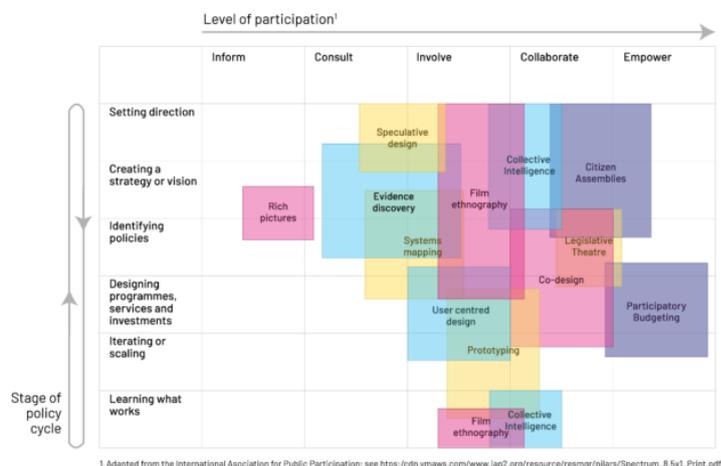
Figure 5 5   Different Levels of the Participatory Framework in UK Policy (Source: UK Government)

GCA Consulting, serving as the civic and structural engineer, participated in the early conceptual design stage. In the formal stage, as Macleod stated (MacLeod 2020a), the project followed a two-fold logic. First, it involved collecting the needs and desires of visitors. As Bauman Lyons, a Leeds-based architectural firm, noted, volunteers and partners were invited to participate in experimental prototyping phases. Second, it engaged the public in contributing ideas and hands-on making through asset-based community development. This hands-on making involved with visitor participation also reflect Bauman Lyons' project overview, which includes furniture, fixtures, and fittings, as well as programmed events and activities.

Figure 5 6　Experimental Prototyping Phases and Public Engagement in the MoM. (Source: Bauman Lyons Architects Leeds)

During the construction process, after completing the physical investigation, GCA Consulting decided to design a thin-profile ground floor to encapsulate existing asbestos. This solution retained the existing ground and first-floor structures. Figure 5.7 illustrates the original existing building and the encapsulation process within the Civic Hall.

Figure 5 7　The Original Existing Building and the Encapsulation Process within the Civic Hall. (Source: GCA Consulting)

5.3.2 Visual Perception from Materials

The Industrial Revolution had a profound impact on building materials. Due to technological development, traditional building materials such as stone, brick, and wood were gradually replaced by modern materials, such as cast iron, glass,

and cement. These early changes first emerged in the mills, as they expanded to serve the national and international markets. The production of iron and steel became fundamental in shaping new structures and typological designs for these factories. Early textile mills were constructed with iron skeleton structures and brick facades, a style often referred to as the 'English style' (Oevermann et al. 2022).

Referring to 3.3.3.1 Museum Heritage Site, the Ironbridge Gorge represents the first structure in the world made entirely of cast iron, marking a significant milestone in material innovation. Similarly, 3.3.3.2 Museum Heritage Exhibition highlights the main mill at Shrewsbury Flaxmill Maltings, recognised as the first iron-framed building in the world. These pioneering structures exemplify the transformative role of iron in industrial architecture.

From the Derby Silk Mill to the Derby Industrial Museum and, eventually, the Museum of Making, the evolution of materials reflects a striking contrast. The transition from the red bricks of the Edwardian period to contemporary materials such as steel and glass creates a layered visual impression. This adaptive

reuse of old and new materials results in a unique architectural composition (Zumthor 2006).

From a modern perspective, the use of red brick and steel in both industrial and post-industrial buildings enhances the material's surface depth, particularly in response to weathering (Mostafavi and Leatherbarrow 1993). Exposure to these mixed materials involves sedimentation and the accumulation of residual deposits, while the processes of subtraction (stripping out) and addition (renovation) serve as a testimony to the building's history (Littlefield and Lewis 2007).

While viewing a building allows for a surface-level reading, perceiving its materials offers a deeper interpretation. In this industrial building, perception carries a powerful temporal dimension (Hale 2016). For instance, material changes on the ground floor are particularly significant, as visitors are invited to interpret the collection based on their own perspectives. Even though this floor primarily facilitates social activities rather than exhibitions, it still evokes a sense of curiosity.

Materiality serves as a medium that connects visitors to the past. As they move along the route from the Civic Hall to the Italian Mill, a sense of spatial progression emerges, allowing

them to immerse themselves in the surroundings. As Merleau-Ponty describes, this phenomenon represents a 'lived space', where the visitor's body becomes the origin of spatial experience rather than the collections themselves (Hale and Back 2018). This form of perception begins through material interactions with the surroundings, including the tactile engagement of the body with both old and new building materials (Griffiths 2023).

5.3.3 Materials and Occupied Space

The Civic Hall and River Kitchen serve as extensions of the MoM. As noted by the constructor, Speller Metcalfe, this space includes an additional mezzanine level designed to enhance the museum's state-of-the-art facilities. The newly constructed section acts as a backdrop, with its white-painted grafted wall illuminating the original architectural form. In contrast, the existing wall of the historic structure remains exposed, preserving traces of the former waterwheel. The juxtaposition of materials accumulated over time is particularly evident in the Civic Hall, the museum's central transformational space. This dramatic entrance area functions as both a welcoming space and a circulation hub (Pearman 2021).

Notably, the industrial wall was originally the exterior boundary of the Derby Silk Mill in the 19th century, marking the separation between interior and exterior spaces (Shown in Figure 5.8). Today, this wall has become an interior partition, delineating flexible space (Italian Mill) from fixed space (Civic Hall). The triple-height atrium, connected by this industrial wall, is an addition to the existing building, constructed with steel and glass. On one side, the grafted wall is painted white, while on the other, the red Edwardian brick of the historic industrial building has been carefully preserved. Visitors seated in the River Kitchen café experience a striking visual contrast between the contemporary white wall and the three-hundred-year-old red brick wall, immersing them in the layered materiality of the space. This interplay of old and new materials evokes curiosity, encouraging visitors to explore the space through bodily engagement and to imagine its past. The original building materials serve as tangible evidence of the site's temporal dimension, enriching the visual and spatial experience.

Visual perception is the first step in arousing a primitive, instinctive response to the space. This initial impression evolves into a deeper, embodied experience shaped by historical aesthetics. At this stage, perception becomes a complex

synthesis involving language, emotion, sensation, touch, and

anticipation. By physically interacting with both historical and

contemporary materials, visitors construct an imaginative image

that blends past memories with present experiences. This

informed perception, shaped through embodied engagement,

defines human embodiment in a specific space and time

(Connolly 2010).
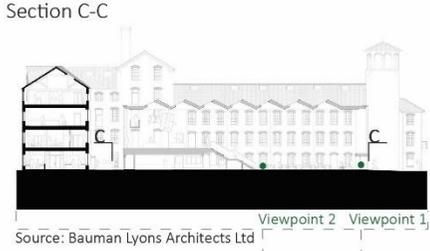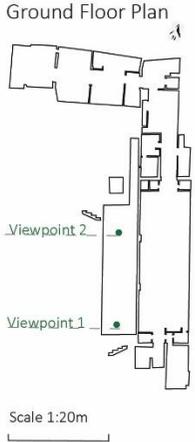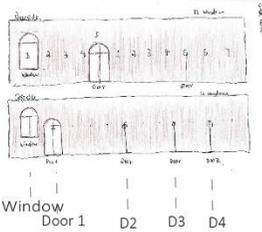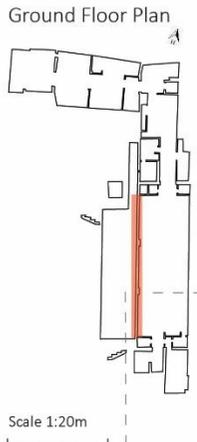
Ground Floor Plan

Viewpoint 2

Viewpoint 1

Scale 1:20m

Section C-C

C   C

Viewpoint 2   Viewpoint 1

Source: Bauman Lyons Architects Ltd

Cafeside

Wall Details

Window

Door 1   D2   D3   D4

Riverside

Ground Floor Plan

Scale 1:20m

Civic Hall

Italian Mill

This wall has become an interior partition,
delineating flexible space (Italian Mill) from fixed space (Civic Hall).

1910

2016

The industrial wall was originally
the exterior boundary
of the Derby Silk Mill
in the 19th century.

Design with special colour of
tile to underline
its importance as the rive before.

Figure 5 8   The Industrial Wall of the MoM. (Source: Drawn by the Author)

5.4 Spatial Arrangement

This section examines the spatial arrangement of the Museum of Making, focusing on spatial continuity, functional spaces, and visitor feedback. By analysing how spaces connect and interact, this discussion highlights the museum's role in shaping visitor experiences through its architectural and design choices.

5.4.1 Spatial Continuity

As discussed in Section 5.2.1.2, the MoM is not an isolated entity but is deeply connected to the city, particularly in terms of spatial continuity, both horizontally, from outside to inside, and vertically, from bottom to top. This spatial continuity is not solely perceived through visual impressions but also through bodily engagement, as architecture is experienced through the enclosure of space at a tangible scale (Walker 2004).Beyond its physical boundaries, the MoM extends its presence into the urban fabric, creating a broader network that integrates the museum within the city and the wider industrial landscape.

5.4.1.1 From Derby Museums to the Museum of Making

The Derby Museums comprise three distinct institutions: the MoM serves as a contemporary space chronicling Derby's 300-

year history of making; the Museum and Art Gallery is a repository of diverse collections, including fine art, archaeology, and natural history; Pickford's house is a house museum dedicated to the life and work of Derby architect Joseph Pickford, converted from his self-built Georgian residence.

Although each museum maintains its own identity, they are interconnected through both physical proximity and thematic links, and the three are expected to form a network (MS01 2024). The MoM is just a seven-minute walk from the DMAG, an 11-minute walk from Pickford's House, and the distance between the DMaAG and Pickford's House is only six minutes (Figure 5.9).

The MoM, originally an industrial mill built in 1717 and later converted into the Derby Industrial Museum in 1974, contrasts with the Georgian-style Pickford's House and the Victorian-era Museum and Art Gallery. Despite these architectural differences, exhibitions and workshops across the three sites are strategically coordinated to encourage visitor engagement, fostering a cohesive and immersive museum experience (Figure 5.10).
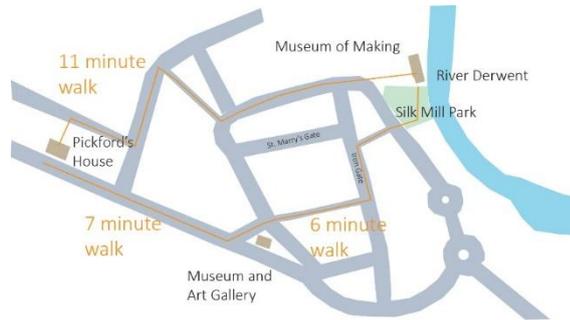
Figure 5 9   Walking Distances Between Pickford's House, Derby Museum and Art Gallery, and the Museum of Making (Source: Derby Museums Guidebook)

Figure 5 10   The Georgian-style Pickford's House, the Victorian-era Museum and Art Gallery, and the Industrial-style Museum of Making. (Source: Created by the Derby Museums)

5.4.1.2 From Outside to Inside

The MoM features multiple entry points, each offering visitors a distinct approach to the museum. These access routes include pathways along the River Derwent, through Derby Cathedral, and from the museum's dedicated parking area. While signage and external features provide visual cues to guide visitors

toward the entrance, some routes - particularly from the parking area - lack clear directional signage, which can cause a certain degree of confusion.

Figure 5 11   Three entry points include 'Natural Way', 'Urban Way' and 'Parking Way'. (Source: Drawn by the Author)

The 'Natural Way' – Alongside the River Derwent

The first entry route (1 of Figure 5.11) follows the River Derwent, passing through the Derby River Gardens. Along this path, a brass plaque commemorates Prince Charles Edward Stuart's arrival in Derby on December 4, 1745, marking the historical significance of the site. This route offers a seamless, intuitive approach, as visitors naturally encounter the museum's façade, which distinctly signals its industrial heritage. Further along, the

Peregrine Falcons Mural, a cultural landmark, draws attention and serves as an inscription welcoming visitors.

The 'Urban Way' – Through Derby Cathedral

The second entry point (2 of Figure 5.11) leads from Derby Cathedral in the city centre, guiding visitors into Silk Mill Park, where the MoM is located. This urban approach is more intricate, as visitors must navigate narrow, less-visible roads behind the cathedral before reaching the museum. Within Derby Silk Park, several art installations (Figure 5.12) hint at the museum's industrial theme, subtly reinforcing its identity.

The 'Parking Way' – From the Museum's Parking Area

The third route (3 of Figure 5.11) is via the museum's parking area, located on the opposite side of Sowter Road. This entrance connects to the Silk Mill Derby Pub, which features a mural (Figure 5.12) depicting the Labour Movement. However, signage for the MoM is less prominent in this area, making it less intuitive for visitors approaching from this direction.

Labour Movement Mural   Peregrine Falcons Mural   Art Installation   Brass Sign

Figure 5 12   Cultural Signages display near the MoM. (Source: Photos taken by the Author)

Each entry point provides a unique spatial entry experience, influencing how visitors perceive and engage with the museum. According to the researcher, while the natural and urban routes create an immersive lead-in to the museum's historical and industrial context, the parking route lacks the same level of clarity and integration. Addressing signage inconsistencies could enhance wayfinding and improve visitor orientation.

5.4.1.3 From Bottom to Top
The internal journey through the MoM begins with a long and narrow L-shaped space, guiding visitors through its multi-level layout. As a four-storey building, the museum features key vertical connections that facilitate movement between floors, particularly in the riverside section of the original structure.

There are two primary circulation routes linking different levels:
one is a central staircase (Figure 5.13, Staircase 2) connecting
the ground and first floors, situated in the middle of the new
extension; the other is two additional staircases (Figure 5.13,
Staircase 1 & Staircase 3) positioned at the front and middle
sections of the building, providing alternative vertical
connections.

The top floor, which was refurbished to offer a panoramic view
of the entire Silk Mill Park, serves as a key vantage point within
the museum. Visitors can reach this level directly via lifts,
located at both the front and middle sections of the building. This
unobstructed vertical transition allows for a continuous visual
and spatial engagement with the heritage site, reinforcing the
museum's connection to its industrial surroundings.

Figure 5 13   The Position of Three Staircases within the
Ground Floor of the MoM. (Source: Drawn by the Author)

Ground Floor Plan

Staircase 3

The Workshop

The Old Shop

Staircase 2

Italian Mill

Staircase 1

The Civic Hall and River Kitchen

The Workshop

Aisle

Viewpoint

Exhibition nearby the staircase

The Old Shop

Italian Mill
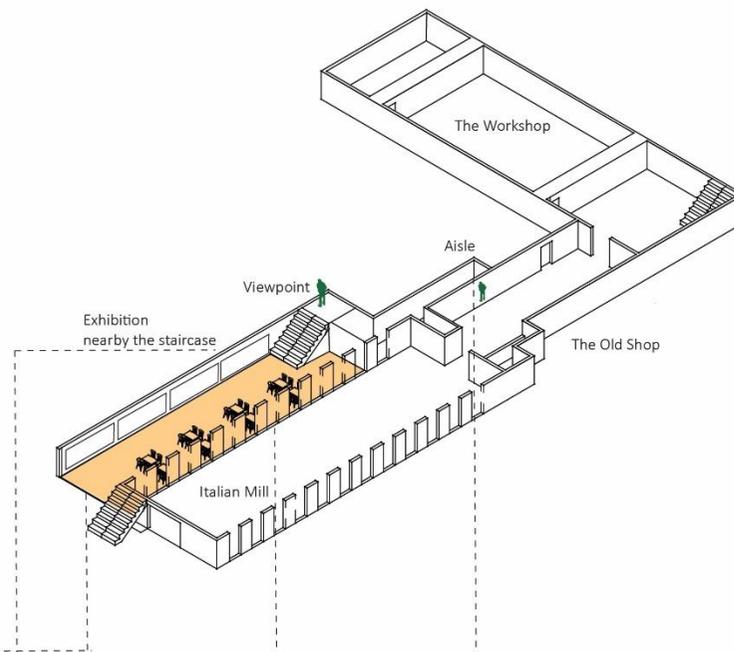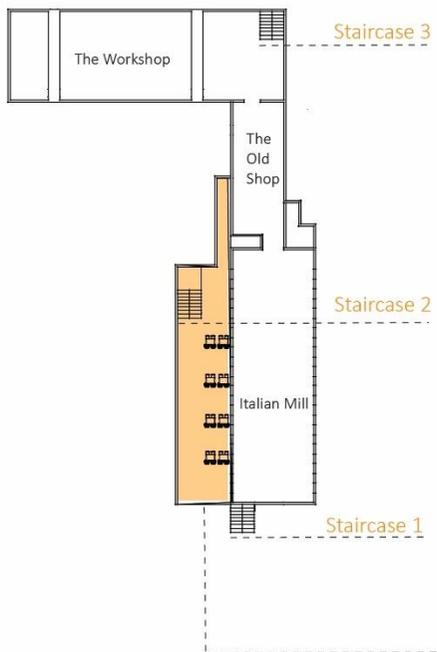
5.4.2 Functional Space

5.4.2.1 Museum Café
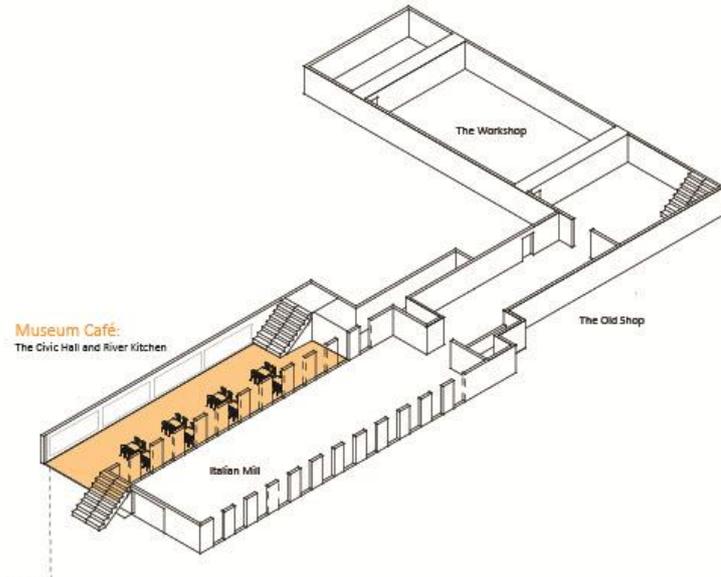
Figure 5 14   The Civic Hall and River Kitchen serve as the Museum Café within the MoM. (Source: Drawn by the Author)

The Civic Hall and River Kitchen, located on the ground floor, serve as the central atrium of the MoM, playing a pivotal role in shaping visitor experiences. The museum café, known as River Kitchen, is seamlessly integrated into the museum space, functioning as both a social hub. In addition, the Civic Hall is an extension of the exhibition environment. The design elements of the whole space, including vertical layering and industrial aesthetics, contribute to a distinctive atmosphere that embodies the museum's historical and contemporary narrative.

One of the defining spatial features of River Kitchen is its vertical layering, which is emphasised by the staircase positioned on the left side of the new building (Figure 5.14). This strategic placement maximises open space for the café, creating a balance between movement and stillness. The interplay of dynamic and static rhythms within the space evokes a sense of bodily engagement, encouraging visitors to navigate and experience the area in a multisensory way. Visually, the staircase and River Kitchen appear to divide the new building into two sections, yet the placement of tables and chairs extends the café's presence without disrupting the spatial flow.

The staff station, positioned at the front of the staircase, is a particularly flexible workplace in front of this space. While it serves an operational function, its placement slightly interrupts the perception of movement within the space. Despite this, the museum's industrial atmosphere is strongly reinforced, emphasising sensory engagement as a core component of the visitor experience. The museum café is embedded within a striking contrast of materials and colours, where contemporary white walls juxtapose original red brickwork, creating a visually compelling dialogue between past and present. This contrast visually expands the narrow space, seamlessly connecting the

old and new sections of the museum while evoking a deeper sense of historical continuity. In addition to colour contrast, material textures play a crucial role in enhancing the industrial ambience. The careful restoration and exposure of original materials under natural light emphasise the museum's authenticity, heightening visitors' sensory perceptions and reinforcing the significance of Derby's manufacturing heritage.

Overall, the Museum Café serves as a key component of the MoM, fostering social interaction and immersive engagement through its thoughtful spatial design, material integration, and industrial aesthetics. By blending functionality with historical resonance, it enhances the museum's role as both a cultural and communal space.

5.4.2.2 Museum Exhibition
The museum exhibition, located on the first floor, features a clear boundary between the Gateway and the Throwing Room (Figure Shown in 6.2 Intellectual Experiences in the MoM).

The Gateway introduces the story of the Derwent Valley Mills World Heritage Site, recognised as the birthplace of the modern factory system. This room displays newspaper articles, such as *Derby Locked Out*, a painting depicting a prospect of Derby,

interactive devices illustrating waterwheel-powered silk production, an interactive map showing mills spread across the Derwent Valley, silk products manufactured at the Silk Mill, and letter copybooks from mill workers. The Throwing Room, serving as the museum's main gallery, consists of ten circular display structures that create semi-private spaces for visitor engagement. This space explores various historical periods in Derby, Derbyshire, and beyond, incorporating both traditional exhibits and interactive elements such as art installations, video walls, and a postcard wall to provide a dynamic, immersive experience. Between these two rooms, there is a key link between the Gateway and the Throwing Room, which is the *Listen to the Podcast* station and a video presentation of a real Throwing Room, helping visitors connect historical narratives with lived experiences.

Here, sound plays a crucial role in linking the space to shape the visitor experience. On one hand, the realistic factory sounds in the Gateway act as a thematic episode, complementing the workers' letter copybooks. On the other hand, the Podcast station offers historical context on the Silk Mill's development, focusing on the lives and working conditions of mill workers. Beyond sound, the exhibition engages visitors through multiple

sensory experiences: reading mill workers' letter copybooks, observing the inner workings of a throwing machine, listening to realistic machine sounds, and exploring workers' stories through Podcasts.

These four elements serve as key interpretive nodes, creating a small yet authentic environment that organises meaning, knowledge, and emotion to enrich visitors' cultural experience.

5.4.2.3 Museum Archive

At the heart of the museum's archive, the Assemblage Room serves as a dynamic space catering to researchers, academics, and the general public. Unlike conventional archives focused purely on storage, this space fosters human connections between visitors and objects (Fink 2006), allowing for an interactive exploration of Derby's industrial heritage (Figure 5.15).

Rooted in the historical tradition of Cabinets of Curiosity, referring to 4.3.1.2 Cabinets of Curiosity. The Assemblage Room presents its collections in a grid-like arrangement, categorising objects by material rather than chronology. This approach mirrors the historical diversity of industrial production, offering visitors an intuitive and tactile experience.

One distinctive feature of the collection is its emphasis on everyday historical items. For instance, teacups still bearing tea stains provide a tangible link to the past, sparking imagination and personal reflection. These artefacts evoke a strong emotional resonance, allowing visitors to connect with history on a deeply personal level. Although the Assemblage Room lacks a strict organisational structure and detailed object descriptions, museum staff emphasise the importance of human engagement in enriching the visitor experience. Through guided exploration and conversation, visitors gain deeper insights into the historical significance of these artefacts, reinforcing the museum's mission to preserve and showcase Derby's industrial past.

Rather than a traditional, static collection, the Assemblage room embodies a fluid and interactive approach to archiving, where visitors are encouraged to explore industrial collections freely, touch and engage with select objects, imagine the historical narratives behind everyday items and engage with museum staff for deeper interpretation. This innovative format transforms the archive into a living space, fostering curiosity, learning, and personal connections to history.
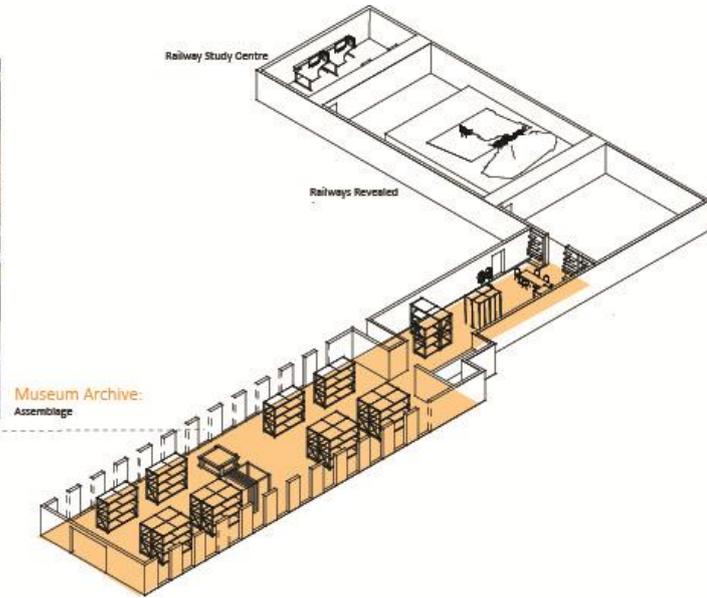
Figure 5 15   The Assemblage room serves as the Museum Archive within the MoM. (Source: Drawn by the Author)

5.4.2.4 Beyond Functional Purposes

Exhibitions, the primary function of museums, will be discussed in Chapter 6. However, beyond their functional purposes, spaces such as the museum café and archive serve not only as supplementary facilities but also as significant social and historical mediums, fostering connections between people, the past, and the present. These spaces act as bridges between communities, knowledge, and cultural heritage, reinforcing the role of the MoM as a space for both leisure and knowledge exchange.

The museum café, located in the Civic Hall and River Kitchen on the ground floor, serves as a vital social hub connecting residents and visitors of the City of Derby. More than just a place for food and drink, it functions as a 'third space' for social interaction - a concept that emerged during the Industrial Revolution when home and workplace became increasingly distinct, both physically and socially. Furthermore, it offers visitors new and engaging experiences, providing a temporary escape from everyday life (Falk 2011; De Certeau 1998).

Unlike the structured environments of home and work, the museum café provides a low-cost, inclusive setting where individuals from diverse backgrounds can gather, engage in informal discussions, and participate in cultural exchange. This neutral, communal setting fosters informal discussions, cultural exchange, and a sense of belonging. Ultimately, the museum café operates not just as a physical setting but as a social hub, facilitating connections and community-building among its visitors (Oldenburg 1999).

The Assemblage Room, located on the second floor, acts as a historical medium, fostering a connection between the past and present. This space closely resembles a library, emphasising

the act of reading, discovery, and curiosity-driven learning. Visitors are encouraged to freely explore the collections, which are organised by material and displayed in a grid system of numbers, letters, and colours – a design that invites both wandering and wondering.

Unlike conventional museum archives focused purely on documentation, the Assemblage room serves as a living space where visitors can engage tactilely and intellectually with historical artefacts. The objects on display extend beyond industrial history, offering insights into Derby's rich cultural heritage. In addition to passive observation, the workshops held within the Assemblage Room act as another historical medium, preserving and passing down the spirit of making from past to present. These hands-on experiences allow visitors to actively engage with traditional techniques, mirroring the apprenticeship system that once defined industrial craftsmanship.

Historically, the Derby Silk Mill played a pivotal role in industrial history. Established as the first fully mechanised factory in the world, it introduced water-powered spinning technology, replacing the traditional spinning wheel and marking the beginning of a technological revolution. Today, the workshop

space continues this legacy by encouraging creativity,

innovation, and skill-building. Through hands-on participation,

visitors bridge the gap between historical knowledge and

contemporary practice, much like how newcomers and

experienced craftspeople once exchanged expertise in

traditional workshops. In doing so, the MoM not only preserves

its historical significance but also actively develops and evolves

the making spirit for future generations.

5.5   Evaluating Museum Architecture

As discussed in 2.3.2.1 Phenomenological Observation,

understanding the nature of a particular phenomenon requires

exploring lived experiences from two perspectives: the

researcher's and the visitors'. The previous section focused on

spatial analysis from the researcher's perspective, while this

section presents data gathered from two different visitor groups.

Referring to the 2.3.2 User Studies, the first group consisted of

natural visitors, mainly local residents, as shown in Table 2.4.

The second group comprised recruited visitors, primarily

international participants, as shown in Table 2.5.

As shown in Figure 5.16, the interpreted data compares the

museum experiences of two visitor groups by measuring the

frequency of key words mentioned. In total, terms related to museum architecture appeared 11 times, while those related to museum interpretation appeared 41 times. The analysis also reveals differences in visitor profiles: recruited visitors (second group) recognised the importance of architectural design, whereas general visitors (first group) did not. This difference may be explained by the fact that 70% of the recruited visitors had an architectural background. The following data is organised floor by floor and room by room, presenting visitors' qualitative feedback on the MoM's architecture. In particular, the process of detailed time-spend measurement from recruited visitors is shown in Appendix C.2.

The Summary of the Evaluation of Recruited Visitors in the MoM

Ground Floor

First Floor

Second Floor

Legend:
- Arch Space
- Arch Space (N)
- Musuem Interpretation
- Musuem Interpretation (N)
- Events (N)

Ground Floor

Old Shop
- Cinematic Scene
- Human Photos
- Light and Size Contrast

Entry

Civic Hall
- Rolls-Royce Engine
- Less Special and Focus
- Historical Significance
- Industrial Atmosphere
- Community-Driven Social Space
- Lose Sound and Odour
- Lack of Signage
- Appreciation of the Products
- The Link between Musuem and City
- Toyota
- Obstructed

Recruited Visitors

First Floor

Gateway Room
- Industrail Atmosphere
- Authentic Milieu
- Interaction
- Product
- Interative Device (System of Cogs)
- Timeline of Global Cotton Connection
- Auditory Spatial Perception
- The Link between the Object and Space (Video and Space)
- Interactive Map (Derwent Valley Mills)

Throwing Room
- Various Paintings
- The Table
- The Dialogue (With simple instructions to assemblage)
- Table
- Lack Professional Collections
- Curved Forms
- Signage of the Display
- Narrative way regarding colonialism from different perspective
- Excellence Engineers
- Building Derby
- The Dialogue(Add Something)
- Video Demonstration
- The Dialogue (Writing up your feelling)

- Interative Device (System of Cogs)
- Balcony
- Interative Map (Derwent Valley Mills)
- Interative Map (Derwent Valley Mills)
- Podcast
- Table
- Limit of Nature
- Excellence Engineers
- Building Derby
- Interative Device (Art Installation)

Recruited Visitors / General Visitors

Second Floor

Assemblage
- Table
- Cloth Samples
- Table
- Tools
- The Model of the Water Bomb
- The Model of the Water Bomb
- The Model of Fashions
- Trail Maker
- Material Samples
- The Model of Fashions
- Antique Shop
- Drawers
- Staff
- Window and Lights
- Tactility
- Materialities
- Trail Maker
- Paint
- Trail Maker
- Resonance
- Researching
- Old Picture of the Industrial Factory
- Staff
- Old Picture
- Intriguing
- Open Gallery
- Printer Press
- Book
- connetcted to the Family History
- Social Hub
- History Significance
- Category
- Shelves/Open Storage
- The Model of the R&R Soar Engine
- The Model of the Navel Boat

Recruited Visitors / General Visitors

Findings of Colour Coding

Data Analysis

Museum interpretation > Architectural Design

(Words related to the Museum interpretation have been mentioned 11 times, and words related to the Architectural design have been mentioned 41 times. Recruited visitors realised the importance of the Arch Design, but General Visitors did not.)

Architectural Design =
Emotional Charge caused by authentic industrial atmosphere + Tables/Drawers + Lights

(In the Architectural Design, the emotional charge caused by the authentic industrial atmosphere has been mentioned 5 times, including historical significance from industrial wall, resonance and re-search after playing the system of cogs; tables and 'how to play on the tables' have been mentioned 4 times, drawers with the sign of 'open me' stimulates visitors' curiosity, lights with size contrast and lights with windows is the important elements of arch design.)

Museum interpretation =
Models + Interactive Devices + Trail Maker + Exhibitions + Staffs + Samples
Visual (Collection)+Tactility (Play)+Visual (Text)+People(Talk)>Tactility (Collection)

In the Museum Interpretation, various models (6 times) within the Assemblage room attract general visitors' attention, including water bomb, fashions, R&R Soar Engine and the Navel Boat; interactive devices (5 times) design related to the 'Derwent Valley Mills' and 'System of Cogs' attract recruited visitors' attentions. The Trail Maker (4 times) is a good connection between visitors and collections, its purpose is setting up for searching information Two Exhibitions (4 times) on the first floor have strong locality and were liked by general visitors, one is the 'Building Derby', the other one is the 'Excellent Engineers'. Apart from these, staff (2 times) and samples for materials and clothes (2 times) play an important role in the museum experience.

Nicholas Serota (1996) states that the museum can be seen as a cabinet of treasures instead of a history book. In the meantime, the museum could reduce the didactic function, to encourage a personal experience for developing their reading, instead of relying on the curatorial interpretation

Theory

Adam Sharr (2012)
Temporality of Industrial Culture- Materiality of Building fabric
(This museum showcases a blend of old and new culture, embodying the enduring spirit of making that spans both the industrial and post-industrial periods. This industrial spirit represents the intangible culture reflected in the activities supported by these industrial buildings over time.)

The Building has Multiple Authors- Layers of Building Fabric
(The layers of building fabric created by multiple authors at different times add richness to the current re-occupied space, enhancing the sensorial experience and creating an imaginative space for visitors.)

The Building is Anticipated through Drawings and Contract Document
(The understanding of customs and cultures strongly influences the built fabric result, because it could form future buildings and the sensuous atmospheres for a proposed space.)

Liliane Wong (2017) & Christian Norberg-Schulz (1965)
The Civic Hall and Rives Kitchen of the Museum of Making is a good example representing a mixed space with the authentic context restored and contemporary design interventions and the entire museum space is integrated as a social space, in this integrated space, light is the most important.

Another restoration method is identification which means understanding and accepting the mediated values. Without any strong sense of nostalgia or atmosphere, this museum is trying to convey a message through communication – Industrial Creativity.

Cabinets of Curiosity – Remodelling Old Mill
The purpose of the Cabinets of Curiosity was to surprise visitors with rare and curious objects, close to the workshop. Nowadays, this form of the workshop has evolved into a museum space with a system of order. For public visitors, the principle of spatial interpretations has been transformed into two models: classification and framing. The classification in the museum means the object configuration is organised through a certain type of order, such as Assemblage room.

Juhani Pallasmaa (2012)
Hands are a complicated organism, a delta in which life from the most distant sources flows together surging into the great current of action. The tactile sense connects us with time and tradition: through impression of touch we shake the hands of countless generations.

Figure 5 16   The Summary of the Evaluation of Occasional
Museum Visitors in the MoM. (Source: Created by the Author)

5.5.1 Ground Floor

Time-spent:
How visitors allocate their time within the museum?

The semi-structured interview :
How do people experience the mood?

Old Shop

Light and Size Contrast

Entry

Civic Hall

Historical Significance
Industrial Atmosphere

Lose Sound and Odour

Entry

25 Mins
20 Mins
15 Mins
10 Mins
5 Mins

● Arch Space
○ Arch Space (N)
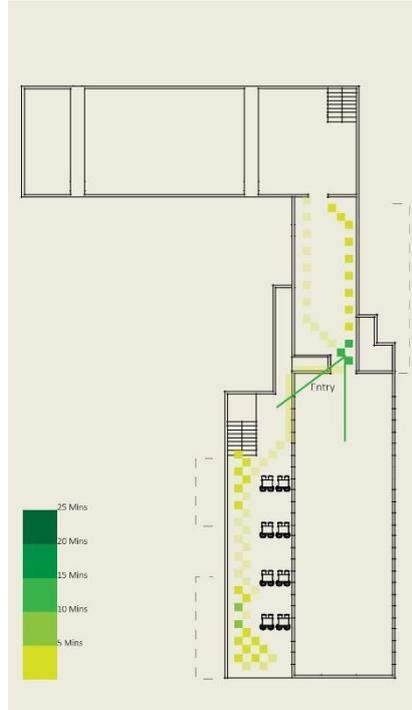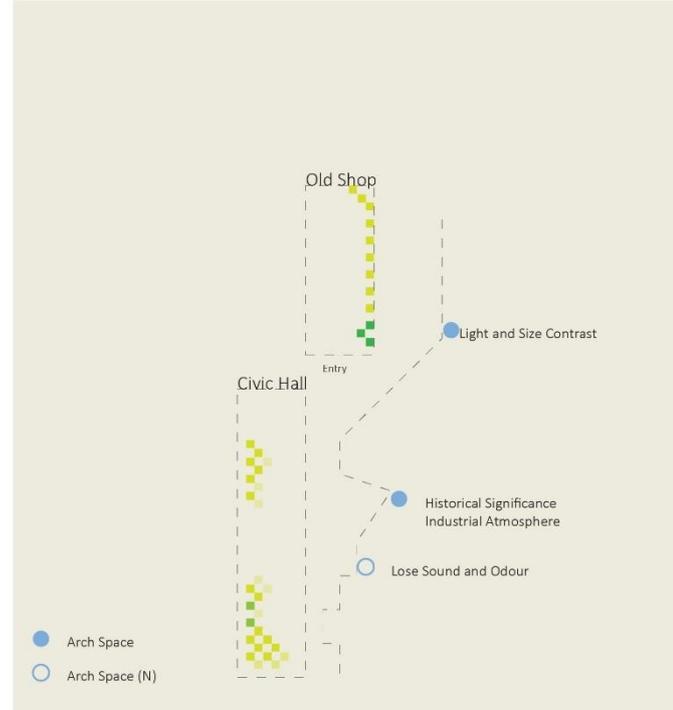
Figure 5 17   Recruited Visitors, the Evaluation, including time-
spent and semi-structured interview of the Architectural Setting
on the ~~Ground Floor.~~ (Source: Author)

Room	Overall Spatial Experience the Café					
Positive	Fantastic location	Excellent Café	Great Refurbishment	Nice café	Great café	Nice cafe in a spacious setting
Negative	N/A					

Table 5 3   Opinions of General visitors on the Civic Hall and
River Kitchen (Source: Summarised by the Author)

Civic Hall and River Kitchen

As shown in Table 5.3, the Civic Hall and River Kitchen elicited

contrasting opinions from general and recruited visitors.

The positive feedback is:

- It is a nice café with great refurbishment in a spatial setting. It is in a fantastic location with a good spatial setting.
  - Deeply impressed by this adaptive reused industrial building itself, because it seamlessly blends old and new elements. The café nestled in between adds to the charm, and the skylights allow ample natural light to filter through, creating a unique ambience.
  - The texture treatment is also well done, especially in creating an industrial atmosphere for the entire space.

The negative feedback is:

- Lose spatial functionality, like layout, exhibition, sound, odours, and special colour clues, for elderly people.
  - In terms of functionality, it leans more towards being a restaurant and lacks exhibition functionality. For example, lack of special colour cues for the elderly, who are the main visitors of this museum; the sound effects, such as broadcasts on weekends, completely lose their functionality, as it's impossible to sit down and listen attentively; The odours are not managed, with the overpowering smell of coffee and bread hitting you upon entry; The navigation system is very chaotic. The most peculiar space is the corner under the stairs, which leads from the restroom to the kitchen and finally to the Civic Hall. For first-time visitors, this transition feels very strange.
  - The exhibits lack attraction, and it is interrupted by the restaurant, causing the desire to appreciate the exhibition to diminish.
- This space is more like a local gathering centre in Derby, more of a memory place for the city's locals to revel in, rather than for foreign visitors.

This space generated the most polarised feedback, with distinct preferences between general and recruited visitors. General visitors expressed positive opinions with broad statements such as 'a nice café with great refurbishment'. Recruited visitors, however, provided more detailed feedback:

At first, this is a nice café because this adaptively reused building seamlessly blends old and new elements, with ample natural lights to filter through; in the meantime, the texture of materials was preserved well and contrasted with contemporary materials, which constitutes a unique industrial atmosphere. Secondly, some expected functionality is lost. For example, for visitors who are interested in learning new things in the museum, the exhibition is not attractive and is obstructed by the kitchen, the sound and odour have not been managed well, and the navigation system is quite chaotic. Finally, the floor within the MoM is a local community centre for gathering rather than exhibiting.

Old Shop

General museum visitors have not made many comments about the Old Shop, but recruited visitors have expressed opinions, as Figure 5.18 shows.

- From Civic Hall to the Old Shop, the engaging design element with visitors is the light and size contrast. One sees the sunlight from the other floors and enters the black box to see the photography, the other one is leaving a big size room and entering a small size room.
- In this 'cinema room', replacing historical photos with videos of residents would make the scene more vivid.

5.5.2 First Floor

Figure 5 18   Recruited Visitors, the Evaluation, including time-spent and semi-structured interview of Architectural Setting on the First Floor. (Source: Drawn by the Author)

The first floor consists of the Gateway and Throwing Room, primarily serving as the museum exhibition area. As a result, general visitors did not comment on the architecture of this floor. However, both general and recruited visitors acknowledged the

historical significance of the MoM, noting that the industrial

atmosphere successfully evoked a sense of historical memory.

The positive feedback is:

- Historical significance from the industrial atmosphere evokes the associated memory
- Auditory Spatial Perception Support
- The Table supplies a Rest of Space with Play
- Large and diverse collections on display

For the architectural setting on this floor, recruited visitors

universally appreciated that historical significance was

emphasised under the industrial atmosphere setting, particularly

with the auditory support. Also, the table was set up to provide a

space to play together, and visitors felt joyful and relaxed.

5.5.3 Second Floor

Time-spent:
How visitors allocate their time within the museum?
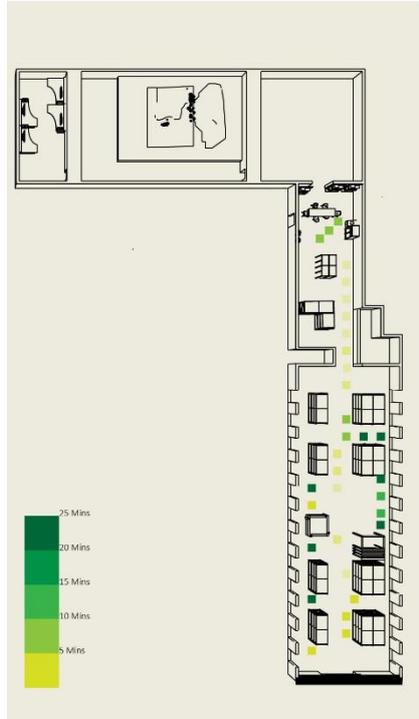
The semi-structured interview :
How do people experience the mood?
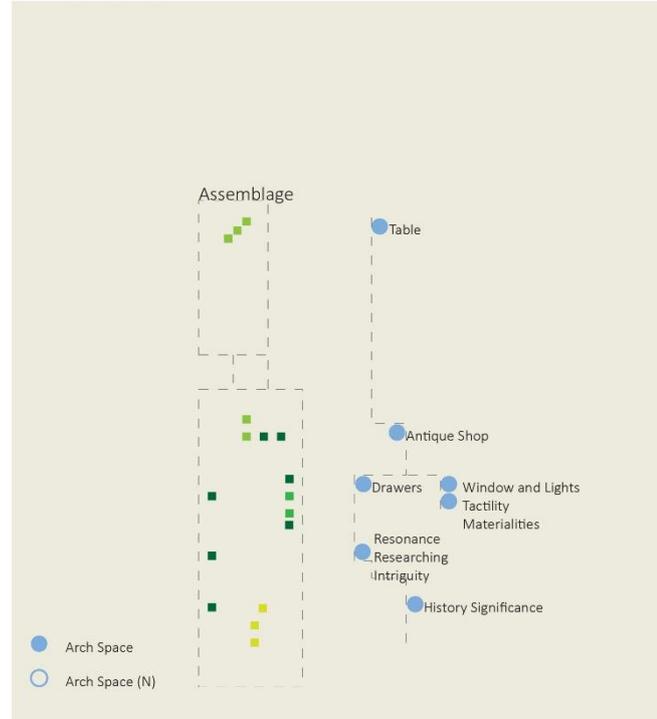
Figure 5 19   Recruited Visitors, the Evaluation, including time-spent and semi-structure interview of Architectural Setting on Second Floor. (Source: Drawn by the Author)

Room	Overall Spatial Experience the Café				
Positive	The archive floor (floor 2) was a little more engaging	A real treasure trove	Tweaks your curiosity		
Negative	Odd Museum likes loads of stuff has been dumped into the shelves for people to look at	The Assemblage room is the worst, with items just thrown in, not much explanation of the items	The Assemblage room feels more like browsing a junk shop	Like a storage facility	Like a huge version of grandad's old garage

Table 5 4   Opinions of General and Recruited visitors on the Assemblage Room (Source: Drawn by the Author)

The Assemblage room occupied most of the space on the second floor, above Figure 5.19 and Table 5.4 shows the interviews with recruited visitors and the summary of the online survey from general visitors.

As the below summary shows, a very contrasting opinion appears in both general visitors and recruited visitors. On one hand, both of them think this is a real treasure trove, or antique shop because these collections under the industrial atmosphere evoke visitors' curiosity to engage deeply; on the other hand, they feel like this is an open storage, junk shop or old garage, because, loads of stuff were dumped onto the shelves, even if it categorised by materiality.

The positive feedback is:

- A real treasure trove like an antique shop to evoke curiosity with more engage visitors
    - Interactivity from drawers, tables, tailmakers and staff
    - Everything can be touched, with a good sense of tactility
    - Evoking the emotion of resonance, and would like to research after leaving

The negative feedback is:

- Like an open storage, junk shop and old garage, loads of stuff were dumped onto the shelves

Recruited visitors explained their preference for the Assemblage Room based on several factors. First, the space fosters strong interactivity between visitors and various elements, including drawers, tables, toolmakers, and staff. Second, it provides a rich tactile experience, as most objects are meant to be touched, enhancing engagement. Third, these interactive and tactile aspects, combined with the industrial atmosphere, evoke a sense of emotional resonance in visitors. For items of particular interest, visitors can conduct further research after leaving the museum, extending their learning experience beyond the visit.

5.5.4 Third Floor

The top floor was mainly converted into the Warehouse, which functions as a temporary exhibition, and the Prospect, which is the co-working desk space. During the period of the data collection, a temporary Lego exhibition was held and recruited visitors commented on this.

The positive feedback is:

- Playing Lego in its exhibition is a good kind of engagement because in Lego in London, you need to wait for a quite long queue. At the weekend, this area was occupied by children.
- While building LEGO, the designer himself was also present.

5.6 Conclusion

This chapter has explored the evolution of architectural space from Lombe's Mill to the Museum of Making from two perspectives: the researcher's analysis and visitor feedback. It consists of four key themes: an overview of the context, the experience of materiality, spatial arrangement, and visitor feedback.

The overview context begins with an examination of the natural and urban landscape, a historical and cultural review, and community engagement. Water, as a crucial resource, has shaped Derby's urban development and continues to contribute to its rich heritage and cultural value. The Museum of Making, housed in a historically significant building, preserves the spirit of making, reflecting both historical and contemporary relevance. Furthermore, the museum serves as a time capsule of Derby, recording traces of the city's industrial history through its collections, architecture, and urban fabric.

The materiality of the Museum of Making serves as tangible evidence of its transformation. Adopting a people-centred and participatory approach, the museum's design evolved from light-touch consultation to the deliberate use of present-day architectural language that visually contrasts old and new

elements. The interplay of industrial materials, particularly the repurposing of the building's former exterior walls as interior elements, creates a layered spatial narrative. Additionally, these architectural interventions evoke an imaginative engagement with space, enriching visitors' embodied experiences.

The spatial arrangement of the Museum of Making is analysed from two perspectives. The first considers spatial continuity, examining transitions from affiliated museum spaces to individual experiences, from external to internal spaces, and from lower to upper floors. The second focuses on functional areas, such as the café, exhibition spaces, and archives, with the café and archive serving as significant social and historical mediums.

Finally, visitor feedback provides a critical counterbalance to the researcher's analysis, particularly regarding two debated spaces. The Civic Hall and River Kitchen offer a unique industrial atmosphere but function more as a local community hub than a traditional museum space. Meanwhile, the Assemblage Room is seen either as a treasure trove or merely open storage; overall, it provides a highly interactive and tactile learning experience.

Chapter 6 – THE VISITOR EXPERIENCE AT THE MUSEUM OF MAKING: INTELLECTUAL AND EMBODIED ENGAGEMENT

6.1 Introduction

This chapter examines the museum experience at the Museum of Making, focusing on both intellectual and embodied engagement. It provides a detailed interpretation of the museum exhibition, drawing on two objective data sources: keyword frequency from online surveys and time spent by recruited visitors. These data points serve as the basis for evaluating both the overall and specific visitor experiences.

The intellectual experience is analysed through the theoretical lens of Tony Bennett's *Show and Tell* and *Creating an Authentic Milieu approach*. The Civic Hall and Throwing Room serve as key examples of *Show and Tell*, illustrating the evolution of making in Derbyshire to foster a deeper connection between visitors and the museum's central theme. Meanwhile, the Gateway represents an *authentic milieu*, employing various interpretative techniques to narrate the story of the Derwent Valley Mills. Notably, the power of material reality is emphasised

to establish a rational model for evaluating historical relationships and stimulating an authentic historical context.

The concept of embodied experience is linked to Le Corbusier's *promenade architecturale*, which proposes a curated sequence of movement to enhance spatial emotion and engagement. At the Museum of Making, embodied experience is categorised into two aspects: bodily imagination, as exemplified by the Old Shop and Assemblage Room, and hands-on interactions, such as installations and workshops. In particular, the Assemblage Room offers a dynamic and fluid interactive experience. However, Caulton's research highlights a key limitation: hands-on exhibits alone have a relatively short lifecycle if not regularly updated or reimagined (Caulton 2023).

In evaluating the museum's interpretation, the Gateway emerges as a highly engaging space with minimal controversy. In contrast, as the last Chapter discussed, the Assemblage Room provokes debate regarding its interpretation - whether it functions as an open storage space or a treasure trove of industrial history. Despite this ambiguity, the room is widely recognised for its strong industrial atmosphere, which evokes

curiosity and fosters deeper engagement through tactile interaction.

6.2 Intellectual Experiences in the MoM

The origins of museum spaces can be traced back to two historical models: the *Cabinet of Curiosity*, also known as the German Room, and the *Theatre of Memory*. These models emerged as distinctive architectural settings for intellectual engagement and the display of art. As discussed in Chapter 4.3.1, both models represent private spatial arrangements designed to facilitate intellectual experiences. However, their approaches differ: the *Cabinet of Curiosity* emphasises the *classification* and categorisation of collections, whereas the *Theatre of Memory* focuses on presenting paintings and sculptures in a harmonious and integrated manner (Tzortzi 2015a).

Tony Bennett expands on these spatial models by examining how exhibition spaces shape visitor experiences through visual power. He conceptualises the exhibition space as a space of representation, in which display techniques regulate the way knowledge is perceived (Bennett 1995).

First, he introduces the *show* and *tell* approach, which involves structuring exhibitions to present objects as part of a developmental sequence, guiding visitors' attention toward specific narratives and enhancing their perception (Merleau-Ponty 2012). In this model, the architectural environment serves as a spatial device that provides visual order, aiding in visitor orientation within the building (Tzortzi 2015b). This approach aligns with the *Cabinet of Curiosity* model, which emerged in the 16th century as a method of organising knowledge.

Bennett also defines an alternative approach - one that creates the impression of a historically authentic milieu (Bennett 1995). In this model, the spatial environment is not merely a backdrop for objects but a cohesive unity in which artefacts and people interact across time. This approach corresponds with the *Theatre of Memory*, which gained prominence in the seventeenth and eighteenth centuries, particularly in Italy, where galleries of art were developed as a distinctive architectural milieu (MacGregor 2007).

On the one hand, the *show* and *tell* approach in museum exhibitions relies on two primary methods for conveying visual information: textual and graphical. First, an overarching narrative

structure serves as the framework for an exhibition, allowing for complexity through the incorporation of sub-themes, secondary storylines, and diverse character representations. Beneath the grand historical storyline, individual voices and perspectives emerge, enriching the visitor's intellectual engagement (Hanks 2012).

On the other hand, the creation of an *authentic milieu* involves adopting a theatrical and scenographic language to shape the exhibition environment. Instead of focusing solely on displaying artefacts as part of a linear historical narrative, this approach integrates visual and aural elements to evoke emotional and intellectual responses. While exhibition designers can manipulate visitors' perceptions through adjustments in lighting and sound (Crawley 2012), visitors' primary focus remains on the textual and graphical components that frame their understanding of the exhibition.

6.2.1 Interpretation and Experience Design

Within the internal development of the MoM, as shown in Table 6.1, Remartin, a painting and decorating company, collaborated with Spell Metcalfe (the main contractor) to refurbish existing spaces and enhance new areas, including exhibition spaces, workshops, public areas, and the café. This foundational work

provided a strong basis for interpretation and experience design (Remartin 2024).

As discussed in 5.3.1 Restoration Stage, following a people-centred and participatory design approach, the key partner, the Creative Core, worked closely with audience groups to co-produce interpretative content while also managing the build and fit-out of the new galleries (Creative Core 2025).

During the initial stages of the project, the focus of interpretation and experience design was to reimagine the visitor experience within the future museum. This process involved active collaboration with the Derby community to celebrate the spirit of making – honouring its past, engaging with its present, and envisioning its future.

Table 6 1   Roles and Responsibilities of Designer and Painter in the MoM Project (Source: Summarised by the Author)

Consultant	Responsibility	Timescale	Formal Stage			
The Creative Core	Interpretation and Experience Design	2016-21	A blend of Exhibitions	Public Workshops	Co-working Spaces	Open Storage
Remartin	Painter and Decorating	N/A	Exhibition Space	Workshops	Public-Space	Cafe

6.2.2 'Show and Tell'

The concept of 'Show and Tell' serves as the foundation of exhibition disciplines, emphasising visual power and structured presentation. This approach allows exhibitions to control and direct visitors' focus through a structure, which is a clear and developmental sequence of display (Bennett 1995). In exhibitions, '*Show*' relies on structure and characterisation as two fundamental principles that frame the presentation (Hanks 2012). Meanwhile, '*Tellability*,' a concept from literary studies, refers to a plot's capacity to be narrated in an intelligible and engaging manner. Within this framework, the narrator assumes the role of the source, guarantor, and organiser of the narrative, balancing between direct storytelling and shared interpretation. At the MoM, the '*Show and Tell*' approach is primarily implemented in key exhibition spaces, including the Civic Hall on the ground floor and the Gateway and Throwing Room on the first floor.

6.2.2.1 Civic Hall
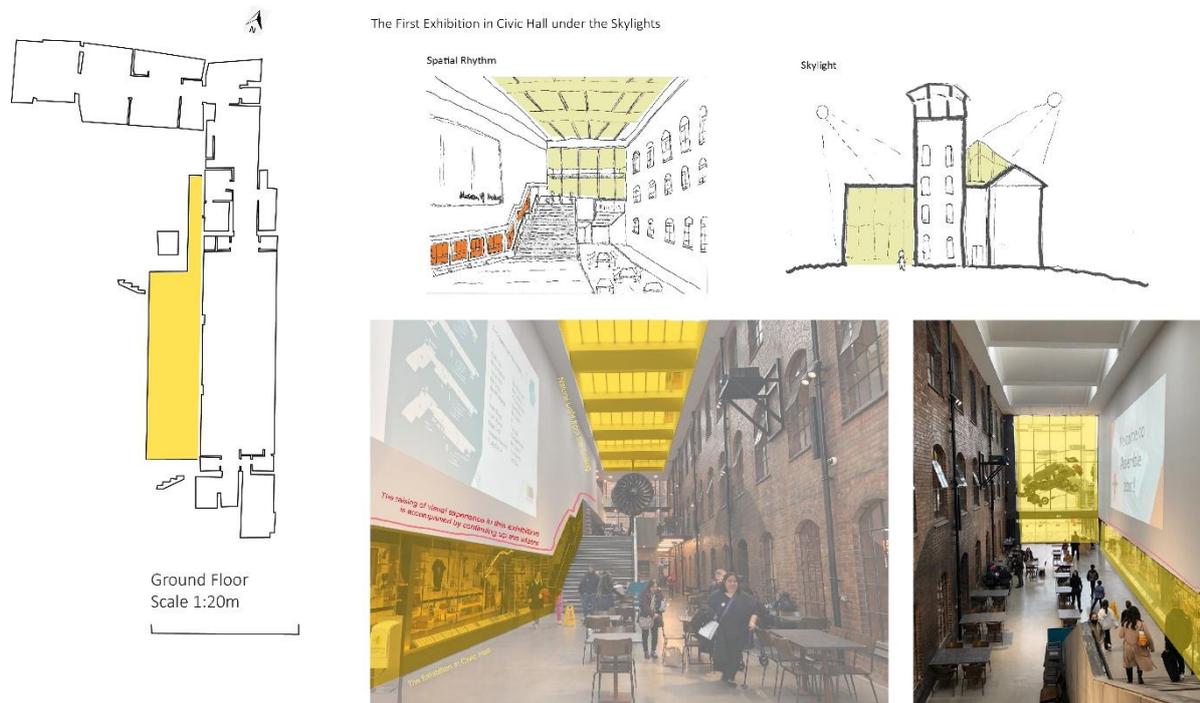
Figure 6 1   The First Exhibition with Natural Light in the Civic Hall of the Museum of Making. (Source: Drawn by the Author)

On the ground floor, the Civic Hall serves as an introductory space for the museum's exhibition. Apart from a suspended, partially disassembled Toyota car, the primary exhibition is located on the left side. This display employs a classification-based structure, grouping collections by material, including wood, metal, ceramic, organic, glass, stone, textile, and synthetic materials. Each artifact is accompanied by a textual label providing concise information based on the categories of 'Who, When, Where, How, and Why'.

The exhibition in this space benefits from an abundance of natural light, which enters through the ceiling, enhancing visibility and engagement, as shown in the yellow part of Figure 6.1. As an extension of the Civic Hall, this exhibition encourages visual continuity, guiding visitors up the stairs toward the first floor, thereby extending their engagement with the display. The connectivity between spatial design and visual presentation ensures a seamless transition between floors, enriching the visitor experience. At the far end of the upper level, visitors encounter another significant installation – a suspended Rolls-Royce Trent fanjet engine. Together with the partially disassembled Toyota car, these two installations serve as focal points, symbolising Derby's transition from its historical roots in textile manufacturing to its present-day prominence in engineering and advanced manufacturing (Pearman 2021).

6.2.2.2 Throwing Room
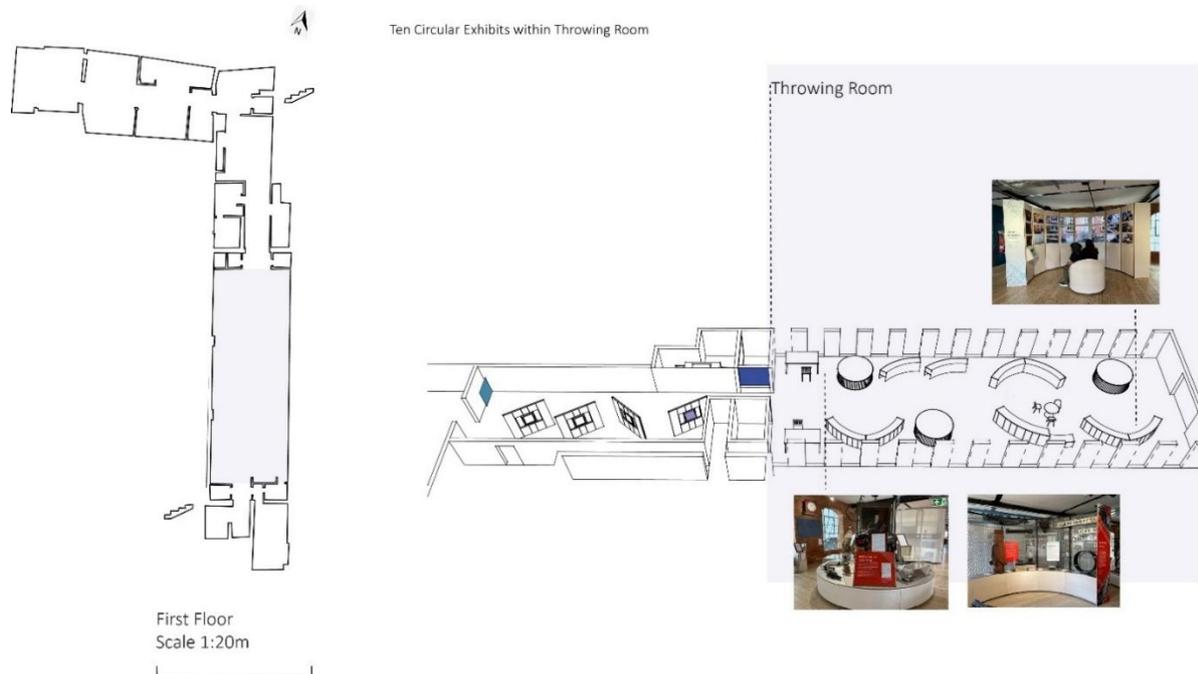
Figure 6 2　Ten Circular Exhibitions in the Throwing Room of the Museum of Making. (Source: Drawn by the Author)

On the First Floor, the Throwing Room features ten circular exhibits that explore various themes of making, employing a range of design techniques to showcase the evolution of craftsmanship in Derby, Derbyshire, and beyond. The exhibition format is designed to create engaged and interactive spaces, allowing visitors to study the historical and contemporary aspects of making. This is achieved through installations that recreate the experience of large, noisy silk-throwing machines and a digital wall that highlights Derbyshire's diverse network of making studios.

In contrast to the Civic Hall, which provides a broad historical overview of Derby's industrial achievements, the Throwing Room focuses on contemporary making practices. It shares the same style of brief signage as the Civic Hall, concisely introducing collections. The Throwing Room is structured as a self-guided space, encouraging visitors to actively explore, read, and engage with the exhibits.

6.2.3 'Creating an Authentic Milieu'

The concept of *milieu* refers to the sociological investigation of the relationship between human beings and their external environment. An *authentic milieu* seeks to establish an organic connection between artifacts and the spaces in which they are displayed, often categorised by historical periods (Bennett 1995). Within the MoM, the *Show and Tell* approach is commonly used in exhibitions such as the Civic Hall and Throwing Room, providing structured interpretations of collections. However, creating an *authentic milieu* offers a more immersive and engaging way to connect visitors with the museum's themes. A prime example of this approach is the Gateway, which employs various interpretative techniques to narrate the story of the Derwent Valley Mills World Heritage Site - recognised as the birthplace of the modern factory system. By

integrating historical artefacts, interactive elements, and sensory

experiences, the Gateway fosters a deeper engagement with

the site's industrial heritage.

6.2.3.1 Gateway
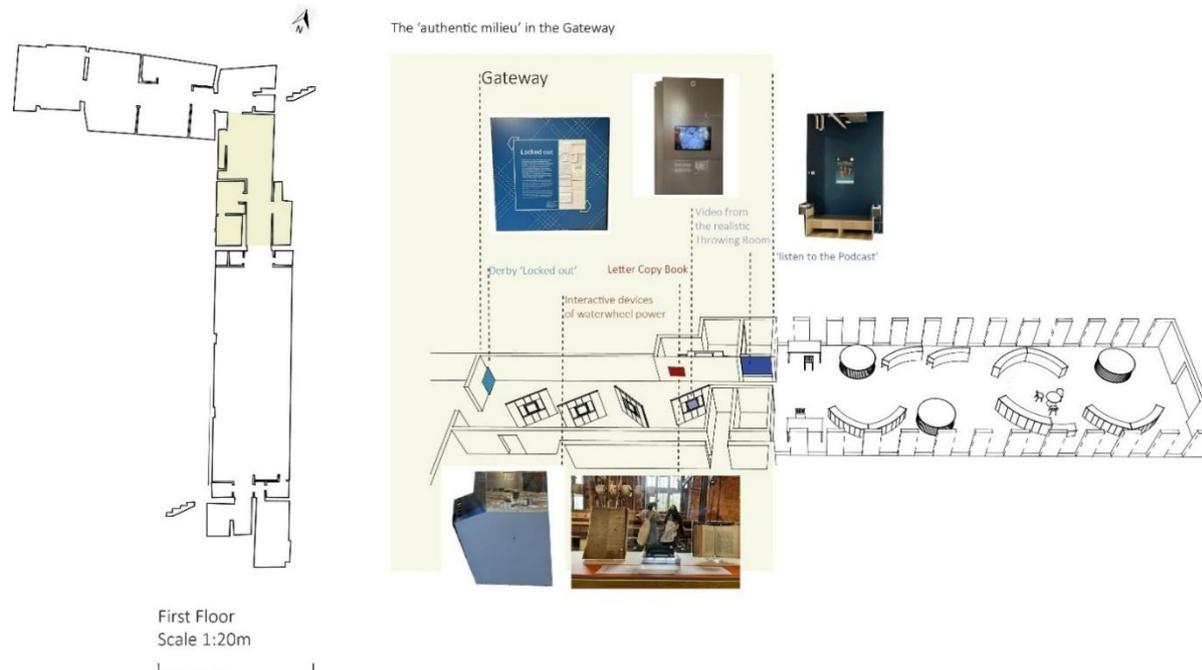
Figure 6 3   The 'authentic milieu' in the Gateway of the
Museum of Making (Source: Drawn by the Author)

Unlike the Throwing Room, which emphasises contemporary

making practices in Derbyshire, the Gateway is dedicated to

historical and interactive exhibits that contextualise Derby's

industrial past, as shown in Figure 6.3. The exhibition included

newspaper articles on *Derby Locked Out*, a prospect painting of

Derby, an interactive cog system illustrating waterwheel-

powered machinery used in the Silk Mill, an interactive map showing the spread of mills across the Derwent Valley, original Silk Mill products, and letter copy books from mill workers. While each exhibit may not have a direct connection to the others, together they construct a comprehensive narrative of the Derwent Valley Mills World Heritage Site. By integrating elements such as the industrial landscape, mill workers' voices, mill products, and the mill's working environment, Gateway is trying to form a thematic episode within this larger storytelling framework.

Beyond visual displays, the space connecting the Gateway and the Throwing Room incorporates two key audio experiences: a podcast, which provides an overview of the Silk Mill's development, focusing on mill workers and their working conditions; and a video featuring a functioning throwing machine, designed to evoke a more immersive, authentic experience. To enhance the intellectual engagement of visitors, the sound from the video replicates the noise of a real throwing machine in operation. Listening to these sounds becomes a passive yet impactful process, enabling visitors to mentally reconstruct a vivid image of the industrial past (Bubaris 2014). This auditory experience, combined with the podcast's narration,

reinforces visitors' understanding of the historical working

environment at the Silk Mill.

6.2.4 A Comparative Analysis

The exhibitions in the Civic Hall, Throwing Room, and Gateway

each tell a distinct story about Derby's industrial heritage,

employing different interpretative techniques.

The Civic Hall provides a broad historical overview of Derby's

industrial achievements, the Throwing Room highlights the

evolution of craftsmanship and contemporary making practices

in Derbyshire, while the Gateway contextualises Derby's

industrial past through historical and interactive exhibits. Various

interpretative strategies are used within the museum to illustrate

the relationships among collections. The *Show and Tell* method

is a widely adopted approach, offering a structured way to

communicate with visitors. However, *creating an authentic*

milieu presents a more immersive and engaging experience,

fostering deeper connections between visitors and the

museum's themes. For instance, in the Gateway, while textual

and graphical information remain central, they are enhanced by

auditory elements. Visitors engage with artefacts, read historical

documents, and listen to sounds that contribute to a cohesive

and immersive experience. When objects are displayed in a

museum setting, they lose their original function and context; however, their reinterpretation within an *authentic milieu* can create a more compelling and realistic narrative (Plevoets and Van Cleempoel 2020).

From the visitor's perspective, reading mill workers' letter copy books, the interconnected elements of observing the throwing machine, listening to its realistic sounds, and engaging with oral histories via podcasts form a small-scale but authentic milieu. Together, they organise meaning, knowledge, and interpretation while evoking emotion and experience, particularly regarding the lives and working conditions of mill workers.

6.2.4.1 Authentic Representation

A key advantage of *creating an authentic milieu* is that it allows industrial culture, even as an intangible heritage, to be preserved and conveyed through museum interpretation. Even when industries cease to exist, their legacy and spirit can be carried forward. As Yi-Fu Tuan (Tuan 1977) suggests, humans not only recognise geometric patterns in nature but also construct abstract spaces in the mind. At the MoM, the industrial spirit can be reimagined through visitors' engagement with historical traces, fostering a deeper understanding of past working environments. The immersive nature of oral storytelling

further transforms these abstract spaces into vivid, lasting impressions. Stories, whether fiction or non-fiction, tend to activate imaginative processes by connecting with individuals' experiences and emotions while encouraging creativity on many levels (Nielsen 2017).

Moreover, an authentic museum setting plays a crucial role in visitor engagement. Authenticity reassures visitors of the artefacts' provenance and significance, evoking deeper emotional responses. Museums housed in restored industrial buildings reinforce this authenticity by preserving original architectural typologies and incorporating narrative exhibitions that illustrate historical working and living conditions.

6.2.4.2 The Power of Authenticity

Kevin Moore proposed "the power of the real" to refer to establishing a rational model of evaluating mutual relationships. He states, "a geographic site connected to a historical connection seems to have power because it carries the past into the present by virtue of its relationships to past events" (Moore 2000, p.135). All historical material culture, including museum collections and the industrial buildings, tends to have a stronger sense of the real place, and all the senses activated by this site constitute the evinced intuitive experience.

In the Gateway, powerful interpretive techniques include the letter Copy Books written by Thomas Bennet, who was the manager of the Derby Silk Mill, and a real silk product of its silk thread made by Derby Silk Mill. Unlike other artefacts, these objects evoke an intuitive experience by reinforcing the tangible reality of Derby's silk industry, because it is the real product situated in the real place. Additionally, a book written from a child labourer's perspective, detailing the physical and social environment of Derby, is presented alongside the recorded sounds of silk-throwing machines. These elements collectively create an authentic milieu by situating real artefacts in their original historical context.

Figure 6 4   An Example of the 'Power of the Real' in the Gateway. (Source: Photos taken by the Author)

6.2.4.3 The Role of the Industrial Museum

Industrial museums have a unique advantage in preserving and interpreting industrial heritage. By linking visitors to authentic

industrial culture, museums encourage engagement with the real thing' as part of the past story (Black 2024), meanwhile trying to revive past industrial phenomena to raise awareness of historical labour and craftsmanship. Both interpretative approaches – *Show and Tell* and *Creating an Authentic Milieu* – are powerful. *Show and Tell* provides structured narratives through classification and sequencing, creating the link between one organic structure and another which can identify the relations between interpretational elements (Hooper Greenhill 1992), whereas *Creating an Authentic Milieu* fosters deeper emotional and intellectual engagement by linking artefacts, spaces, and historical narratives. Its power lies in fact but provides methods for emphasising meaning, understanding and feelings (Nielsen 2017). Together, these approaches enrich visitors' experiences, bridging historical knowledge with contemporary interpretation.

6.3 Embodied Experiences in the MoM

Embodied experience refers to an individual's direct, bodily engagement with their surroundings, where perception is shaped through movement and interaction. In Maurice Merleau-Ponty's philosophy, the 'lived body' is central to human experience, as bodily intentionality provides an initial sense of a

situation, enabling individuals to interpret and respond to their environment within the continuous flow of experience. He argues that our physical presence forms the foundation for understanding the world, shaping how we navigate and engage with spaces (Hale 2017).

In architecture, embodied experience describes a dynamic and fluid interaction between individuals and built environments, where movement and activities help define spatial meaning. A key example of this concept is Le Corbusier's '*promenade architecturale*', referring to 3.4.3 Promenade Architecturale. This term goes beyond mere circulation; it encapsulates a structured journey through a space, where architecture actively guides perception and emotion. At its most basic level, *promenade architecturale* refers to the physical movement through a building, emphasising spatial transitions. However, on a deeper level, it represents a carefully orchestrated sensory experience (Samuel 2010). Le Corbusier aimed to make architecture a way of life, encouraging architects to consider how spaces shape human experiences and prompting users to reawaken their sensitivity to their surroundings.

6.3.1 Bodily Imagination
Embodied experience in a museum involves engaging with

sensory, physical, and emotional forms of knowledge (Tzortzi

2017). At the MoM, two primary forms of embodied experience

exist: bodily imagination, as seen in the Old Shop and the

Assemblage Room, and hands-on activities, such as workshops.

6.3.1.1 Old Shop

The Old Shop exhibition (Yellow part of Figure 6.5) is centrally

located between the Italian Mill and the Workshop. This flexible

gallery space houses both framed and digital images, creating

an immersive visual experience. Unlike the Civic Hall, which

employs a '*show and tell*' approach that intertwines visual and

spatial experiences, the Old Shop exhibition presents a fictional

representation closely tied to the history of Derby.

Illuminated entirely by artificial light, the space resembles a

cinematic setting, featuring three photographic tableaux that

depict a pivotal moment in Britain's struggle for equality,

democracy, and social justice. This exhibition connects with

other historical narratives, such as the Derby Lockout

newspaper article in the Gateway and the Silk Mill Derby mural

outside the museum. By presenting the same historical event

through different mediums and settings, the exhibition reinforces

visitors' memory of this significant moment, demonstrating the

power of repetition, visual storytelling, and immersive

representation.
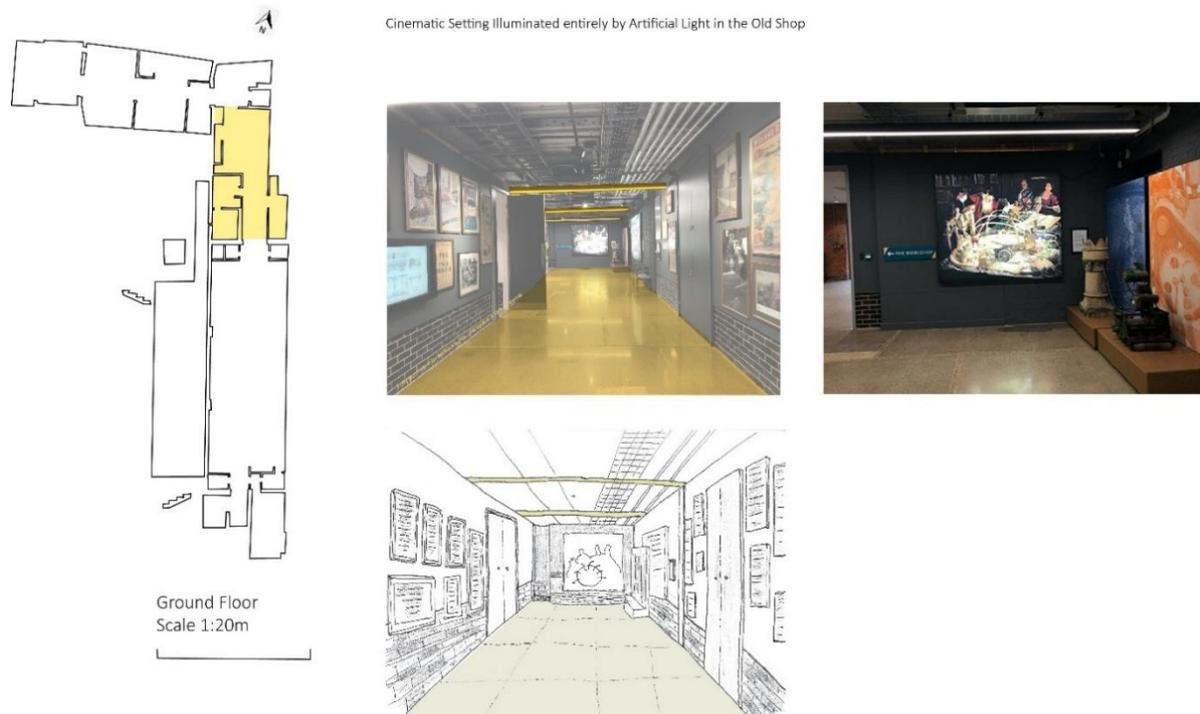
Figure 6 5　The Cinematic Setting Exhibition in the Old Shop of the MoM. (Source: Drawn by the Author)

6.3.1.2 Assemblage

If the Old Shop resembles a cinema space, the Assemblage

Room, located on the second floor, offers a dynamic and fluid

interactive embodied experience.

This space blends elements of both a museum archive and an

open gallery, creating a mixed spatial typology where visitors

can explore the process of making through various materials.

The collections are displayed and grouped by material type,

including wood, metal, ceramic, organic matter, glass, stone, textile, and synthetic materials. Each collection is further categorised using numbers, letters, and colours, enhancing navigability. Drawing inspiration from early museum typologies, this part of the Assemblage Room evokes one of the origin museum typologies which is the 'Cabinet of Curiosities', a historical model for displaying diverse collections, as shown in Figure 6.6. However, unlike its traditional counterpart, this space integrates modern digital tools to enrich the visitor experience. The Trailmaker, a digital collection platform, allows visitors to quickly locate objects of interest, while long desks and seating areas encourage in-depth exploration. Additionally, three groups of fashion samples, displayed in cabinets and on platforms, stimulate curiosity and inspire creativity.

By merging historical spatial concepts with modern interactive elements, the Assemblage Room fosters both intellectual discovery and hands-on engagement, making it a space of both reflection and inspiration.
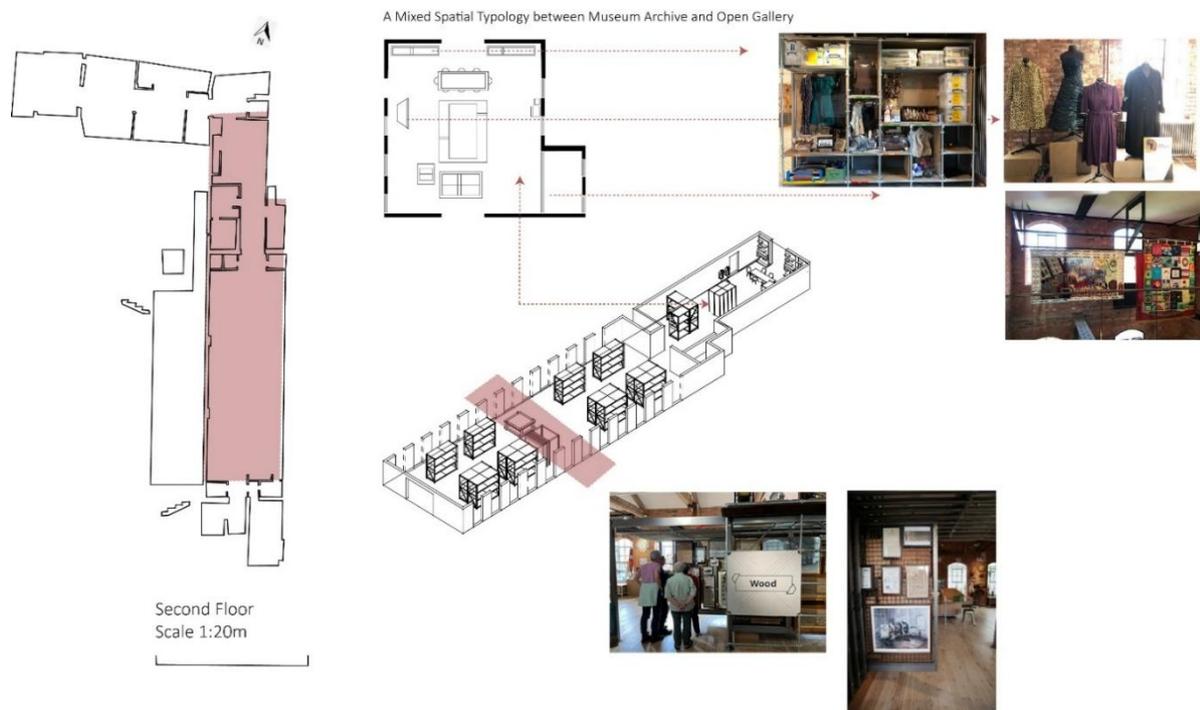
Figure 6 6　A Mixed Spatial Typology in the Assemblage Room of the MoM. (Source: Drawn by the Author)

6.3.2 Hands-on Interactions

As discussed in the previous section, the *Promenade*

Architecturale creates an interplay between the body and spatial

perception. In contrast, hands-on experiences increase physical

proximity, allowing visitors greater freedom to engage through

touch and interaction, driven by curiosity.

In the UK, the hands-on approach was initially introduced in the

Children's Gallery at the Science Museum in London (1931) in

the field of the science[13], and later spread to other museums (Caulton 2023). Particularly for children, this was a significant change to prioritise visitor engagement over static collections, while adding educational value by fostering 'minds-on' experiences. Furthermore, hands-on interaction aligns with Andy Clark and David Chalmers' concept of active externalism[14], which suggests that removing an external component (such as an interactive object) reduces cognitive engagement, similar to losing a part of the brain (Menary 2012). In this section, hands-on experience refers to direct physical interaction with objects, leading to cognitive engagement within the museum. Unlike the bodily imagination experienced in the Old Shop and Assemblage Room, hands-on experiences focus more on technological enhancements that recalibrate other bodily senses in a compensatory act of suppression. This occurs through activities such as pressing buttons, using a computer keyboard, or engaging in complex, multi-outcome interactions. In other

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[13] This museum was revamped in 1969, and the historical perspectives were to some extent abandoned in favour of combining instruction with pleasure to make the children feel that 'science is a wonderful thing'.

[14] There are several formulations of active externalism, but the view can be fruitfully categorised into three main varieties: (1) the hypothesis of extended cognition, according to which cognitive processes extend to the environment beyond the organism; (2) the hypothesis of extended cognition, according to which mental states, such as beliefs and desires; (3) the hypothesis of distributed cognition, according to which cognitive processes are distributed between several individuals along with their epistemic artefacts.

words, visitors experience the museum space by extending their

sensory perception through interactive tools, effectively

'borrowing' the technologies of the body's sensory systems

(Hale 2011).

At the MoM, hands-on experiences are categorised into two

formats: the fixed format means permanent installations

designed for direct visitor interaction, and the flexible format

means that the temporary workshops are held in various

locations throughout the museum.

6.3.2.1 Installations and Tables
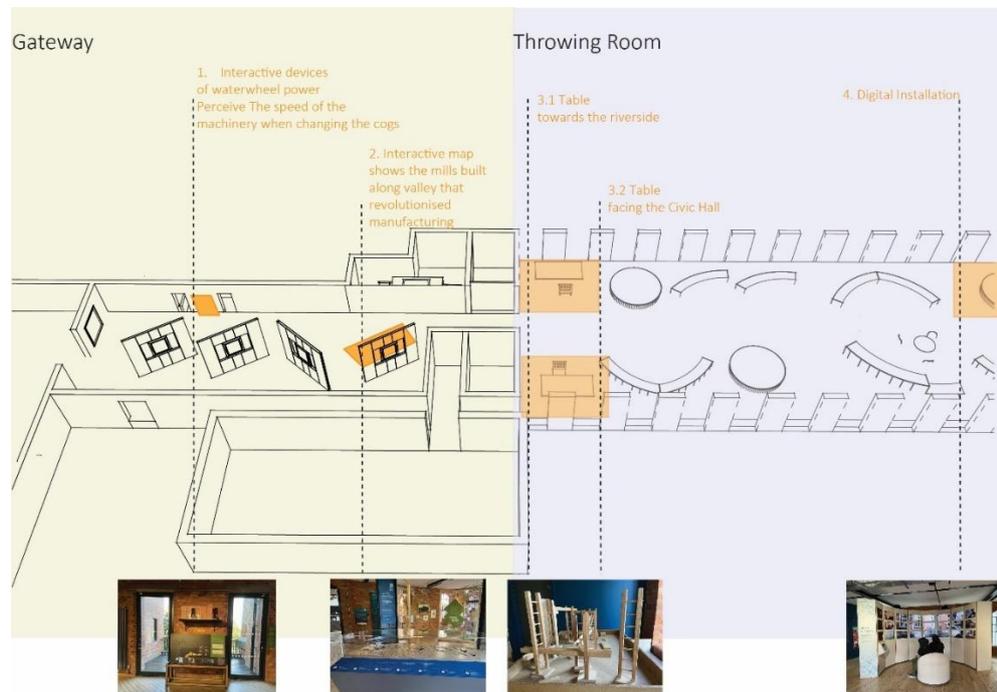
Figure 6 7   The Installations and Tables on the Second Floor of the MoM. (Source: Drawn by the Author)

Hands-on activities at the MoM are primarily concentrated on the first floor, featuring interactive exhibits, installations integrated within the museum. In the room of Gateway, key hands-on installations include the Cog System, the Interactive Map, Tables, and a Digital Installation. Cog System (Gateway) (Shown in the '1' of Figure 6.7 and Figure 6.8) – Located between two doors near a balcony, this exhibit invites visitors to build a system of cogs to understand how power was transmitted from watermills to factory machinery, offering insight into historical industrial processes. Interactive Map (Gateway) (Shown in the '2' of Figure 6.7) – This exhibit highlights mill locations along the valley, demonstrating their impact on British manufacturing, the economy, and global trade. Tables (Throwing Room Entrance) (Shown in the '3' of Figure 6.7) – The riverside-facing table features wooden toy models, allowing children to build simple mill structures; the Civic Hall-facing table functions as a workshop, guiding visitors through a six-step creative process to construct objects using various components. Digital Installation (Throwing Room) (Shown in the '4' of Figure 6.7) – A light-based installation where visitors can draw their own patterns, offering a blend of technology and artistic engagement.

Figure 6 8   The Cog System and Table towards the riverside on the Second Floor of the MoM. (Source: Drawn by the Author)

In addition to the above four types of installations, another interactive experience is found in the Railways Revealed exhibition, which showcases a model railway representing Derbyshire's railway heritage. The purpose of this room is to tell the story of Derby's impact locally, nationally and internationally. Visitors, with staff assistance, can observe the miniature trains in action, gaining insight into Derby's role in railway history. Beneath the model, a digital screen displays a non-linear film by artist Andrew Martyn Sugar, exploring the personal experiences of museum volunteers, staff, and construction teams. Adjacent to this space is the Railway Study Centre, a research facility equipped with computers and archival materials, allowing visitors to delve into the Midland Railway Society and Derby Museums archives by appointment (Figure 6.9).
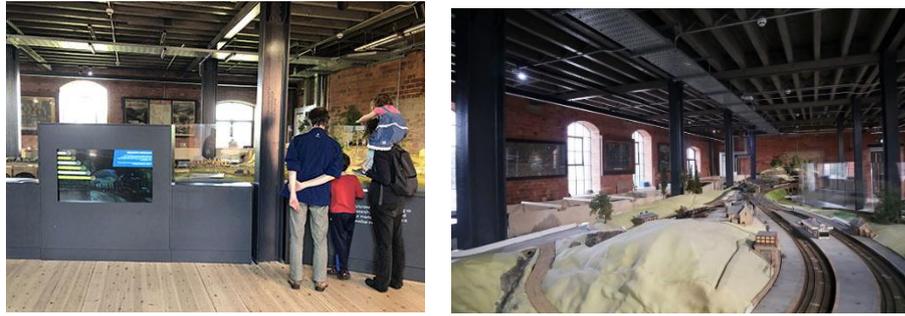
Figure 6 9   The Railway Study Centre of the MoM. (Source: Photos taken by the Author)

6.3.2.2 Workshops

Similar to the café and archive spaces discussed in 5.4.2.4

Beyond Functional Purposes, the museum workshop serves as a social space that continues the tradition of craftsmanship and making. Through hands-on experience, the workshop acts as a bridge, facilitating dialogue between newcomers and experienced practitioners, and fostering the exchange of skills and knowledge.

Historically, the Derby Silk Mill, built as the world's first modern factory, was established by John Lombe, who introduced a fully mechanised system powered by water wheels, replacing traditional spinning wheels. This groundbreaking innovation sparked a technological revolution. In modern times, the spirit of making continues to be preserved and passed down. The workshop provides visitors with an opportunity to explore ideas,

transform concepts into reality, and actively engage with the building's enduring legacy of craftsmanship.

There are two workshops (Figure 6.10) held in the MoM which the researcher participated in: one was Quilts of Connection (Assemblage) – a collaborative project where visitors craft a quilt representing Derby, blending historical narratives and artistic expression; the other is LEGO Lake District Exhibition (Warehouse) – A temporary installation accessible to all ages on weekdays, while weekends are family-focused, with tables occupied by children engaging in LEGO-based creativity. Beyond structured workshops, MoM also integrates some informal hands-on experiences (Figure 6.11), like the Postcard Wall (Throwing Room, First Floor), where visitors contribute personal reflections by writing and displaying postcards, and Drawers (Assemblage Room) – Staff encourage visitors to open drawers containing hidden objects, inviting curiosity and discovery.

Both formal workshops and informal activities enhance tactile engagement, fostering a deeper connection between visitors and museum spaces.

Figure 6 10   Slow-stitch Quilt Workshop and LEGO Lake
District Exhibition. (Source: Photos taken by the Author)
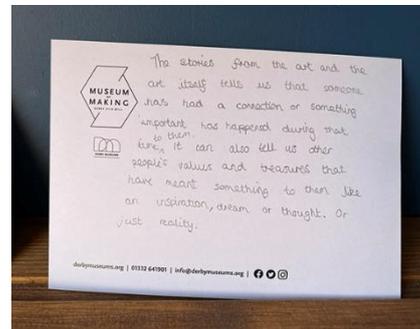
Figure 6 11   Postcard Wall of the MoM. (Source: Photos taken
by the Author)

6.3.2.3 Limitations of the Hands-on Interactions

Within the museum, as one of embodied experiences, hands-on

activities aim to communicate with visitors at an affective level,

which is the deep modification of visitors' understanding of

perception, cognition and knowledge (Tzortzi 2017).

However, relying solely on hands-on exhibits presents

challenges. Caulton's research suggests that the popularity of a

single hands-on exhibit declines significantly after its fourth year,

especially if there is no reinvestment or update (Caulton 2023).
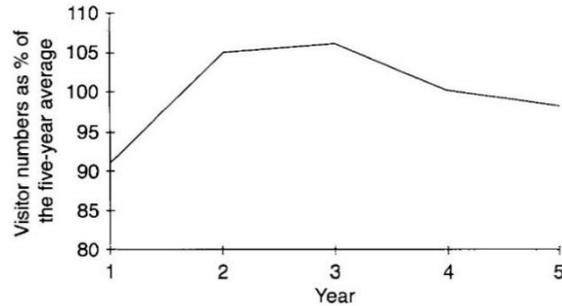
Figure 6 12   Typical product Lifecycle of a new hand attraction.
Source: (Caulton 2023).

6.4 Evaluating Museum Interpretation

As discussed in Chapter 2.3.4, the evaluation of museum

interpretation at the MoM relies on two main sources: online

surveys (Google Reviews) from general visitors and interviews

with recruited visitors, referring to Figure 5.16. Since general

visitors often lack sensitivity to architectural design, their

feedback primarily informs the museum interpretation analysis.

To assess visitor interpretation, data collection occurred in two

phases: the first round, gathered from online surveys on

14.03.2024, and the second round, measuring time spent by

recruited visitors, conducted between 07.02.2024 and

23.03.2024.

The following analysis categorises data into two types of visitor experiences: intellectual experiences (Civic Hall, Throwing Room, and Gateway) and embodied experiences (Old Shop and Assemblage Room).

6.4.1 Overview of Museum Experience
6.4.1.1 Online Surveys
Although general visitors did not explicitly discuss architecture, the survey revealed the three most frequently mentioned terms: 'Café' (140 mentions), 'Floor' (52 mentions), and 'Poppies' (39 mentions).

'Café' refers to the River Kitchen, an extension of the Civic Hall that serves as a social space. 'Floor' likely reflects the overall spatial experience, as inferred from visitor comments. 'Poppies' relates to a special installation featuring cascading poppies from the tower, set up for a special festival.

Notably, feedback regarding the 'floor' provided insights into general museum experiences. Positive comments highlighted the spacious industrial atmosphere, whereas negative comments pointed to a lack of clear signage, leading to visitor confusion.

General Visitors Mention keywords' Times

	Café	Floor	Poppies	Model Raiway	Manufacturing	Silk Mill	Jet Engineer	Toyota	Industrail Heritage	Lego
Value	140	52	39	31	24	17	10	10	9	8
	1	2	3	4	5	6	7	8	9	10
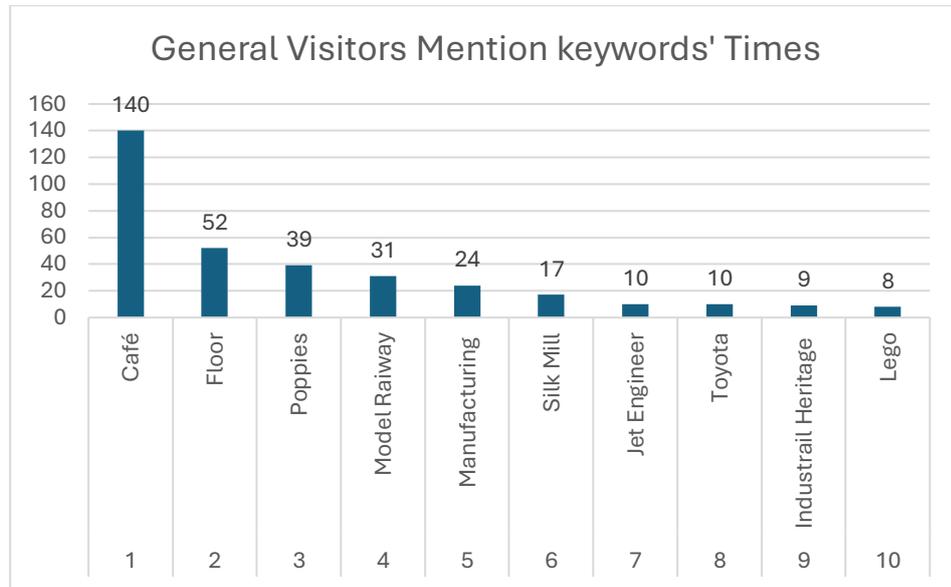
'Floor'	Positive	Negative
Overall Spatial Experience from General Visitors	The smell of old walls and tons of memories on the shelves	The layout is confusing
	Atmosphere	confusing experience
	Nice spacious setting	No logical progression
Summary	Spacious setting with an industrial atmosphere	Lack of logical signage leads to a confusing experience

Table 6 2   The Overview of Museum Experience from Online Survey (Source: Summarised by the Author)

6.4.1.2 Time-spent

To analyse visitor movement, 20 recruited visitors were given 60

minutes to explore freely, with the first 45 minutes recorded for

evaluating museum experiences. For 10 selected visitors, the total time spent across rooms in the first 45 minutes was: the Gateway occupied 130 mins, the Throwing room was 104 mins, and the Assemblage was 100 mins. These three rooms could be identified as the effective museum experience with strong social interaction in this study and attracted more attention from recruited visitors.

Due to the higher social interaction, the Gateway, Throwing Room, and Assemblage attracted higher visitor engagement. In contrast, the Warehouse, Old Shop, and Civic Hall saw lower ngagement, possibly due to less interaction-driven content.

Time Consumption of the Each Room

Room	Time
The Civic Hall	30
The Old Shop	36
Throwing Room	104
The Gateway	130
Assemblage Room	100
The Warehouse	50
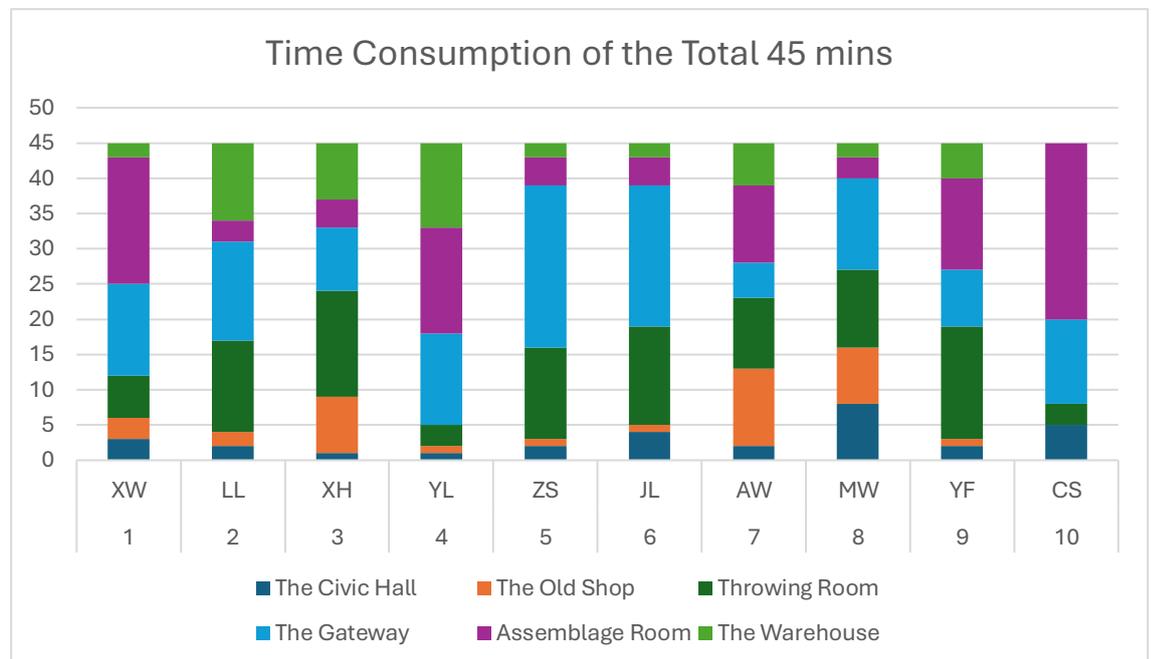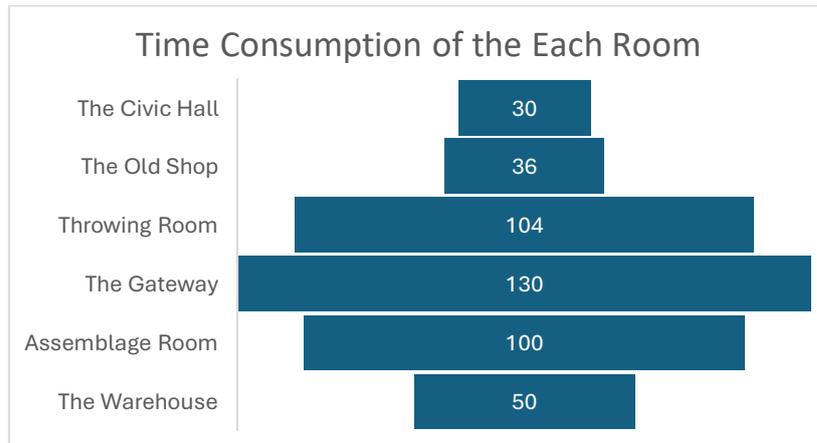
Table 6 3   The Time Spent of Each Single Museum Room
(Source: Summarised by the Author)

6.4.1.3 Result

Comparing online survey data (general visitors) with time-spent

analysis (recruited visitors) reveals a key contradiction: the Civic

Hall and River Kitchen. This room acquired very high comments,

general visitors rated this space highly (140 mentions) and

recruited visitors who spent the least time there (30 minutes)

and ranked it lowest.

This discrepancy is explained by visitor intent for two reasons.

The first is many general visitors are Derby residents who view

the museum as a social gathering space rather than an

exhibition site; the second is recruited visitors, who came

specifically for the museum experience, did not prioritise the

café area for leisure. This contrast highlights how the MoM

serves dual functions: a community space for locals and a museum for dedicated visitors – each with distinct expectations.

6.4.2 Intellectual Experiences

As Serota states, distraction occurs when visitors' consciousness aligns with the curatorial interpretation of the works (Nicholas Serota 2000). In a museum context, this means that visitors engage with curated relationships between objects - connections they might not have considered independently. Their attention follows the curator's classification and arrangement of exhibits.

In this study, the Civic Hall, Throwing Room, and Gateway are categorised as spaces of distraction, where curatorial interpretation plays a significant role in shaping visitor engagement.

6.4.2.1 Civic Hall

As the last section mentioned, the Civic Hall presents a notable divergence between general visitors and recruited visitors, primarily regarding its architectural setting (6.2.2.1 Civic Hall). As an introductory exhibition space, the hall features two major installations: a suspended Rolls-Royce Trent fanjet engine and a partially disassembled Toyota car.

Recruited visitors found the exhibition experience disruptive due
to its proximity to the café, which created distractions, like
Serota mentioned. They also criticised the lack of thematic focus
but acknowledged that their attention was consistently drawn to
the two large installations.
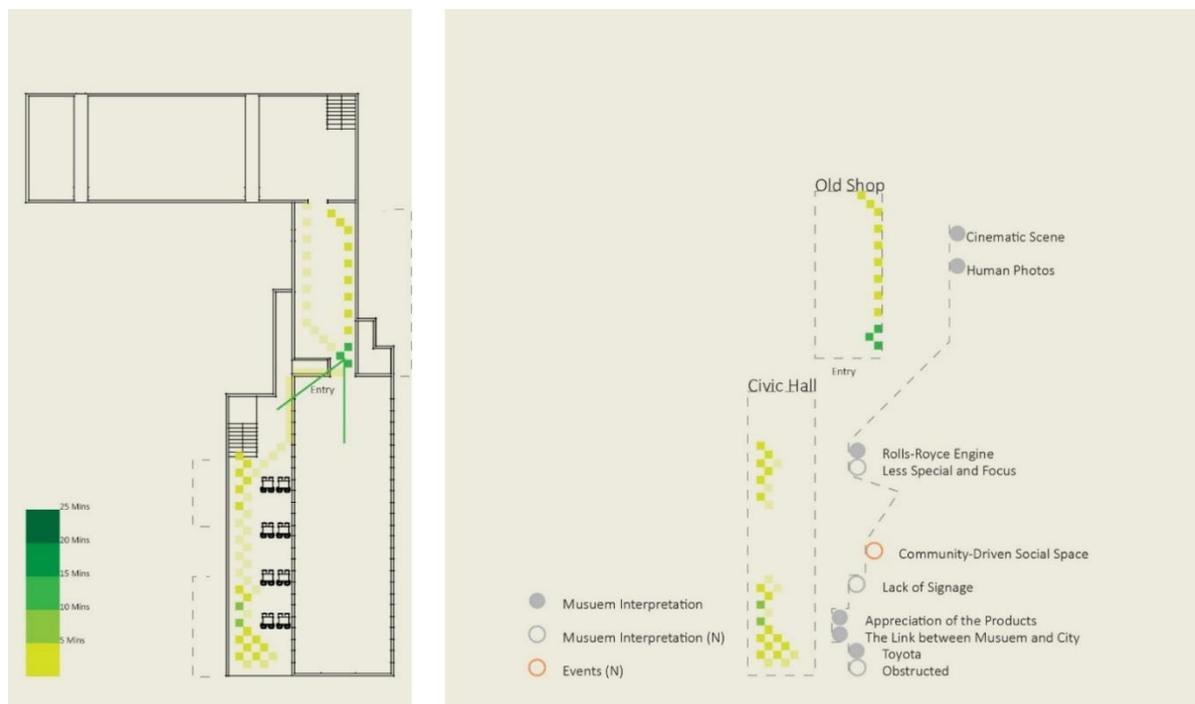
Figure 6 13   Recruited Visitors, the Evaluation, including time-
spent and semi-structured interview of Museum Interpretation on
the Ground Floor. (Source: Drawn by the Author)

6.4.2.2 Throwing Room and Gateway

The Throwing Room and Gateway received similar feedback
from both general and recruited visitors. As Table 6.4 shows,
general visitors' feedback from the online survey was more

expected and criticised. In summary, general visitors highlighted

three main expectations for a professional collection display:

lack of detailed labels – fragmented interpretations that do not

provide sufficient context; focus on 'made' rather than 'making' –

the museum emphasises finished products rather than the

process of making; limited socio-economic context – a lack of

information on how industrialisation impacted society.

	Positive	Negative
	Demonstrating Derby's 'making' heritage through heavy industry to the present digital and crafts era	More a museum of Made rather than Making as could have more explanation of how the objects were made
	Exhibits to interest all Ages	Exhibits were a bit random
	Look at things closely	Displays are a bit fragmented
	Exhibitions and the activities dotted	Need more logical order on the 2nd and 3rd Floor
	Full of historical memorabilia brought back good memories	Used the information was limited
	Information boards could be improved	The exhibits are not labelled
	Expected to show the full story and range of Derby's industrial history, could see and understand	Layout, display and information on items lets it down
Overall Spatial Experience from the Exhibition		Unfocused
		There was also little or nothing about either the industrialists of Derby or the socio-economic impacts of industrialisation

Table 6 4   Overview of Opinions on the Throwing Room and Gateway from the Online Survey (Source: Summarised by the Author)

In contrast, as shown in Figure 6.14, recruited visitors from interviews suggested the strength of Interpretation. As the summary below illustrates, recruited visitors identified two key strengths in the museum's interpretative approach: multi-sensory engagement – effective use of audio, video demonstrations, and tactile elements; and interactive design – where the museum fosters visitor interaction through various forms, including curved displays, tables, and postcards, creating a more immersive and human-centred experience.

Figure 6 14   Recruited Visitors, the Evaluation, including time-spent and semi-structured interview of Museum Interpretation on the First Floor (Source: Drawn by the Author)

The positive feedback is:

- Link between collection and space with strong multiple sensory stimulation (auditory and video demonstration)
- Establish the dialogue between the collection and visitors through different forms, such as the curved form, table, and postcards.

The negative feedback is:

- Lack of professional collections
  - Fragmented interpretation without detailed label
  - Lacks information on how to make rather than made
  - Lacks information on the socio-economic impacts of industrialisation

Despite differences in visitor backgrounds, both groups recognised the MoM's historical significance and appreciated the industrial atmosphere and diverse collection. However, both groups shared concerns about the lack of professional curation for three reasons: fragmented interpretation – incomplete narratives with simple labels; insufficient focus on 'making' – limited insight into how objects were created; lack of socio-economic context – minimal explanation information on industrialisation's broader impact.

6.4.3 Embodied Experiences

As the co-presence of the subject and object collapses, attention begins to exhibit characteristics of distraction (Marder 2011).

Traditionally, attention is understood as a continuous act of focus, where the subject remains engaged with an object of interest. According to Serota, attention is shaped by spatial and lighting manipulation, creating an immersive experience that engages visitors while evoking a hushed, transcendental mood (Nicholas Serota 2000). In this study, the Old Shop, Workshop, and Assemblage Room are categorised as spaces that facilitate embodied experiences—where physical interaction plays a key role in museum engagement.

6.4.3.1 Old Shop and Workshop

General museum visitors did not provide many comments on these two spaces. However, recruited visitors offered positive feedback.

The positive feedback for Warehouse:

- Playing with Lego in its exhibition is a good kind of engagement because in London, you need to wait for quite a long queue. At the weekend, this area was occupied by children.
- While building LEGO, the designer himself was also present.

The positive feedback for Old Shop (Shown in Figure 6.12):

- From Civic Hall to the Old Shop, the engaging design element with visitors is the light and size contrast. One is seeing the

sunlight from the other floors and enters the black box to see the photography, the other one is leaving a big size room and entering a small size room.

- In this 'cinema room', replacing historical photos with videos of residents would make the scene more vivid.

6.4.3.2 Assemblage Room

Referring to Chapter 5.5.3, although there were no major disagreements between general and recruited visitors, contrasting opinions emerged, similar to the feedback on the Civic Hall and River Kitchen.

On one hand, both groups appreciated the Assemblage Room, describing it as a 'treasure trove' or 'antique shop' that, under the industrial atmosphere, sparked curiosity and deeper engagement. On the other hand, some visitors perceived it as 'open storage', 'a junk shop', or 'an old garage', feeling that objects were cluttered on shelves, even though they were categorised by materiality.

The following presents comments from general visitors shown in Table 5 *4*, while the accompanying figure illustrates insights from recruited visitors shown in Figure 6.15. Furthermore, recruited visitors highlighted three key reasons for their preference for the Assemblage Room: Staff – engage with the real person who hold the historical knowledge will be impressed

engage; Open Gallery –a social space for visitors who can share and exchange their collective memories; Shelves/Open Gallery – this setting assisted with visitors freely explore their interests.
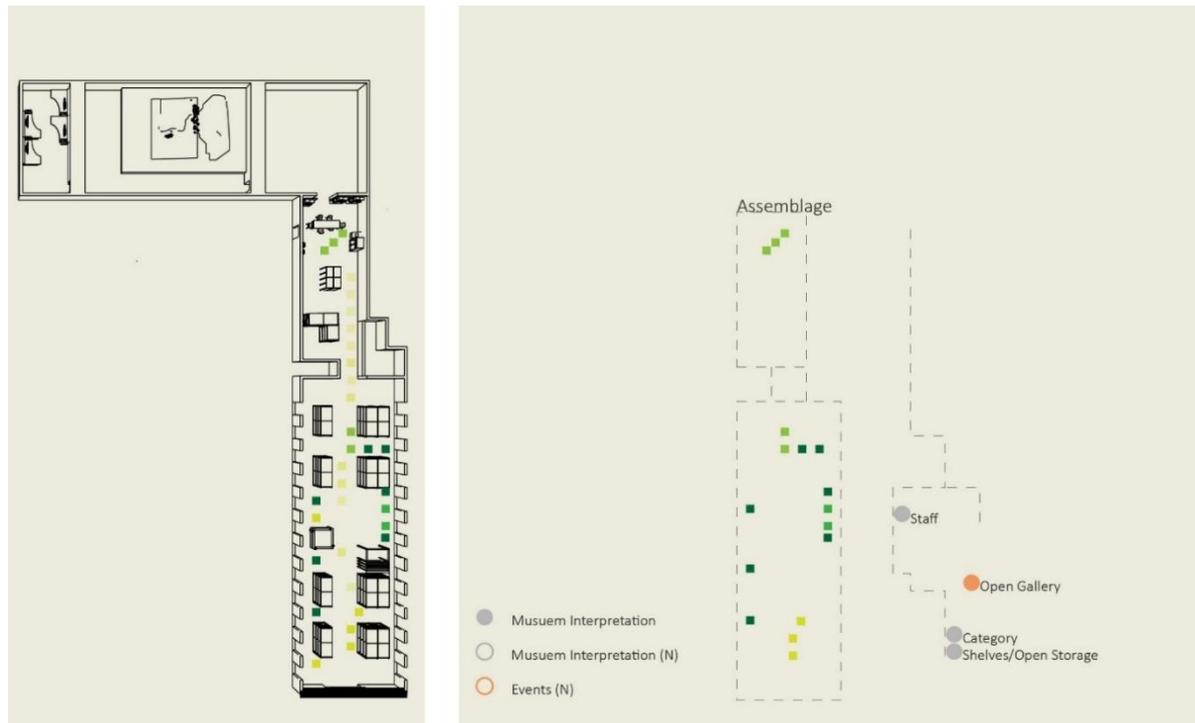
Figure 6 15   Recruited Visitors, the Evaluation, including time-spent and semi-structured interview of Museum Interpretation on the Second Floor (Source: Drawn by the Author)

However, some general visitors expressed a dislike for the space, perceiving it as disorganised and cluttered, resembling an open storage area rather than a curated exhibition.

6.4.4 Summary
6.4.4.1 Intellectual Experience

Two notable rooms in terms of intellectual experience are the Gateway and the Civic Hall.

Based on visitor evaluations, the Gateway is the most attractive room with no controversial opinions. Visitors experience the mutual relationships between the building and its historical context while engaging with preserved historical materials. Kevin Moore states that a geographic site connected to a historical connection seems to have power because it carries the past into the present by virtue of its relationships to past events (Moore 2000). In this sense, the museum's collections and industrial buildings contribute to an authentic, sensory-rich experience that evokes the past. In contrast, the Civic Hall is the most controversial room. While it serves as a social space, strengthening the link between the museum and the city, it lacks a clear museum interpretation function. However, its two significant installations – a suspended Rolls-Royce Trent fanjet engine and a partially disassembled Toyota car – still captivate visitors due to their impressive scale.

6.4.4.2 Embodied Experience

Beyond intellectual experiences, assemblage and hands-on activities related to the embodied experience are also noteworthy. The Assemblage Room allows visitors to freely explore collections related to making. Although its format resembles open storage, its everyday life collections offer insight into historical daily life, inspiring deeper engagement. The workshop provides visitors with hands-on opportunities to create something by hand, immersing them in a situated space where the industrial atmosphere evokes a historical connection. In addition, the curator has deliberately introduced a degree of freedom, fostering interaction between the museum and visitors. Examples include visitors leaving written comments on paper posted on the wall, and visitors engaging with toys using minimal instructions. Both forms of interaction are deeply supported by the industrial atmosphere, reinforcing the museum's engaging and participatory nature.

6.5 Conclusion

This chapter has examined intellectual and embodied experiences at the MoM from two perspectives: the researcher's analysis and visitor feedback. The discussion was structured around three key themes: intellectual experiences, embodied experiences, and visitor responses.

The Gateway and Throwing Room received similar feedback from both general and recruited visitors. However, a slight difference emerged: general visitors, primarily residents of Derby and Derbyshire, expressed stronger emotional attachments and higher expectations for detailed interpretations of the making process and the socio-economic impacts of industrialisation. For example, general visitors prefer to share collective memory in the 'Open Gallery'. In contrast, recruited visitors sought a more professional curatorial approach to strengthen the interpretative depth.

From a research perspective, the Gateway demonstrates the effectiveness of diverse interpretative techniques, including visual displays, audio support, interactive installations, and hands-on activities. These methods contribute to an authentic historical milieu, aiming to evoke intuitive connections between past industrial phenomena and modern life while fostering an appreciation for the spirit of making.

Unlike the Gateway and Throwing Room, referring to 5.5.3 Second Floor, the Assemblage Room elicited divergent reactions from general and recruited visitors. Some perceived it as a 'junk shop' due to its open-storage aesthetic, while others

appreciated its interactive and tactile qualities, which encouraged emotional engagement and curiosity. Similarly, the Civic Hall was another space with notable differences in visitor perception, but this is mentioned in 5.5.2 First Floor. While it serves as an introductory exhibition space, featuring two large-scale installations (the Rolls-Royce Trent fanjet engine and a partially disassembled Toyota car), it lacks interpretative depth, limiting its potential for deeper engagement. However, general visitors valued the space for its social function, as the café setting allowed for relaxation and interaction.

In conclusion, differences in visitor profiles, including national and international backgrounds, influence expectations and engagement with museum interpretation. General visitors, with a stronger emotional connection to Derby's industrial heritage, sought a more in-depth exploration of its historical significance. In contrast, recruited visitors, approaching the exhibits with a fresh perspective, favoured clearer and more immediate interpretative strategies, where embodied imagination and hands-on interaction played a crucial role in immersing them in the industrial context.

Chapter 7 – THE MUSEUM OF MAKING AS A THIRD LEARNING SPACE

7.1 Introduction

This chapter comprehensively examines the empirical findings in relation to the theory of museums as a third learning space, which bridges the gap between formal education in schools and workplace learning. The Museum of Making serves as a pioneering model for learning-oriented spatial design, a concept explored through literature review, qualitative case studies, and interview data.

This chapter is divided into two main sections:

Theoretical Framework – This section explores the concept of the third learning space, focusing on the role of museums in learning, challenges in spatial design, and future directions for industrial heritage museum design

Empirical Analysis – This section integrates theoretical insights, qualitative case studies, and interview data to illustrate how learning occurs within the MoM's spatial and interpretive framework.

Through this analysis, four key principles emerge for designing future museums that prioritise learning, providing a foundation

for evaluating the MoM's impact as an adaptive learning environment.

7.2 A Third Learning Space

7.2.1 Roles of the Museum Learning

According to Hooper-Greenhill (Hooper-Greenhill 1994), communication is the museum's major function in fulfilling intellectual needs, including education and entertainment. Education, in essence, is fundamental to providing opportunities for people to expand their reservoirs of knowledge and experience. This contrasts with formal education, such as academic learning, which prioritises outcomes over the learning process.

Historically, referring to 4.3.1.2 Cabinets of Curiosity, one of the typologies of museum origins - the Cabinet of Curiosities - was strongly connected to knowledge and experience. Although lacking a clear order, these rooms served as repositories for miscellaneous knowledge, accumulating the latest curiosities and early machines to attract scholars and physicians.

Nowadays, the Kew Millennium Seed Bank, as a modern museum, integrates laboratories and exhibition spaces for public viewing, creating a dynamic learning environment. Serota noted that the modern museum is becoming more of a historical book

rather than a 'cabinet of treasures' (Nicholas Serota 2000). Over time, museum audiences have shifted from scholars and physicians in residence to public visitors (Tzortzi 2015a), transitioning from private to public institutions. This shift has also influenced the museum's interpretative approach, evolving into a more communicative medium and prompting changes in spatial settings.

The original typology of museums functioned as private 'living libraries', stimulating intellectual experiences. Modern museums, however, typically follow two interpretational approaches, *classification* and *framing*, and intend to provide a positive learning environment, in which assisting visitors to develop new knowledge and broaden their experience horizons (Yu and Hirzel 2024).

In contemporary society, the distinction between formal and informal learning has become increasingly blurred (Black 2012), positioning museums as significant contributors to complementary learning environments. To bridge the gap between formal (academic) and informal (apprenticeship) learning, museums - alongside libraries - could serve as a third learning space for supplementary education.

As Black (Black 2005) suggests, museums are ideal places for exploring life-wide and lifelong learning. Furthermore, Black (Black 2012) postulates that museums can play a role in both formal and informal education, emphasising that learning is an active process.

Referring to 4.3.4 A Third Learning Space, the Heineken Experience and the Prince Philip Maritime Collections Centre exemplify contemporary museums that serve as 'third learning spaces', providing engaged and sensory-rich educational experiences. Unlike the traditional didactic teaching method, the Heineken Experience prioritises learning through visual communication, interactive exhibitions, and hands-on activities. Similarly, the Prince Philip Maritime Collections Centre, situated near a museum archive, encourages visitors to engage with various studios and collections, fostering curiosity through conversation and observation.

7.2.2 Challenges of Spatial Setting

Despite their evolving role in meeting modern educational needs, museums face the challenge of relying on traditional interpretative models that mirror formal education. To overcome this, museums must consider multiple entry points for engaging

visitors and activating the learning process through diverse

methods (Table 7.1).

Table 7 1   Museum's Role and Expected Challenges. Source:
(Nicholas Serota 2000; Black 2005; Black 2012)

Serota (2000): Modern Museum as *a historical book* rather than a 'Cabinet of Trousers'	
Black (2005): The museum could be a good place to explore **life-wide** and **life-long learning**.	Black (2012): The museum could play a role in **formal** and **informal learning** based on the premise that learning is an active process.
Challenges: Interpretation follows the typical of formal education	

Foucault[15] suggests that understanding a natural object goes

beyond its surface appearance; true comprehension involves

recognising its complex structures and interrelated components.

In a museum setting, curators play a crucial role in revealing the

complex relationships behind collections, such as their historical

---

[15] Foucault's theories primarily addressed the relationships between power versus knowledge and liberty. He analysed how they are used as a form of social control through multiple institutions.

relevance. From a visitor's perspective, the most convenient way to 'know' an object is to follow the curator's narrative. However, curatorial methods should not be limited to linear storytelling. Instead, museums should incorporate multiple approaches - exhibiting historical complexity, exploring relationships among collections, and offering diverse perspectives - to encourage visitors to engage in independent thinking (Table 7.2).

To address this, museums could draw inspiration from their origins - revisiting the Cabinet of Curiosities as a 'living library'. Industrial heritage museums, in particular, hold unique advantages as third learning spaces as they do not solely rely on curatorial direction.

Table 7 2   Curators' Expected Attributes regarding the Museum Interpretation. Source: (Hooper Greenhill 1992)

Hooper-Greenhill (1992):
Understanding an object is based on its organic structure, involving a variety of different levels of complexity and relationships to each other instead of by one-level hierarchy.

→

Curators' Attributes

- Exhibiting the historical Complexity

- Exploring the relationship among collections

- Offering multiple perspectives
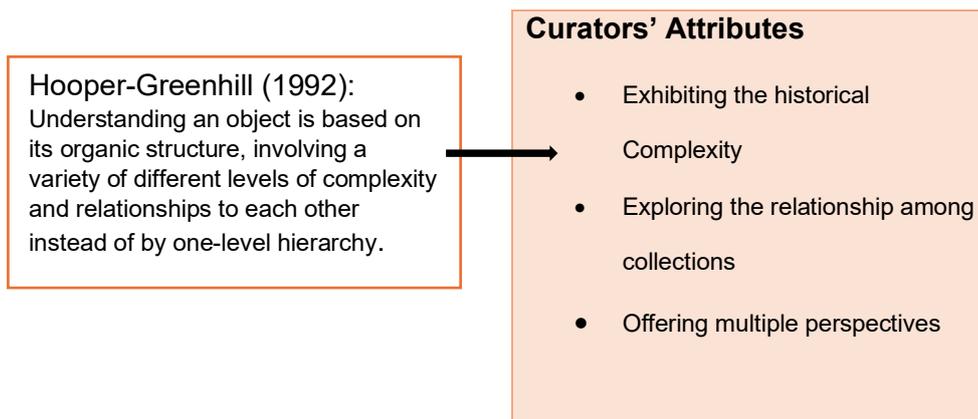
7.2.3 Transmission of Knowledge

A key challenge museums face is their reliance on traditional interpretative models that mirror formal education, often

resulting in a monologic approach to knowledge transmission. This can be understood as a continuum with two contrasting extremes: at one end, a transmission-absorption model, where learning occurs in a linear, step-by-step process, gradually adding new information to an individual's knowledge base (Hein 1998). At the other end is dialogue - a knowledge exchange model that fosters critical thinking and active engagement (Freire 2020).

According to Welbourne (Welbourne 1979), the acceptance of new knowledge is based on the premise that knowledge is both transmissible and shareable, deeply embedded in the structure of human thought. However, Winchester argues that the transmission of knowledge into the sentient mind is not a static process but rather a continuous ebb and flow, requiring awareness and curiosity.

In formal education, knowledge transfer is often constrained by one-way communication, reinforcing a transmission-absorption system. In contrast, within the museum context, knowledge is frequently perceived as a commodity, and the way visitors engage with and interpret this knowledge depends on their prior understanding and experiences (Hooper Greenhill 1992, p.2).

To move beyond formal educational structures and enhance knowledge transmission, museums must adopt diverse communication strategies. One of the most powerful approaches is dialogue. Dialogue, as a uniquely human phenomenon, inherently involves critical thinking and active engagement (Freire 2020). Learning in a museum is not merely about 'being' present in the space, but about 'becoming' an active participant in its narrative. By fostering dialogical engagement, museums empower visitors to contribute to and shape their own learning experiences, transforming knowledge transmission into an interactive and participatory process, to shape their own narratives.

Just as museums encourage visitors to share their knowledge and personal stories, museum communication should not be confined to insider perspectives or one-way transmission. Instead, dialogue is essential for incorporating outsider viewpoints and examining museums through the eyes of others (Postman 1995). Although dialogue in museum practice plays a crucial role in promoting equity and inclusion, it also requires critical analyses of power dynamics to enhance museum functions, impact, and identity. As Dine argues, critiques framed through the lens of situated culture can be transformed into

dialogical engagement when paired with meaningful action (Dine 2021). A historical example from the 1970s in Australia demonstrates the link between museums, dialogue, and local communities. In efforts to preserve Indigenous cultures, Australian museums began forging new relationships with Indigenous communities in response to both internal institutional changes and external political and cultural pressures.

In summary, dialogue, as a fusion of museum communication and community engagement, facilitates the development of social relationships through sustained mediation over time. In the meantime, dialogue evolves engagement and continues to shape the future of museums, reinforcing their role as collaborative spaces of cultural negotiation and shared heritage (Kelly and Gordon 2002). Furthermore, industrial heritage museums are uniquely positioned to leverage dialogue as a tool for community engagement, allowing visitors to share stories, knowledge, and collective memories, thereby strengthening their connection to local history and identity.

7.2.4 Future Industrial Heritage Museum Design

In industrial museums, thematic exhibitions - such as those presenting industrial history - are often structured by curators to guide visitors through knowledge acquisition through sequential

experiences, referring to 3.4.2 Clock Time and Human Time. This structured approach is commonly employed to engage visitors. However, industrial heritage museums enable visitors to construct their own narratives based on temporal experiences, movement, attention, and emotional engagement.

Although industrial heritage museums are not typically 'curated spaces', they possess a more communicative and interactive framework for future museum design, primarily through architectural engagement and bodily interaction. On the one hand, as discussed in Chapter 3.3, industrial buildings evolve over time, but architectural remnants profoundly shape individuals' behaviours and values. From a tangible perspective, different layers of building fabric are crafted by multiple authors to enhance sensory experiences and stimulate visitors' imaginations, as seen in the Museum of Gorge, referring to 3.3.2.2 The Building Has Multiple Authors. From an intangible perspective, industrial heritage museums construct and reinforce official historical narratives, contributing to the formation of an 'imagined community' through collective memory, exemplified by Ironbridge Gorge, referring to 3.3.3.1 Museum Heritage Site. On the other hand, bodily movement plays a pivotal role in recalling memories, reenacting spatial

experiences, and shaping situational memory. Referring to Le Corbusier's concept of the architectural promenade, referring to 3.4.3 Promenade Architecturale, 'curated space' is perceived through physical movement, as exemplified in the Heineken Experience. Similarly, Louis Kahn's library design emphasises interactive relationships between readers and their environment - an approach mirrored in the Prince Philip Maritime Collections Centre.

One of the greatest opportunities for industrial heritage museums is their ability to bridge architecture and bodily experience - a bridge formed through dialogue (as discussed in the previous section). Museums serve as learning spaces that facilitate knowledge transmission, and dialogue extends beyond static interactions with exhibits, encouraging critical reflection and active engagement (Freire 2020). In heritage museums, dialogue acts as a link between visitors, architecture, and historical narratives. Layers of building fabric stimulate visitors' imagination, enabling a contrast between official historical accounts and personal collective memories. Industrial heritage museums offer unique opportunities for visitor engagement. Whether through cultural artefacts, collective memory, or spatial interactions, these museums foster immersive educational

experiences without relying solely on curatorial guidance. Furthermore, dialogue between museums and visitors enhances critical thinking and active participation, reinforcing the role of industrial heritage museums as dynamic learning environments.

7.3 Learning within the MoM
7.3.1 Museum's Vision and Recruited Visitors
7.3.1.1 Data Result from Learning Activities

The Museum of Making is one of three institutions in Derby Museums, which indicate the data showing learning activities in 2022-23: 3,501 school children participated in programmes and 7,944 people engaged in informal learning opportunities. In addition, 46% of the audience was over 55 years old, and 46% of visitors were from Derby and Derbyshire. These statistics data from the MoM support Black's theory, suggesting that the MoM is a conducive environment for life-wide and lifelong learning and plays a critical role in both formal and informal education. Notably, nearly half the audience is local residents and elderly people.

Furthermore, when considering learning at the MoM, visitors reported an increased understanding of Derby and Derbyshire's heritage; volunteers recognised that they had developed broader and transferable skills; and makers and artists

emphasised the museum's role in fostering networking and collaboration within their communities. Hence, as the data result shows, the MoM is a museum for deeply learning local history and boosting the local community.

During the design process, as 5.3.1 Restoration Stage shows, the MoM adopted an innovative 'citizen curator' approach throughout its development. Since the project started in 2011, before starting the formal stage, architects and designers have been commissioned to focus on designing spaces and fabricating on-site furniture rather than creating exhibitions for artefacts (Museums + Heritage Advisor 2014). Apart from architects and designers, visitors are encouraged to create their own relationships with the objects, elevating these interactions to a more experiential level. This approach aims to foster a sense of emotional ownership among visitors, supporting Derby's place-shaping and regeneration as a 'City of Makers' (Derbymuseums 2023b). In contrast to traditional museums, curators generally hold control over the forms of power. The people-centred and participatory approach the MoM adopted aligns with the general participatory framework from the UK government.

As Foucault states, discursive information contains complex structures of discourse practice, constructed and defined by physical objects (the museum) and activities (making). Consequently, knowledge and the individuals who produce it are inextricably linked to particular institutional conditions and forms of power (Paul 1993).

7.3.1.2 The Changes of Museum Vision

At the beginning of the MoM project, its early scope phases and terminologies were identified as the Human-Centred Design, Community, Co-production and STEAM, which is new to the museum sector. After around a decade of development, in 2023, they were working towards a new vision, which is putting communities at the centre, sharing and exchanging knowledge and skills to develop collections, experiences and stories of relevance to people's lives today (Derbymuseums 2023b), as Table 7.3 shows.

Table 7 3   The Early and Expected Scope Phases of the MoM.
Source: (Derbymuseums 2023b)

Early Scoping Phase	Expected Scoping Phase
Human-Centred Design Community Co-production STEAM	Communities at the centre Sharing and exchanging knowledge and skills to develop collections, experiences and stories that are relevant and important to people's lives today.
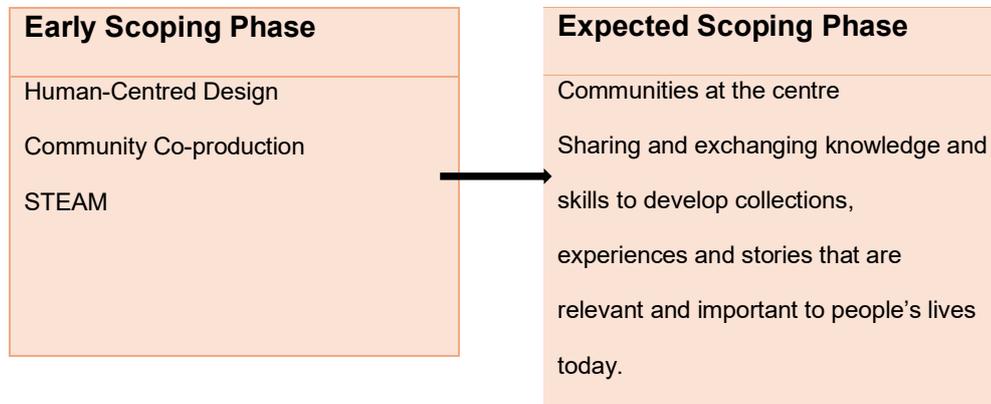
7.3.1.3 Recruited Visitors' Profiles

As Table 7.3 above shows, in 2023, the MoM revised its vision during the scoping phase, maintaining communities at the centre while seeking to *share and exchange knowledge and skills to develop collections, experiences, and stories that are relevant to people's lives today*. Statistics from that year indicate that the museum supports both life-wide and lifelong learning, fostering dialogue that encourages reflection and action.

In line with this vision, the recruited visitor group for this study differs from the general natural visitor profile typically seen in museums. In addition to an online survey for collecting feedback and phenomenological observation of movement patterns, a visitor study was conducted to strengthen the critical evaluation

and gain deeper insights into learning within the museum. As shown in Tables 2.5, 2.6 and 2.7, this included 15 participants: 10 occasional visitors (OVs) with international backgrounds and 5 workshop participants (WPs). A follow-up group of selected interviewees (STIs) will also be contacted 3–6 months after their visit. These STIs interviewees, some of whom have teaching experience, were selected to facilitate extended reflection on learning processes within the museum.

Table 7.4 highlights the distinction between general natural visitors (mainly residents) and recruited participants. 60% of the WPs were local to Derby and Derbyshire, similar to the general (natural) visitor demographic. 10 OVs represents a broader international visitors' view, which is a more targeted engagement strategy. With a slight distinction, the benefit of working with these recruited visitors (OVs, WPs and STIs) lies in their contribution to creating a more authentic museum environment, one shaped by sharing perspectives, exchanging ideas, and discussing learning within the museum.

Table 7 4   General visitors and recruited visitors' profile.

Source: (Derbymuseums 2023b)

General Visitors (Derbymuseums 2023b)	Recruited Visitors to discuss learning
46% of visitors are from Derby or Derbyshire. Over 20% are aged 16 - 34 years and 46% are over 55 years of age. 57% identify as female, 89% are White, and 8% have a limiting disability.	All OMVs hold international backgrounds and beyond the academic level 7. 60% of WPs are residents. Some of the STIs hold teaching experience

7.3.2 Learning Within the MoM

According to Falk and Dierking, true learning is both emotional and cognitive. Due to that, the museum is a meeting point across personal, social-cultural, and physical contexts; hence, learning in a museum is a highly interactive experience (O'Connor et al. 2020). In addition, as stated in Section 7.2.1, informal learning is a type of knowledge acquisition that involves both awareness-making and meaning-making without a structured framework. On the one hand, awareness-making refers to the process by which visitors make sense of museum exhibits based on their prior experiences, knowledge, and ideas; it is a type of perceptual learning. On the other hand, meaning-making occurs when visitors' memories and experiences

transform their museum visit into new knowledge and

understanding; it is a type of cognitive learning.

The whole data was divided into two parts: perceptual and

cognitive learning. Perceptual learning mainly focuses

on sensory modalities, and cognitive learning is an immersive

and active process that engages the senses in a constructive

and long-lasting way (Table 7.6).

Table 7 5   The Integrated True Learning Format. Source: (O'Connor et al. 2020)

True Learning		
Perceptual learning Awareness Making	**+**	Cognitive learning Meaning Making
Emotion through Feeling **+** Emotion starts to impact the mind		Sense of Knowledge **+** Associated Memory
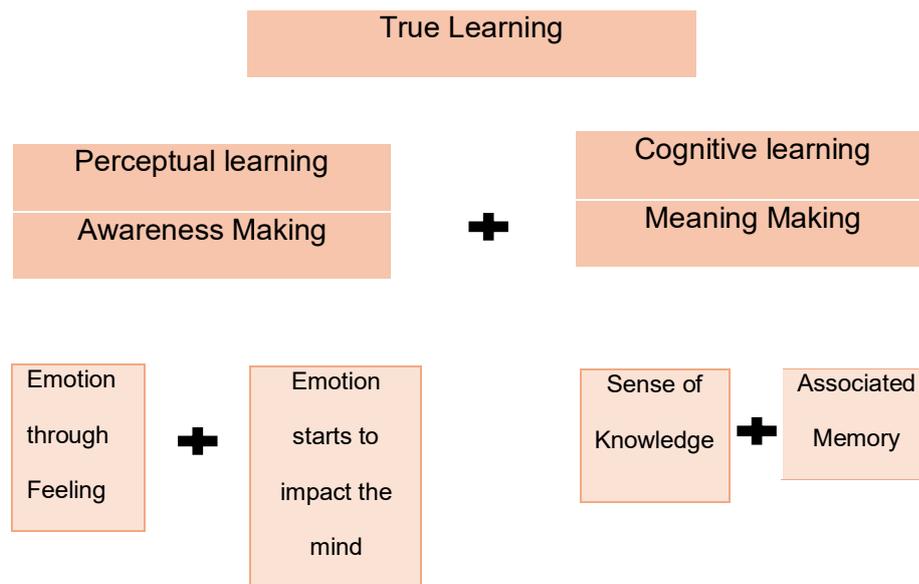
7.3.2.1 Structure of the Learning Process

The MoM provides both awareness-making and meaning-

making experiences, and defining the learning process in the

MoM includes two aspects: one is the theory of the true learning

process, and the other one is the data from primary research, both of which can be considered as part of the MoM as the third learning space. In theory, the true learning process in the museum is defined as the combination of perceptual and cognitive learning, as Table 7.6 below shows.

Based on the theory, in the empirical data, a total of ten OVs were recruited from the University of Nottingham (Faculty of Arts, Science and Engineering), and 60% of the WPs are from the City of Derby and Derbyshire. These data are used to respond to the result of three types of perceptual learning and the 'sense of knowledge' in terms of cognitive learning. Furthermore, a total of five STIs who hold teaching experiences were invited to discuss their 'associated memories' related to the MoM. Eventually, by comparing it with academic learning, five STIs discussed how the MoM is approached as a third learning space, particularly in terms of supporting architectural students' academic learning.

Table 7 6   Empirical Data Distribution. Source: Summarised by the Author.

		Empirical Data Distribution
1	Theory	Perceptual learning + Sense of Knowledge of the Cognitive learning
	Interviewees	OVs+WPs
	Interview Question	Have you learnt any kind of knowledge from your experience? What have you learnt?
2	Theory	Associated Memory of the Cognitive learning
	Interviewees	STIs
	Interview Question	Have you remembered any kind of knowledge from this museum experience? What have you learned?
3	Theory	Third Learning Space
	Interviewees	STIs
	Interview Question	If the museum is the third learning space, how does it fit into academic and workplace learning?

7.3.2.2 Perceptual Learning

An individual's perception is of primary importance in the process of learning. As Immanuel Kant states, experience serves as a guiding principle for our perception of transient events, and all knowledge is shaped by perception and external resources, influenced by the consciousness inherent in our minds (Swabey 1922).

To illustrate the process of perceptual learning in the theory (Table 7.7), Damasio states the human impact of all causes of emotion depends on the feelings engendered. If it is through feelings, the emotion is inwardly directed and private; if it is not, it is outwardly directed and public but begins to impact the mind; however the lasting impact of feelings requires consciousness (Damasio 2000). Furthermore, Tables 7.8, 7.9 and 7.10 show the data from interviews of recruited visitors to explain three types of process in terms of perceptual learning in the MoM: inwardly directed and private, outwardly directed and public, and long and full-lasting impact.

Table 7 7   The process of perceptual learning in the theory. Source: (Damasio 2000, pp.35-81)

Damasio (2000): The cause of emotion depends on the feeling engendered by those emotions or not

Through Feelings	Not Through Feelings
Inwardly directed and private	Outwardly directed and public, starts to impact the mind

The long and full-lasting impact of feelings requires consciousness
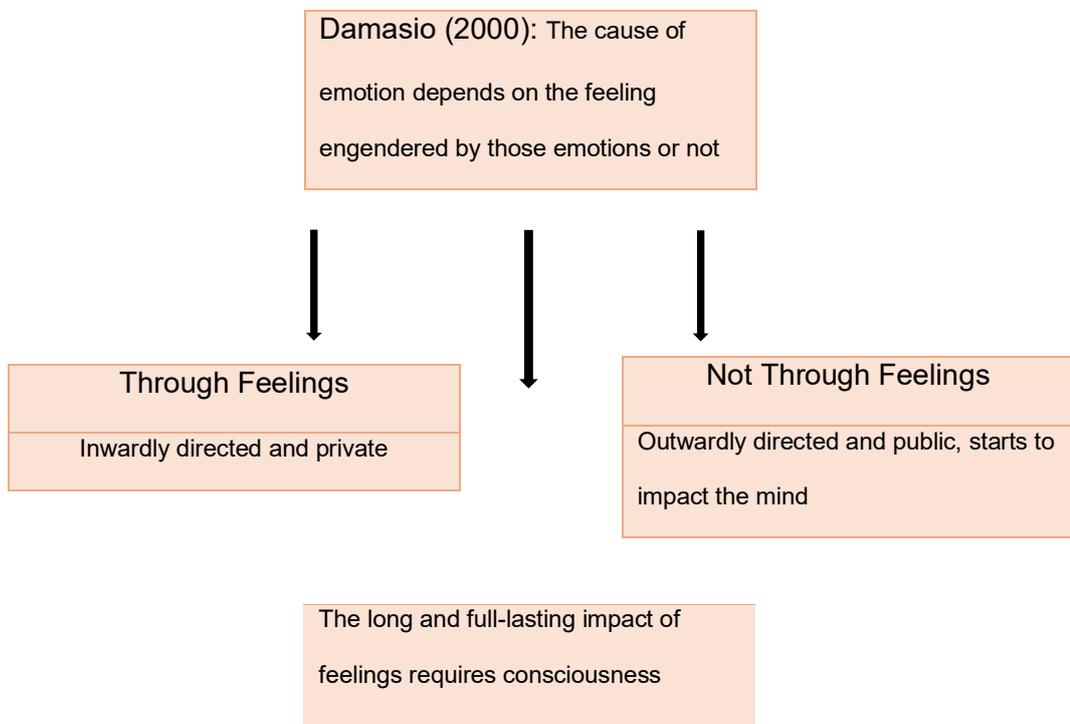
Through Feelings

As Table 7.8 shows, the data was distributed in the first type of process in perceptual learning concentrates on the workshops, because the emotion was inwardly directed. The main reason of the cause of relaxing is the fact that it is Saturday afternoon. In addition, the cause of enjoyment and engagement is the influence of the industrial atmosphere (Figure 7.1 and 7.2).

Table 7 8   The First Category of Data shows Recruited Visitors' Emotions through Feelings. Source: Summarised by the Author.

Emotion (Inwardly directed and private)			
Participants	Reasons	Rooms	Theme
WP	I come to this workshop to have a relaxing time on Saturday afternoon.	Workshop	Relaxing
WP/WP	I had an enjoyable afternoon. It was an enjoyment of the art of human figure painting.	Workshop Workshop	Enjoyable
OV/WP	The influence of the environment allowed me to deeply engage in the workshop.	Workshop	Engaging

Figure 7 1   The Assemblage room shows the cause of enjoyment and relaxation. Source: Diagrams Drawn by the Author; Architectural Plans originally from (Pearman 2021).

Figure 7 2   The Studios shows the Cause of Engagement. Source: Diagrams Drawn by the Author; Architectural Plans originally from (Pearman 2021).

Not Through Feelings

In the second type of process in perceptual learning, the emotion is outwardly directed and public, based on the participation results and personal narrative. Compared to the first category of data, the second category data shows the emotion produced from an individual's perception based on their own narrative, instead of the external influence.

As Table 7.9 shows, the cause of the emotion is an accomplishment (Figure 7.3) because OVs and WPs can directly and quickly see the result through interacting with the Art Installation and participating in the Throwing Room.

In addition, the cause of appreciation is based on OVs' personal experiences that everything has been published in the media, and mass production is everywhere. Here, in the exhibition of the Civic Hall, the OV felt that the museum taught her/him the appreciation (Figure 7.3) of the products, whether influential or not.

Table 7 9   The second category of data shows recruited visitors' emotions do not express themselves through feelings. Source: Summarised by the Author.

Emotion (Outwardly directed and public)			
Participants	**Reasons**	**Rooms**	**Theme**
OV/WP	In this industrial museum, the experience feels ordinary, and only artistic decorations can most directly and quickly showcase participation results. This makes it a very unique experience. In the workshop, you have the opportunity to work with different materials and quickly produce small results, which gives you a sense of accomplishment.	Throwing Workshop	Accomplishment
OV	Nowadays, everything has been published in the Media, and mass production is everywhere, this museum taught me the appreciation of the products, no matter how huge an influence or not.	Civic Hall	Appreciation

Figure 7 3　The Throwing Room and the Civic Hall show the Cause of Accomplishment and Appreciation. Source: Diagrams Drawn by the Author; Architectural Plans originally from (Pearman 2021).

The Long and Full-lasting Impact

In contrast to the above two categories of data, the data from the third type of process in perceptual learning are more critical. When the recruited visitors' emotions have a long-lasting impact on their feelings, their emotions regarding learning within the MoM become more complex, like stimulation and curiosity (Figure 7.4). Both of these can have a long-term impact (Table 7.10). Even this type of long and full-lasting impact still relies on the interaction within different rooms.

On one side, in the Gateway, Ovs' attention not only focuses on the textual information but is also supported by sounds; in addition, they can interact with the System of Cogs and Derwent Valley Mills. Here, the milieu becomes a unity with multiple

sensory designs to assist them in understanding the history of industrial heritage. This is why OVs felt their interests were stimulated by multiple interactions.

On the other side, the workshop on the Lego Model attracts WPs to participate because of curiosity. This type of attraction does not only rely on the branding of Lego as the only reason. This workshop involves a model of the Lake District and others, like communicating with artists and freely playing with the Lego bricks.

Table 7 10   The Data shows Recruited Visitors' Emotions with Long-lasting Impact of Feeling. (Source: Summarised by the Author).

Emotion (With Long-lasting Impact of Feeling)			
Participants	**Reasons**	**Rooms**	**Theme**
OV/WP	• Although the exhibition may not provide detailed explanations, communication between the exhibition and visitors can stimulate interest. • I think it is not the only way to learn, it involves many forms of exhibits to stimulate your perceptions to learn.	Gateway Gateway	Stimulation
WP	• This curiosity led me to become interested in the actual exhibition and subsequently participate in the workshop.	Workshop	Curiosity

Figure 7 4   The Gateway and the Workshop show the Cause of Stimulation and Curiosity. Source: Diagrams Drawn by the Author; Architectural Plans originally from (Pearman 2021).

Summary

In this study, the average museum visit frequency among the group of 10 OVs and 5 WPs - accounting for 26% of the total sample - is once per month. This visit to the MoM marks their first perceptual experience in the space. As a result, they approached the visit with fresh perspectives, driven by curiosity and personal interest, without external pressures.

This summary examines how the MoM functions as a space for perceptual learning through three distinct layers, influenced by both architectural settings and exhibition elements. As illustrated in Table 7.11, these layers highlight the substantial impact of museum spaces on visitors' perceptual learning experiences.

The first layer involves the industrial atmosphere, which evokes personal, inwardly directed and private perceptions. Unlike the more structured viewing experiences in the Civic Hall or Assemblage Room, hands-on activities in this setting offer strong interaction, particularly on weekends, reinforcing the museum's engagement and participatory nature. As discussed in 6.4.4 Summary, this setting strengthens visitors' engagement with history, fostering participatory natural perceptions such as relaxation, enjoyment, and engagement.

The second layer encompasses interactive exhibits in the Throwing Room and personal narratives in the Civic Hall, both designed to engage visitors through participatory experiences. As noted in 6.2.2 'Show and Tell', the Throwing Room consists of ten circular exhibitions as distinct characters, designed to invite visitors to explore both historical and contemporary aspects of making. Meanwhile, the Civic Hall, although primarily an introductory space, encourages visitors to share collective memories, enabling them to develop a sense of appreciation through comparison with their own life experiences. Combined, these experiences shape individual personal narratives.

The third layer pertains to the multi-sensory design in the Gateway, aimed at creating lasting emotional impacts. As

discussed in 6.2.3 'Creating an Authentic Milieu', the Gateway is characterised by its authenticity and employs various interpretative techniques to narrate the story of the Derwent Valley Mills World Heritage Site. These techniques include reading visual information, viewing paintings, and listening to audio content such as podcasts, forming a cohesive learning environment. By stimulating multiple sensory experiences, these elements create an 'authentic milieu,' where artifacts are connected through varied sensory modes.

In conclusion, these three layers of perceptual learning demonstrate the strong relationship between museum architecture and exhibition design, as shown in Table 7.11. Architectural materials play a foundational role in the adaptive reuse of industrial buildings, reinforcing the industrial atmosphere. Additionally, interactive exhibits are essential for providing immediate feedback, fostering a sense of accomplishment, and encouraging visitors to share collective memories. Finally, to create a lasting impact, museums should consider developing an 'authentic milieu' that blends multi-sensory experiences and offers varied degrees of sensory stimulation to enhance learning about industrial heritage.

Table 7 11   The Summary of Perceptual Learning. (Source: Summarised by the Author).

Perceptual Learning				
	Theory	**Data**	**Rooms**	**Reasons**
1	Inwardly directed and private	Relaxing/Enjoyable/Engaging	Workshop	Day and Atmosphere
2	Outwardly directed and public, starts to impact the mind	Accomplishment/Appreciation	Throwing Room/Civic Hall	Interaction and Personal Narrative
3	The long and full-lasting impact of feelings requires consciousness	Stimulation/Curiosity	Gateway/Workshop	Interaction and Multi-sensory

7.3.2.3 Cognitive learning

Perceptual learning refers to all knowledge that can be centred on perception and resources, as awareness-making happens in the museum. However, meaning-making as the next level of learning type occurs when visitors' memories and experiences transform their museum visit into new knowledge and understanding (O'Connor et al. 2020). Furthermore, visitors make 'meaning' through a constant process of remembering and connecting. While museums play an educational role, both perception and learning depend on the accommodation of new information into existing mental structures and frameworks.

During the process of cognitive learning, the physical and social

context shapes recall and connects to the past, and the past

experience shapes present meaning (Silverman 1995).

Claxton defines the whole process of 'intelligence'; the first part

of this model is that the specifics of thought, action, and

perception emerge; the second part is that memories are

retrieved, plans are laid, words are chosen, and attention is

swivelled in one direction rather than another (Claxton 2015).

Table 7 12   The data shows recruited visitors' senses and associated memory, which contributes to the intelligence. Source: (Claxton 2015, p.130)
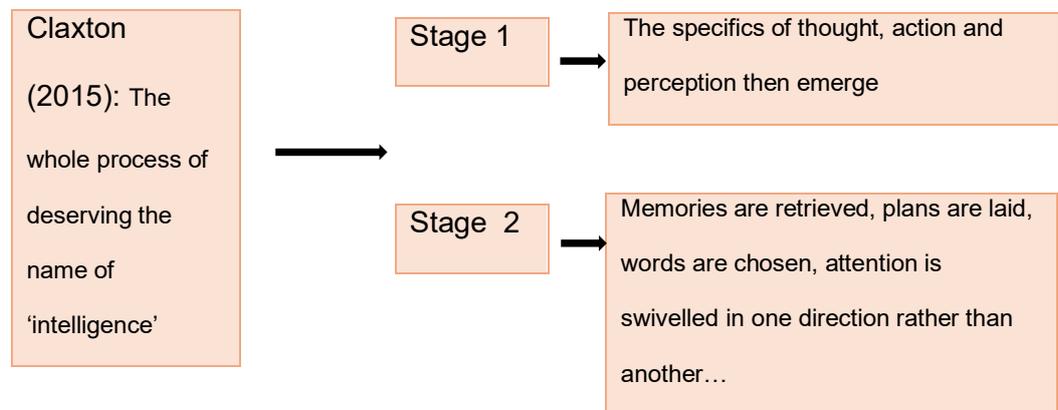
Based on these two stages of the model of the 'intelligence', the

data in relation to the sense of knowledge was selected to

respond to step one, regarding the specifics of emerging

thought, action and perception. The date from the second time

interviewee who visited the MoM 6 months before, in relation to

the associated memory, responds to step two, regarding how the memory is retrieved.

Sense of Knowledge Criticism

In contrast to the three types of perceptual learning, which focus on the emotional charge of learning, the 'sense of knowledge' refers to knowledge acquisition that is directly linked to sensory experiences, including understanding, interaction, inspiration, and research (Figure 7.5).

Similar to perceptual learning, knowledge acquisition is closely associated with interactive exhibits within the Gateway and workshops. However, unlike perceptual learning, the key difference lies in the depth of knowledge gained, which extends beyond external environmental stimuli. Notably, perceptual learning is not explicitly addressed in the Assemblage Room.

As shown in Table 7.13, visitors reported experiencing understanding in the Assemblage Room, the Gateway, and the Workshops. One notable reason for this is the international backgrounds of many visitors, which shaped their engagement with the architecture and exhibits.

In the Assemblage Room, visitors gained insights into the glory of British industrial history and its level of modernisation through

the shelf displays. They also found inspiration in the collections, which were organised by material categories.

In the Gateway, interaction with the System of Cogs helped visitors understand engine mechanics, appreciate its historical significance to the city, and commend the power of science. Additionally, exhibits in the Gateway, particularly the System of Cogs and the Derwent Valley Mills (a UNESCO-recognised industrial heritage site), left a lasting impression, encouraging further independent research beyond the visit.

In the workshops, visitors engaged with local artists, learning new skills while gaining a deeper understanding of creative thought processes and techniques.

Table 7 13   The data shows Recruited Visitors with a Positive Sense of Knowledge. (Source: Summarised by the Author).

Sense of Knowledge			
Participants	**Comments**	**Rooms**	**Theme**
OV/WP/WP/OV/OV	The assemblage helped me understand the glory of British industrial history and its level of modernisation. In the workshop, the explanations from local people made my understanding became much clearer.	Assemblage Workshop Workshop Gateway Gateway	Understanding

	In the workshop, helped me for better understanding of the thought process and techniques. I think the science is powerful. They mention the importance of the city, and the benefits of this, like this kind of engine, which is related to science. Understanding of engine knowledge.		
WP/WP	I really enjoyed this workshop, especially because it was held in a museum, allowing for better interaction with the audience and the exhibits, and the workshop and the museum space complemented each other rather than conflicting. This kind of workshop allows you to get hands-on experience with materials that you don't usually encounter, such as ink.	Workshop Workshop	Interacting
OV/WP/WP/WP/WP	In the Assemblage room, they arrange different areas by categories of materials to inspire you to make. Acquiring inspiration for the work from different ages. This experience reignited my childhood dreams and rekindled my pursuit of a certain aspiration. Although I am not skilled in poetry, the inspirational thinking and the influence of the environment allowed me to deeply engage in the workshop.	Assemblage Workshop Workshop Workshop Workshop	Inspiring

	For beginners, this workshop is already quite satisfying. It focuses more on engaging you and generating interest.		
OV	Seeing a particular exhibit may prompt visitors to continue researching related knowledge after leaving the museum, such as the mechanics of gears or the world's industrial heritage.	Gateway	Researching
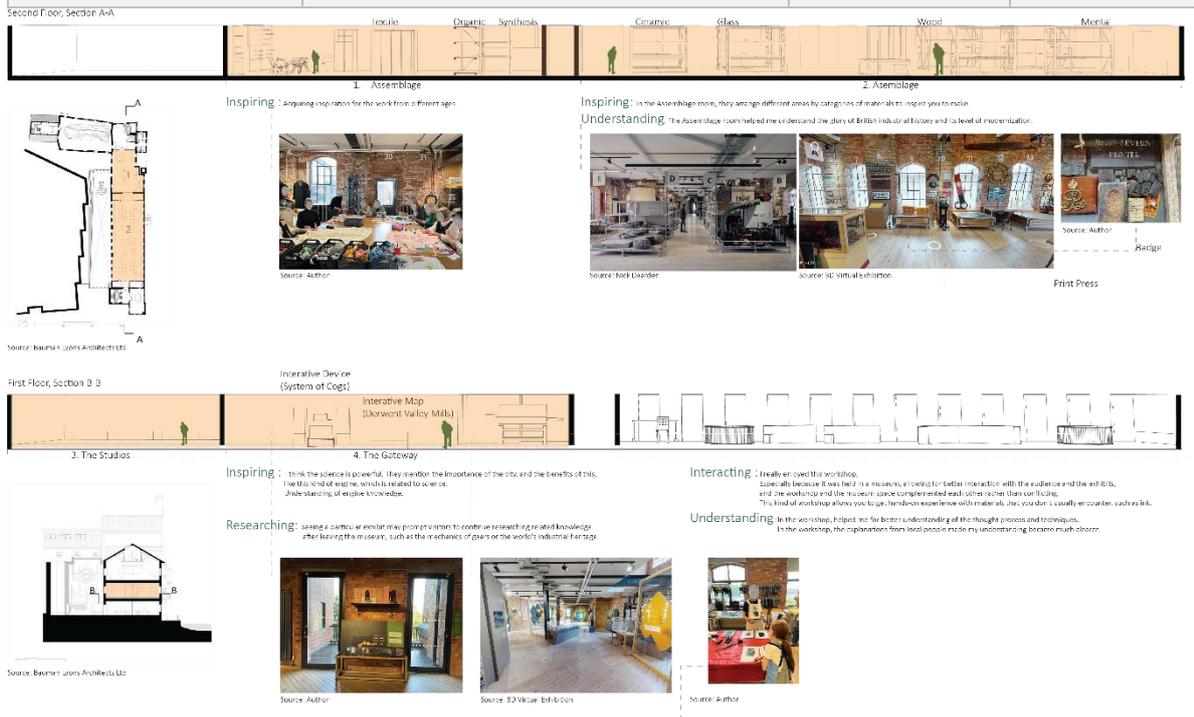
Figure 7 5   The Assemblage room, the Gateway and the Workshop show the cause of understanding, interacting, inspiring and researching. Source: Diagrams Drawn by the Author; Architectural Plans originally from (Pearman 2021).

However, when comparing learning experiences between the museum and the university, recruited visitors identified five key areas of critique related to the museum's ground and first floors. These critiques included a lack of in-depth thought and discussion, a lack of focus and logical flow, knowledge that needs to be recreated instead of reading text, descriptive learning approaches, and short engagement times (Figure 7.6). A finding from the research is that the MoM provided a more superficial learning experience due to the absence of opportunities for deep discussion in terms of interpretation.

Table 7 14   The data shows recruited visitors with a negative sense of knowledge.

Sense of Knowledge (Recommendations)			
Participants	**Comments**	**Rooms**	**Theme**
WP/WP	Regarding this exhibition, I found it somewhat traditional and lacking in-depth thought. It aims to attract residents from the surrounding area to participate, rather than fostering a professional atmosphere for in-depth discussions.	Workshop Workshop	Lacking in-depth thought and discussion
OV	Lack of focus. Only things that one has made with their own hands evoke emotional and memory responses. It is crucial to use space effectively to tell stories in a more logical, sequential, and engaging manner.	Civic Hall Gateway	Lack focus Lack logic

OV	Learning from text alone is ineffective because knowledge needs to be created rather than merely copied.	Civic Hall	Knowledge needs to be recreated instead by reading text
OV/OV	Different educational backgrounds lead to different understandings of knowledge. Descriptive learning is more akin to hermeneutics.	Throwing	Descriptive Learning
WP	The visitor stays for a few minutes to try.	Workshop	Stay for a Short Time
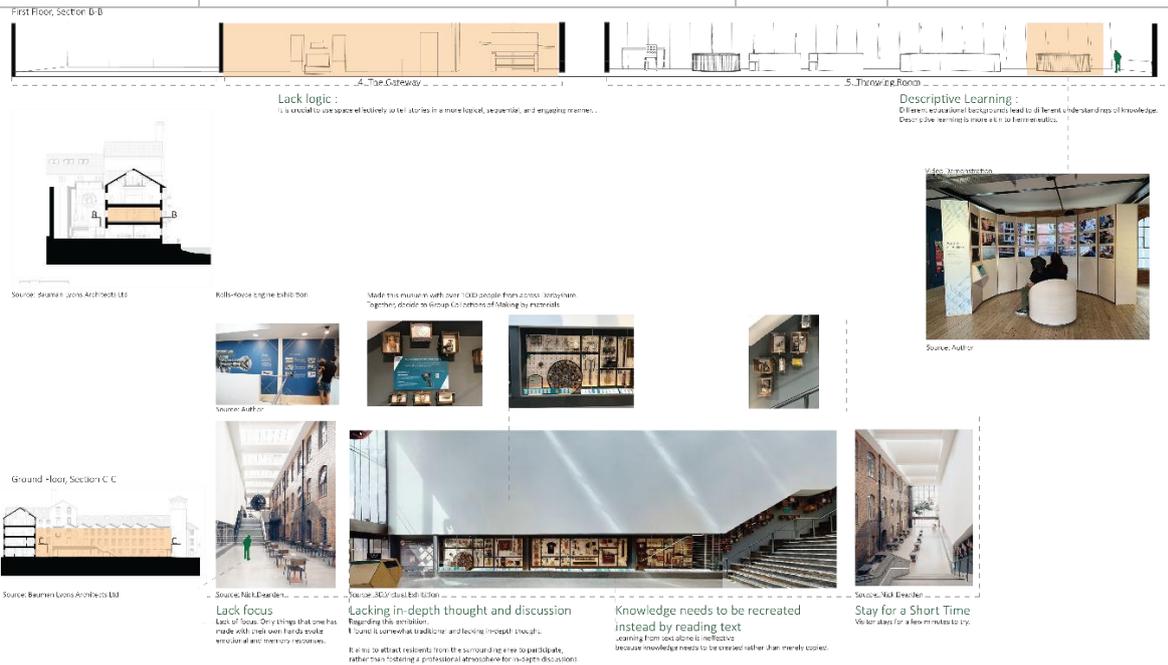
Figure 7 6   The five main areas of critique focused on the museum's ground and first floors. Source: Diagrams Drawn by the Author; Architectural Plans originally from (Pearman 2021).

On the ground floor (as discussed in Chapter 5.5.1), half of the space is occupied by the River Kitchen, while the other half houses an exhibition space known as the Civic Hall. Although the entry hall features an introductory display with material groupings labelled *Who, When, Where, How, and Why*, visitors criticised this approach for lacking depth and critical engagement, perceiving it as primarily designed to attract local residents.

Additionally, two large objects - a partially disassembled Toyota car and a Rolls-Royce Trent fanjet - are suspended from the ceiling. While these exhibits highlight Derby's transformation from textile manufacturing to advanced transportation technology, visitors felt that the presentation lacked clarity and focus, particularly for international audiences. Moreover, the reliance on textual information limited the depth of learning, as visitors had to actively interpret the content without sufficient interactive or contextual support.

On the first floor, the Gateway and Throwing Room were the most popular areas, based on visitor-engaged time spent. However, visitors also provided recommendations for improvement. Although the Gateway aims to create an 'authentic milieu' by introducing the history of Derwent Valley

Mills as a World Industrial Heritage site, visitors suggested that a more cohesive narrative would better connect the objects, presenting history in a logical, sequential, and engaging manner.

In the Throwing Room, visitors appreciated the circular video displays showcasing artists' creative processes in their studios. However, they found the interpretive approach overly descriptive, requiring them to rely heavily on personal knowledge to fully understand the content.

Overall, the MoM's interpretive approach appears to cater more effectively to local and national audiences rather than international visitors. This aligns with the MoM's expected scope and target audience, which focuses on community engagement, knowledge exchange, and skill development to shape collections, experiences, and narratives relevant to contemporary life. Notably, 46% of visitors are from Derby or Derbyshire, reinforcing this local emphasis.

Associated Memory

This part of the further study explores the second part of Claxton's concept of 'intelligence', defined as the process of retrieving memories. The data was gathered from five STIs, all with teaching experience, who participated in follow-up

interviews conducted between three and six months after they visited the MoM. The interviews focused on a specific question:

- *"Have you remembered any kind of knowledge from this museum experience? What have you learned?"*

In response, interviewees' memories of MoM centred around four key aspects: historical significance, architectural form, atmosphere, and visual impact. Notably, their recollections were more strongly associated with the museum's architecture than with its exhibitions, as shown in Table 7.15.

First, the building's historical significance left a lasting impression, particularly in relation to industrial history. MoM spans over 300 years, embodying the power of time through two key dimensions: spatial continuity and temporality. As discussed in 5.2   Contextual Overview, in terms of spatial continuity, the MoM building stands as a testament to industrial culture. It is an integral part of the Derwent Valley Mills industrial landscape, where textile technology innovations influenced the development of mill buildings. At the same time, this industrial heritage has driven urban growth in Derby, a transformation also reflected in the museum's exhibits (Figure 5 *3*). For example, collections such as the disassembled Toyota car and the Rolls-Royce Trent fanjet illustrate the evolution of advanced technology,

showcasing Derby's transition from textile manufacturing to modern engineering excellence.

Many visitors expressed the opinion that the MoM instils a sense of pride in the city and its industrial heritage. The museum serves as a bridge between past and present, allowing visitors to explore the history of Derby's industries and urban development. From a temporal perspective, the building itself retains traces of various tectonic events embedded within its walls, and shaped by multiple architects over time. For instance, a dark circular mark left by an old waterwheel remains visible on the wall, alongside a blend of historical red brick walls and contemporary glazed facades. These elements highlight the museum's authentic historical context while showcasing modern design interventions that reflect its ongoing evolution. (Shown in Figure 5 8).

Second, the architectural form of the museum itself resonated strongly with visitors' memories. The building's design closely resembles modern factory architecture, fostering a strong connection to Derby's industrial past. During the Industrial Revolution, the textile industry played a leading role, and Derby was home to the oldest water-powered textile factory, built in 1702. For those learning about industrial architectural forms, the

MoM provides a space for visitors to visualise and connect with the historical narrative of the region's industrial heritage.

Third, the restored building creates a distinctive industrial atmosphere, contributing to its unique character (Figure 7.7). This aligns with the structuralist concept of a universal and collective framework in human thought. While not immediately apparent, MoM's social patterns are meaningfully structured through temporality and reinforced by collective memory, enhancing visitors' recollections. For instance, in learning about urban history, the Old Shop gallery presents framed and digital images linked to significant historical events in Derby. The space, fully illuminated by artificial lighting, intertwines visual and spatial experiences (6.3.1 Bodily Imagination). Similarly, the workshops at MoM exemplify how an industrial atmosphere can foster a supportive environment for skill development.

Finally, the visual impact created by the museum's collection displays is significant in learning about the production of industrial goods, including patterns, materials, forms, and structures (Figure 7.7). In the Assemblage Room, the variation in scale among collections - ranging from large to small artifacts - creates a visually striking experience that draws visitors in and encourages deeper engagement with industrial history.

Overall, the MoM plays a crucial role in knowledge retrieval through memory, particularly in relation to industrial history, architectural form, urban history, manufacturing processes, and hands-on learning. As illustrated in the second part of Claxton's concept of 'intelligence', the museum serves an important educational function in cognitive learning, allowing visitors to construct meaning from knowledge through an ongoing process of remembering and connecting.
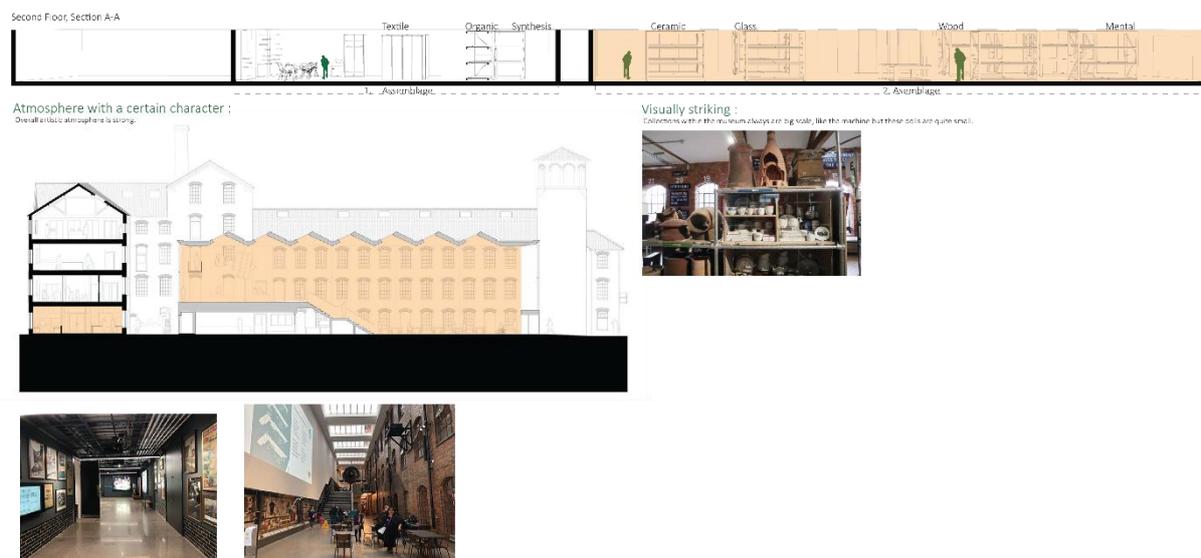
Figure 7 7   The Atmosphere with a Certain Character and Visually striking in the MoM. Source: Diagrams Drawn by the Author; Architectural Plans originally from (Pearman 2021).

Table 7 15   The Data shows Recruited Visitors with the Associated Memory. (Source: Summarised by the Author).

Associated Memory			
Participants	**Comments**	**Object**	**Theme**
STI/STI/STI	This historical imprint signifies the power of time and the meaning it imparts to human society, while also influencing modern design. As a result, I became interested in and learned about industrial history, as I was immersed in the historical atmosphere. They are really proud of their cities and makers, you can learn the history of the city, it is a really context-led museum.	Museum Exhibition City	Historical Significance
STI	The second point is that the architecture itself has a strong identification with modern factory forms.	Museum	Arch form
STI/STI	The thing that gives me the most impression is the Old Shop, like a cinema room Overall artistic atmosphere is strong, The setting is what first comes to mind, rather than the specific activities I engaged in. Within a scene's arrangement, there may be certain character elements that leave a profound impression on the audience. As mentioned previously, the artist embodies many symbols, which represent the essence of art itself—an expression of semiotics in art—and also reflect different characters.	Old Shop Workshop	Atmosphere with a certain character

STI/STI	Collections within the museum always are big scale, like the machine but these dolls are quite small. Although the items in the storage space may not have significant exhibition value individually when displayed together, they create a visually striking and aesthetically valuable experience.	Throwing Assemblage	Visually striking

As shown in Table 7.16, compared with recommendations concerning the cognitive experience of knowledge retention, visitors three to six months after their visit emphasised their embodied, physical memory of the museum's architecture over its interpretive displays. This finding suggests that the adaptive reuse of the MoM's industrial architecture may be more effective in engaging visitors than its current interpretative approach.

The museum's architectural design, with its logical spatial structure, functions as a navigational tool, enabling visitors to understand and interact with objects organised within the space. By fostering a cognitive learning process rooted in bodily exploration and spatial discovery, the museum architecture effectively enhances visitors' understanding of industrial and historical knowledge through their visiting experience.

Additionally, visitors recommended enhancing the narrative structure of the museum's interpretive displays to create a more cohesive framework for understanding the exhibits. Furthermore, lighting, layout, and signage within the historic sections of the building could be optimised to create a more immersive experience, fostering deeper curiosity and enriched learning.

Table 7 16   The data shows recruited visitors' recommendations. (Source: Summarised by the Author).

Associated Memory (Recommendations)			
Participants	**Comments**	**Object**	**Theme**
STI/STI	Timelines and storylines are key to how exhibitions are arranged. When space is combined with a timeline, it leaves a deeper impression. I can't remember the others due to their weak logic.	N/A	Timeline and Storyline
STI	In a history museum, the space could descend or the lighting could dim, creating a sense of oppression (with lower light and ceiling height). This would evoke a physical memory in visitors	N/A	Bodily Memory

Summary

Claxton's framework provides theoretical support for two layers of the cognitive learning process: the acquisition of knowledge and the reinforcement of associative memory. Empirical data indicate that among the 10 OVs and 60% of WPs, many visitors come from academic backgrounds above Level 7 and expect a more advanced level of cognitive learning compared to general visitors.

The first layer pertains to the acquisition of knowledge, encompassing understanding, inspiration, and interaction, which were primarily facilitated in the Assemblage Room and workshops. The Assemblage Room can be understood as a modern reinterpretation of the Cabinet of Curiosities (4.3.1 Historical Models), fostering intimate encounters between collections and visitors. With no curator-led interpretation, the Assemblage Room itself becomes a historical narrative, aligning with Serota's concept of a museum as a dynamic space for discovery, and Kahn's design concept of the library emphasises the vitality of the act of reading. As a result, visitors perceive this space as one of interaction and inspiration. Additionally, the structured hands-on experiences (6.3.2 Hands-on Interactions) are deeply embedded within community participation, offering an

emotionally engaging learning environment that evokes collective memory, where people share knowledge and skills.

Despite engaging with exhibitions and workshops, visitors - particularly those with academic backgrounds - critiqued the museum's ability to foster deeper cognitive learning, citing a lack of critical thought and discussion. The museum's primary focus is on community engagement rather than academic discourse, aligning with its original mission and terminology, which emphasise Human-Centred Design, Community, Co-production, and STEAM principles. The MoM is the first major museum in the UK to be developed through a participatory process, involving the public from the outset and focusing on sustainable community development. While the Human-Centred Design approach strengthens asset-based community development, it may not fully satisfy visitors seeking in-depth engagement with collections. Although the museum's atmosphere and architecture attract visitors interested in industrial heritage, its simplified interpretative methods may limit long-term engagement.

The second layer of cognitive learning involves the reinforcement of associative memory. Claxton's theory suggests that cognitive learning is enhanced through specific thoughts,

actions, and perceptions, making the MoM's spatial memory framework particularly effective for knowledge retention. Two key factors strengthen this process.

One is the spatial impact - the museum's architecture, as a historically significant structure, serves as a physical representation of industrial culture. During the Industrial Revolution, Derby was a centre for textile production, home to the first fully mechanised factory built in 1721 (3.3.2.3 Urban Permanence). The restoration of Derby Silk Mill while preserving historical traces exemplifies adaptive reuse, offers visitors an authentic engagement with industrial history. The other one is the visual impact - in addition to restoration efforts, the MoM employs a preservation concept symbolised by the mathematical 'absolute value' (3.3.1.3 Adaptive Reuse with Mathematical Symbols), maintaining the building's historical integrity while incorporating modern additions such as the Civic Hall and River Kitchen. This approach allows the museum to inherit the spirit of making from the past while simultaneously showcasing technological advancements for modern life. The Assemblage Room's visually striking collections further enhance cognitive learning, providing an aesthetically rich environment that fosters memory retrieval.

Overall, as shown in Table 7.17, memory retrieval at the MoM is primarily driven by its architecture and the Assemblage Room. Improving the museum's interpretative approach - through a cohesive timeline and structured narrative - could further enhance visitors' memory retention related to industrial history. Additionally, a layered spatial design with varied lighting could deepen bodily memory, aligning physical space with cognitive engagement.

Table 7 17   The Summary of Cognitive Learning. (Source: Summarised by the Author).

Cognitive Learning						
	Theory	**Data**			**Rooms**	**Reasons**
1	Sense of Knowledge	Understanding	Interacting	Inspiring Researching	Workshop Civic Hall Gateway Throwing	'Cabinet of Curiosities' Hands-on Experience
	Recommendation	Lacking in-depth thought and discussion Descriptive Learning	Lack focus Lack logic	Knowledge needs to be recreated instead by reading text		N/A

		Stay for a Short Time				
2	Associated Memory	Historical Significance	Arch Form Atmosphere with a certain character	Visually striking	Museum Assemblage	Spatial continuity and temporality Arch Form as a sign Vision Impact
	Recommendation	Timeline and Storyline	Bodily Memory			N/A

7.3.2.4 A Third Learning Space

The concept of a third learning space refers to the informal

learning that exists between the structured environments of

schools and workplaces. While the MoM has faced some

criticism regarding its capacity to foster deeper cognitive

learning, such as a lack of in-depth thought and discussion, it

nonetheless functions as an inspirational setting, particularly for

students of architecture. This section discusses how different

visitor groups engage with learning at the MoM, highlighting its

benefits as a space that bridges formal and informal modes of

knowledge.

Learning Engagement across Visitor Groups

The two visitor groups demonstrate contrasting forms of engagement, illustrating how spatial design shapes exhibition settings and influences learning.

Among residents of Derby and Derbyshire (46% of museum visitors), learning tends to rely more on perceptual than cognitive modes, as many visit without the explicit intention of acquiring new skills. For these visitors, the museum functions as a 'third space': an extension of everyday life where they can socialise, relax, and engage informally. Workshop participants (WPs), in particular, were strongly influenced by the museum's industrial atmosphere and distinct spatial character. Observations, informal conversations, and interviews confirm that emotional connection is the most significant driver of learning for this group. Here, spatial embodiment and active engagement stimulate both perceptual and cognitive responses, deepening the meaning of the museum experience.

The Gateway exemplifies this process. Designed as an immersive entry point into Derbyshire's industrial heritage, it uses multi-sensory experience to create an authentic milieu and a lasting emotional impact. Beyond individual responses, collective memory also plays a crucial role. MoM's collections,

largely derived from Derby and Derbyshire, express civic pride and continuity, linking the city's historic innovations, such as the Silk Mill, with modern industries like Rolls-Royce, Toyota, and the Railway Technical Centre. In this way, the museum enables residents to discover new perspectives on familiar histories, reinforcing both individual memory and communal identity.

This strong local connection is not accidental. MoM was originally developed through a participatory process (2011–2017) that prioritised community involvement and sustainable development. More than a decade later, this ethos remains central to its operation.

In contrast, occasional visitors (OVs) from international backgrounds rely more on formal interpretation. Unlike residents, they often seek the authoritative linear communication to gain in-depth knowledge, step-by-step, gradually adding new information to their knowledge base (Hein 1998). To a certain degree, it argues that Hooper-Greenhill's opinions regarding the outcome are far less important than the process in museum learning (Hooper-Greenhill 1994).

Distinctive Advantage - Dialogue

At the MoM, dialogue functions as a dynamic communicative tool that fosters reflection and action in the learning process

(Freire 2020), as summarised in Table 7.19. Unlike static learning methods, such as reading exhibit descriptions, dialogue encourages visitors to question, respond, and interact. Although the MoM primarily facilitates introductory rather than advanced intellectual discussions, its unique emphasis on dialogic exchange positions it as a 'third learning space', where knowledge is generated through reflection and engagement with the external world.

Dialogue at the MoM takes two main forms: first, the interaction between visitors and the museum, and second, face-to-face dialogue in workshops. The Civic Hall (ground floor) exemplifies the first form, where exhibitions invite visitors to contribute personal stories, knowledge, and experiences, transforming displays into citizen-curated spaces. In the Throwing Room (first floor), visitors extend this exchange through written reflection by composing postcards about their museum experience. The second form of dialogue is seen in the Lego Workshop, where visitors engage directly with artists, asking questions, discussing creative processes, and exchanging ideas in real time.

In addition to these structured formats, spontaneous dialogue often occurs in the Assemblage Room. This room was frequently described as a 'treasure trove' or an 'antique shop',

this space functions as a 'library of industrial production', contrasting with more traditional industrial museums such as the Nottingham Industrial Museum, which focus primarily on machinery and processes.

Overall, dialogue plays a central role in shaping MoM's participatory character. By actively inviting visitors to contribute knowledge and memories, the museum distinguishes itself from curator-led institutions and positions itself as a dynamic, evolving cultural space shaped by its audiences.

Table 7 18   The Format of Reflection and Action within the Museum of Making. (Source: Summarised by the Author).

Reflection and Action			
Formats	Dialogue (Written Communication)		Dialogue (Verbal Interaction)
Location	Civic Hall	Throwing Room	Workshop
Interpretation	Exhibition	Postcard	Lego
Context	Encourage visitors to add their stories, knowledge and experiences to the collections.	Encourage visitors to write their feelings about this museum.	This workshop involves an exhibition and talks with artist

Contributions to Architectural Students

In the second round of interviews, five STIs with teaching experience reflected on the benefits of the MoM as a learning environment, particularly for architecture students. When asked, '*If the museum is the third learning space, how does it fit into academic and workplace learning?*', four main advantages emerged, as the Table 7.19 shows: (1) bridging theory and practice across disciplines, (2) fostering teacher–student engagement, (3) providing direct visualisation, and (4) enabling interactive learning.

Table 7 19   The Summary of the MoM as a Third Learning Space. Source: (Clapham and Barata 2024)

A Third Learning Space Cultural Education and Others (Clapham and Barata 2024)			
Academic-based Formal learning	Museum of Making		Workplace-based Informal leaning
Bridging the gap between theory and practice Bridging the gap among disciplines	Teacher-student Engagement	Direct Visualisation	Interactive Space
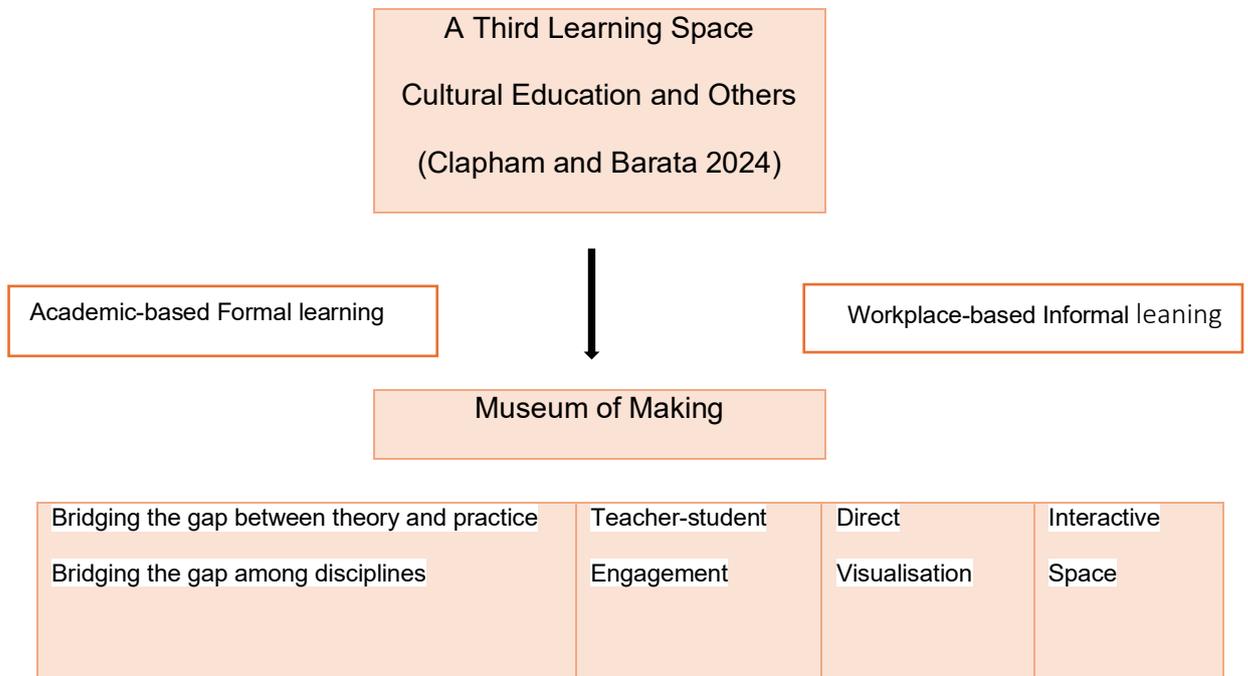
Bridging theory and practice across disciplines: Academic education often emphasises theory over practical application.

The MoM helps students connect abstract knowledge with lived experience. For instance, observing a simple pottery cup in the Assemblage Room allows students to imagine its social use, production process, and historical background, linking design with sociology. Equally, by examining industrial engines, students can explore intersections between architecture, engineering, and the humanities (OV02 2024).

Teacher–student engagement: Unlike traditional lecture-based learning, the MoM fosters multi-generational and interdisciplinary exchanges. The Assemblage Room in particular encourages autonomous exploration, critical reflection, and knowledge-sharing, enabling richer discussions between teachers and students (OV02 2024).

Direct visualisation: The museum itself functions as a spatial model for learning (OV07 2024). In the Textile section of the Assemblage Room, students engage directly with raw materials, weaving machines, and models, experiencing design concepts through touch and sight. This setting transforms abstract architectural ideas into concrete, sensory experiences (WP04 2024).

Interactive space: The MoM promotes interaction both with objects and people. Exhibits such as the *System of Cogs* allow

students to grasp structural principles through hands-on engagement, while workshops encourage dialogue with museum staff, peers, and artists, reinforcing participatory learning.

Overall, the MoM offers a comprehensive social learning environment for architecture students, integrating visualisation, practice, and dialogue. Beyond professional training, it encourages students to engage with broader societal issues. In the context of pedagogical experiments within architectural education, a community-focused approach rather than one bound solely by market-driven professional practice, this approach may more effectively engage current students, new graduates, academics, and practitioners in social movements and the reimagining of a post-carbon world (Fleming and Ghosn 2024). In this regard, the Assemblage Room serves as a modern reinterpretation of the Cabinet of Curiosities, enabling students to situate design practice within wider socio-cultural contexts.

From a practical perspective, the MoM itself is a valuable architectural case study. Its adaptive reuse of industrial heritage, retaining the *making* spirit while incorporating contemporary interventions, embodies spatial continuity and temporal

progression. This dual character positions the MoM as both a model of heritage conservation and an inspiration for adaptive design in contemporary architecture.

7.4 Conclusion

The Museum of Making adopts an innovative approach to establishing itself as a third learning space, integrating both architectural design and exhibition curation. Through spatial analysis and interviews focusing on visitor learning experiences, the MoM is identified as a bridge between formal and informal learning environments, enhancing its long-term impact on visitors' cognitive engagement.

Based on the evaluation of this case, four key principles emerge for future museum designs that prioritise learning. These include two tangible elements (historical authenticity and industrial atmosphere) and two intangible elements (collective memory and narrative space).

Authenticity is a foundational value for heritage museums. Through adaptive reuse, the MoM successfully preserves the 'making spirit' of its 300-year history, ensuring spatial continuity and temporal progression. This allows visitors to draw inspiration from the city's technological legacy. The MoM functions as a time capsule, reflecting societal evolution.

Whether through its architecture or collection materials, these elements are essential in linking learning programs, technological advancements, and urban growth, ultimately enhancing visitor engagement while addressing the needs of contemporary society.

The industrial atmosphere plays a crucial role in supporting exhibitions and workshops at MoM. The Gateway Room fosters an immersive environment, naturally stimulating visitors' curiosity. Hands-on workshops invite visitors to develop their skills through this interactive engagement, whether internal reflection or active participation, both reinforcing spatial experiences, facilitating deep and lasting learning.

Collective memory is preserved and reinforced through sustainable community engagement, ensuring that the 'making spirit' is passed on across generations. Notably, museum activities serve as expressions of local identity, fostering a sense of belonging and strengthening visitors' connection to the city's heritage.

However, beyond the architectural atmosphere, effective museum interpretation can be enhanced through a narrative-driven approach. By integrating architectural ambience with storytelling, museums can create compelling experiential

environments that not only immerse visitors in history but also encourage them to write their own narratives. These multi-layered experiences in architecture and exhibition design contribute to lasting memories and promote repeat visits.

Chapter 8 – OVERALL DISCUSSION

8.1 Introduction

The primary objective of this chapter is to address the research gap by examining how industrial museums facilitate visitor engagement through learning experiences, with a particular focus on the Museum of Making alongside other industrial museum examples.

This chapter is divided into three main sections: identifying three key impacts influencing the learning experiences, comparing industrial Museum learning models, and active learning in the 'real' museum.

Regarding three key impacts extracted from the MoM, First, the integration of architectural form and materiality as active agents in shaping sensorial and cognitive experiences; second, the role of embodied engagement and dialogic interaction in extending visitor participation; and third, the interplay of locality and authenticity in reinforcing collective memory and cultural identity. By highlighting these dimensions, the study situates the MoM as a transitional model within industrial museum practice.

The discussion proceeds through a comparative reading of industrial museums, analysing the MoM alongside six other examples: Ironbridge Gorge Museums, Gladstone Pottery

Museum, Black Country Living Museum, Shrewsbury Flaxmill Maltings, the Heineken Experience, and the Prince Philip Maritime Collections Centre. This comparison demonstrates how the MoM distinguishes itself from both locality-driven and curated experiential models by combining authentic industrial heritage with open-ended, dialogic engagement.

Finally, the paper explores the MoM's role in facilitating active learning in the 'real' museum. Through its spatial strategies and adaptive reuse, the MoM enables visitors to engage with history bodily, sensorially, and reflectively, fostering a deeper connection between past and present. This focus on the 'real', which is defined in alignment with UNESCO's conception of authenticity, positions the MoM as a model for future industrial museums, where the preservation of tangible and intangible heritage can be combined with immersive and participatory forms of learning.

8.2 Identifying Three Key Impacts Influencing the Learning Experiences in the MoM

This study examines the reactivation of industrial buildings converted into museums and their capacity to engage visitors through learning experiences. To identify the key spatial elements that enhance visitor engagement, data were collected from 59 industrial museums across Great Britain and the

European Union, with 17 related museums visited for spatial analysis. A rational selection model - considering year, region, and architectural reused programmes - was applied to determine the most appropriate case study, ultimately identifying The Museum of Making as the primary focus.

Three key impacts were identified at the MoM, each of which influences the learning experience by integrating theoretical perspectives with empirical data (Table 9.1). These are: visual impact, spatial perception, and transmission of knowledge.

The visual impact of architectural form and materials is central to the adaptive reuse of the Derby Silk Mill into the MoM. These spatial qualities shape visitors' perceptions through atmosphere, light, texture, and rhythm, while also guiding embodied experiences via architectural promenade. Through its sensitive reuse of industrial heritage, the MoM positions the community at its core, transforming the site from a static container of collections into a dynamic, lived space.

The MoM distinguishes itself by integrating embodied experiences directly into its interpretive strategies, positioning spatial perception as a central mode of engagement. Unlike narrative-driven approaches in many museums, MoM uses spatial and material engagement to activate learning. Key

methods include the history book model, open storage, multi-sensory design, and hands-on workshops. These encourage visitors to learn not only through cognitive processing but also through sensory immersion, movement, and active participation.

Beyond architecture and interpretation, the MoM fosters learning through dialogic communication. Instead of relying on a monologic model of knowledge transmission, it encourages self-directed exploration and participatory dialogue. Exhibitions, workshops, and interactive installations invite visitors to co-construct meaning, share experiences, and connect personal narratives with broader heritage stories. In doing so, MoM transforms learning into a collaborative process that deepens engagement and reflection.

Table 8 1   The Key Findings of this Study Focused on the Case of the MoM. (Source: Created by the Author)

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                        ┌──────────────────────┐
                        │ Overall Key Findings │
                        └──────────────────────┘
        ┌───────────────────────┬───────────────────────┐

┌─────────────────────┐  ┌─────────────────────┐  ┌─────────────────────┐
│   Visual Impact     │  │  Spatial Perception │  │  Transmission of    │
│                     │  │                     │  │    knowledge        │
│ Architectural Form  │  │ Embodied Experience │  │                     │
│   and Materials     │  │                     │  │      Museum         │
│                     │  │                     │  │                     │
│                     │  │                     │  │   Communication     │
└─────────────────────┘  └─────────────────────┘  └─────────────────────┘
          │                  │           │              │           │
┌──────────────────┐  ┌────────────┐ ┌──────────┐ ┌───────────┐ ┌──────────┐
│   Industrial     │  │Multi-sensory│ │ Hands-on │ │ Monologue │ │ Dialogue │
│   Atmosphere     │  │ Interaction │ │ Workshop │ └───────────┘ └──────────┘
│   supports       │  └────────────┘ └──────────┘
│   Spatial        │  ┌────────────┐ ┌──────────┐
│   Perception     │  │History Book│ │   Open   │
└──────────────────┘  └────────────┘ │ Storage  │
                                     └──────────┘
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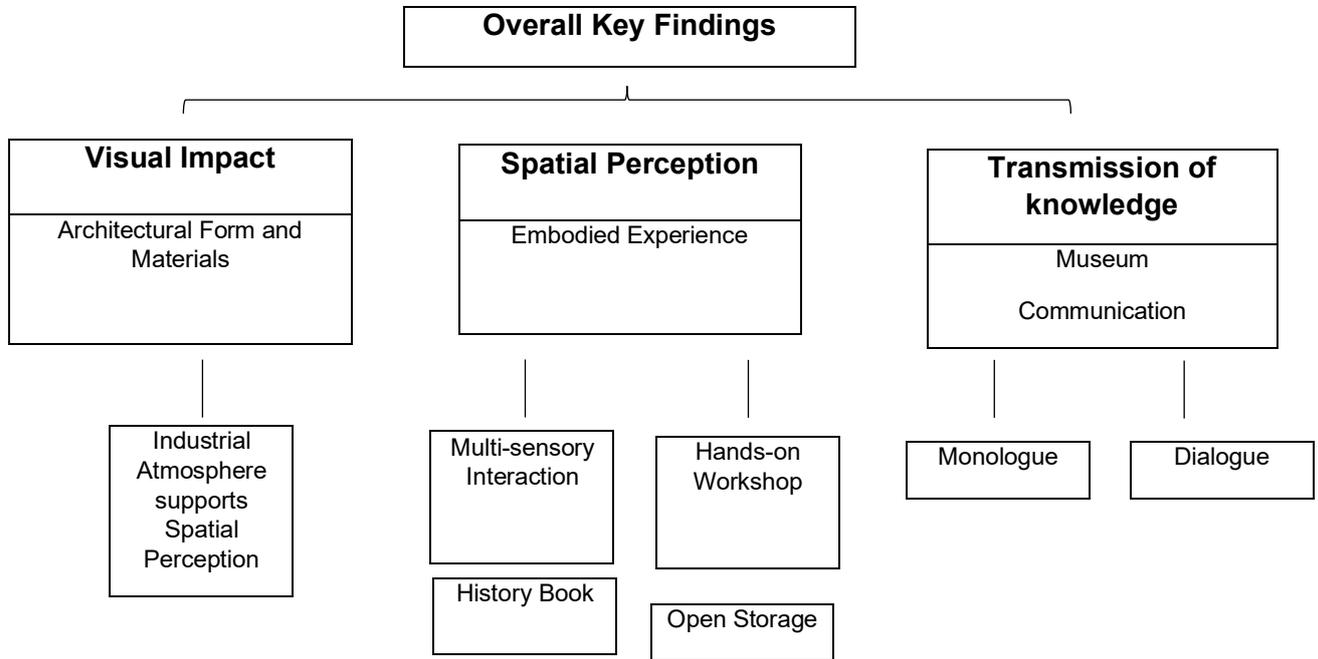
8.2.1 Visual Impact

Following the decline of manufacturing, two contrasting approaches emerged for dealing with industrial heritage: restoration, which focuses on repairing damaged parts of a building to recover its original function (see 3.3.1 Design Intervention and Table 3.1), and adaptive reuse, which seeks to revitalise buildings by accommodating contemporary needs and envisioning future uses. As drawn in the 7.4 Conclusion, the MoM exemplifies the latter. Its most significant contribution lies in preserving the 'making spirit' that has endured for more than

300 years, achieved through spatial continuity and temporal progression.

Throughout its transformation, the MoM adopted an 'absolute value' design approach, aiming to preserve the inherited spirit of making while reactivating the site for new generations. The result is a hybrid space that combines authentic restoration of historical fabric with contemporary design interventions. Empirical findings suggest that this balance between old and new enhances *associative memory*: visitors' first impressions are strongly shaped by the architectural form, which simultaneously imprints lasting memories. Similarly, the layering of building materials contributes to sensorial richness, stimulating both imagination and emotional engagement.

While many studies emphasise 'light touch' restoration methods, prioritising minimal mechanical interventions. The MoM demonstrates the distinct value of adaptive reuse. Here, the architectural form of the original Silk Mill is not simply preserved but extended through carefully integrated additions. Old and new structures blend to create a distinctive industrial atmosphere while accommodating modern public use (see Figure 8.1).

1717 Lombe Mill   1974 Derby Industrial Museum   2021 Museum of Making
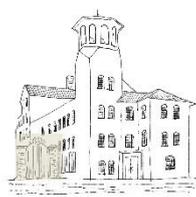
Figure 8 1   The Transformation from the Derby Silk Mill to the Museum of Making. (Source: Drawn by the Author)

Based on the empirical data, two elements stand out as pivotal in shaping the visual impact of transformed industrial spaces: architectural form and materials. These elements fundamentally support spatial perception by defining architectural atmosphere, while simultaneously enhancing embodied experience. In doing so, they not only preserve industrial heritage but also foster deeper community engagement, positioning the MoM as a model of adaptive reuse.

8.2.1.1 Architectural Form

The MoM is one of seven industrial mills along the River Derwent, constructed between 1771 and 1849, which share a common industrial typology yet retain distinctive features. As the world's first modern factory to adopt waterpower, the Silk Mill marked a defining moment in global industrial history and a turning point in Derby's urban identity. Transitioning from mill to museum, its architectural form now functions as a powerful

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vehicle for memory, allowing visitors to connect with the city's industrial legacy while engaging with new cultural meanings in the post-industrial era.

Drawing on semiotic theory, the MoM building can be understood as a *sign*. Referring to 3.2.1.2 Historical Review, in Saussure's terms, its physical form (the signifier) evokes mental concepts of industrial heritage (the signified). Building on Barthes' notion of the fluidity between signifier and signified, the MoM not only enables visitors to visualise the industrial past but also embodies the ideology of official industrial history (Leach 1997b). In this sense, the architectural form mediates a dialogue between building, city, and industrial landscape, positioning the MoM as both historical marker and contemporary cultural artefact. A comparison can be drawn with the Gladstone Pottery Museum, where the kiln, once a utilitarian structure, has been reinterpreted as an abstract symbol of cultural identity.

Empirical findings further suggest that MoM's architectural form supports memory retrieval and meaning-making. By preserving authentic structures while introducing carefully integrated interventions, the museum enhances spatial continuity and temporal progression, helping visitors establish cognitive connections to industrial history (OV01 2024). This aligns with

Claxton's argument that learning emerges when visitors transform memories into new understanding (Claxton 2015). The building thus becomes more than a container of objects: it is a cognitive and emotional framework that helps visitors establish connections between past experiences and present interpretations (Silverman 1995).

Furthermore, the MoM's architectural form also operates as a communicative sign within the wider city. Situated within the Derwent Valley Mills World Heritage landscape, it reinforces spatial continuity with other heritage sites such as the Derby Museum and Art Gallery (Victorian era) and Belper Mill (part of the DVMs). Through its dual role as preserved fabric and adaptive reuse, the museum embodies both historical integrity and contemporary relevance, offering a logical structure that continues to support human activity. The architectural form of industrial museums plays a crucial role in facilitating the learning of industrial aesthetics and historical value (Carpo 2001). By preserving and showcasing authentic industrial structures, these museums provide visitors with a more practical educational experience, allowing them to engage with the form and function that define industrial heritage.

Finally, the blending of old and new forms in spaces such as the Civic Hall and River Kitchen creates a semi-architectural promenade. This curated sequence enhances embodied experience, shaping visitor consciousness and emotional states. As a result, architectural form functions not only as a symbolic link to industrial heritage but also as a dynamic framework for physical memory and lived experience.

8.2.1.2 Architectural Materials

Within the MoM, preserved traces of the former waterwheel remain embedded in the industrial wall, originally the Silk Mill's external boundary, now reinterpreted as an interior partition on the ground floor (Figure 5.8). Encountering this wall creates an immediate sensory connection to the site's industrial past, immersing visitors in a spatial and material experience that can suspend their sense of time (Nathania and Wahid 2022). Over time, this first impression develops into an embodied engagement shaped by the material's historical resonance.

The triple-height atrium extends this dialogue between past and present, incorporating steel and glass alongside Edwardian red brick. The juxtaposition of the white-painted grafted wall with the original brickwork highlights a layered materiality, immersing visitors in a hybrid environment where old and new coexist.

Such contrasts foster subjective experiences and heighten spatial imagination.

Comparable strategies are evident in the Heineken Experience in Amsterdam (see 4.3.3.1 Heineken Experience), where modern steel-and-glass façades are integrated with traditional Dutch windows, and monumental tiles are reused to create continuity between historic and contemporary interiors. Both cases illustrate how material juxtapositions provide a tangible journey across temporal layers.

Empirical findings suggest that materiality not only enhances perception but also encourages active participation. For instance, the circulation route from the Civic Hall to the Italian Mill employs spatial sequencing and material contrasts to cultivate a sense of movement and orientation. This, in turn, fosters imaginative connections to Britain's industrial history, reinforcing both cognitive and embodied learning. Visitor feedback, particularly from workshop participants, underscores that materiality is central to establishing an authentic industrial atmosphere and strengthening community engagement.

8.2.1.3 Summary
As industrial museums continue to evolve, the MoM provides key insights into how adaptive reuse can be leveraged to create

immersive, educational, and socially engaged environments. By preserving historical authenticity while fostering new forms of interaction, the MoM exemplifies a model for future museum design, balancing the past and present to ensure its continued relevance for future generations. Architectural form and materials are central to shaping sensorial experiences and fostering learning about industrial history. Beyond conveying aesthetics and historical value, restored and repurposed materials invite visitors to connect past and present through imaginative engagement.

For architecture students, the MoM offers a critical case study that bridges theoretical knowledge and practical application, reinforcing its role as a third learning space for industrial heritage and architectural education.

In sum, form and materiality are not only essential to the adaptive reuse of industrial buildings but also integral to shaping visitor learning. The MoM's careful balance of spatial continuity and historical preservation demonstrates how industrial museums can serve as immersive, interactive, and socially engaged environments. Preserving authenticity while encouraging new modes of participation, the MoM provides a

model for future museum design, one that sustains cultural

relevance while inspiring future generations.

8.2.3 Spatial Perception
8.2.3.1 Museum Typology and its Time

The spatial typology of the MoM is strongly influenced by the

Cabinet of Curiosity model, aligning with Nicholas Serota's view

that museums should minimise curatorial over-interpretation and

prioritise personal discovery (Serota 2000).

Referring to 3.4.2 Clock Time and Human Time, time emerges

as a central theme in industrial museums. *Clock time* is

embedded in preservation and adaptive reuse, marking

transitions from past to present. At the MoM, this is expressed

architecturally: floor tiles trace the course of the River Derwent,

while exposed industrial walls retain the imprint of the former

waterwheel, anchoring the site within its industrial history.

Yet beyond clock time, the MoM engages with *human time*, a

more subjective, experiential temporality. On one level, curators

organise exhibitions in a linear, chronological sequence. On

another, visitors interpret freely. They fill narrative gaps, reframe

exhibits, and construct meaning through self-guided exploration.

In this way, the MoM becomes a dynamic learning space where

perceptions of time shift according to visitor engagement.

Drawing on (Kavanaugh 2013). The interplay of objects, materials, light, and spatial form produces an experience of *becoming* rather than static *being*. Immersion in the museum thus contrasts with routine temporal perception, offering visitors a sense of 'slowed time' through reflective encounter.

8.2.3.2 Promenade Architecturale
This phenomenon reflects Merleau-Ponty's theory (Hale 2017), which positions the visitor's body, not the collections themselves, as the origin of spatial perception (Figure 4.2). Within the MoM, the interplay of old and new materials fosters curiosity, inviting visitors to engage visually and tactilely, and to reimagine the past through embodied interaction. In the context of the *promenade architecturale*, this experience unfolds as a progressive sensory journey: as visitors move, their perceptions and emotions evolve, deepening empathy with the environment (Mallgrave 2018a). The alternation of dynamic and static rhythms thus plays a crucial role, enabling intuitive and personal navigation of space.

Empirical data confirm that embodied engagement is the MoM's primary spatial characteristic. Rather than depending on curatorial sequencing, visitors experience time subjectively, fostering self-directed learning.

Civic Hall and River Kitchen is a transitional space where historic and contemporary structures intersect. Natural light and a layered staircase encourage vertical movement and contrast between old and new. While not a full promenade in Le Corbusier's sense (Samuel 2010), it aligns with his principle that curated movement enhances spatial engagement.

While the MoM successfully creates embodied engagement, empirical data also point to areas for improvement. Spatial sequencing could be extended to create richer layers of promenade across the museum, while enhanced wayfinding and signage would strengthen both memory formation and collective engagement.

8.2.3.3 Bodily Engagement
Multi-sensory Interaction: The Gateway

The Gateway is a space of situated heritage, strongly tied to the Derwent Valley Mills landscape. Here, multi-sensory interaction (sight, touch, sound) reinforces visitors' connection to the place. It exemplifies multi-sensory engagement, creating a natural learning atmosphere with lasting emotional impact. Empirical data show that this environment stimulates both introspective reflection and active participation. Interactive elements, such as waterwheel-powered machinery and digital maps, both of these

enhance tactile engagement, while authentic materials establish an *authentic milieu*, emphasising the 'power of the real' in conveying intangible history.

Significantly, certain artefacts, including letter books and original Silk Mill products, these remain in their original geographical location, reinforcing MoM's role as a *situated museum space* (4.3.2 Situated Museum Space). These objects carry the past into the present, enabling visitors to construct rational models for understanding historical relationships (Moore 2000). Quantitative findings highlight this room as the space where visitors spent the longest average time, underscoring its effectiveness in sustaining engagement.

Open Storage: The Assemblage Room

The Assemblage Room, inspired by Cabinets of Curiosity, this area promotes free exploration. With minimal curatorial direction, visitors interpret collections individually, reinforcing autonomy and imaginative engagement. It reflects the Cabinet of Curiosity model, employing classification and framing as interpretive strategies. Open-shelf displays encourage free exploration, inspiring many visitors to connect imaginatively with Britain's industrial history. For architecture students, this

typology fosters critical reflection on the sociological contexts of design and production.

However, limitations remain. Open storage lacks the interpretive depth needed for an international academic audience, and its emphasis on local engagement can limit broader scholarly discourse. Despite these challenges, the Assemblage Room represents a hybrid model that blends museum and library typologies. Drawing on Louis Kahn's vision of books and readers as active participants rather than static presences, the room becomes a dynamic repository of diverse knowledge, connecting past, present, and future.

Hands-on Workshops

Hands-on Workshops embody the MoM's ethos of 'making'. By combining historical context with active participation, workshops extend the promenade beyond observation into tactile learning. In addition to permanent spaces, the MoM fosters temporary forms of bodily engagement through workshops, such as *Quilts of Connection* in the Assemblage Room and the Warehouse's Lego Workshop. These activities immerse visitors in tactile interaction—handling fabric fragments or constructing giant Lego models of the Lake District—while encouraging dialogue with artists.

Aligned with Derby Museums' ethos of '*making museums together with the head, heart, and hands'* (Derby Museums 2016), workshops stimulate curiosity, support Claxton's model of intelligence (Claxton 2015), and strengthen community engagement. They act as social spaces where newcomers and experienced practitioners exchange skills and knowledge, reinforcing MoM's role as both a cultural and civic forum.

1 - *'Promenade Architecturale'*
2 - Multi-sensory Interaction
3 - Open Storage
4 - Hands-on Workshop
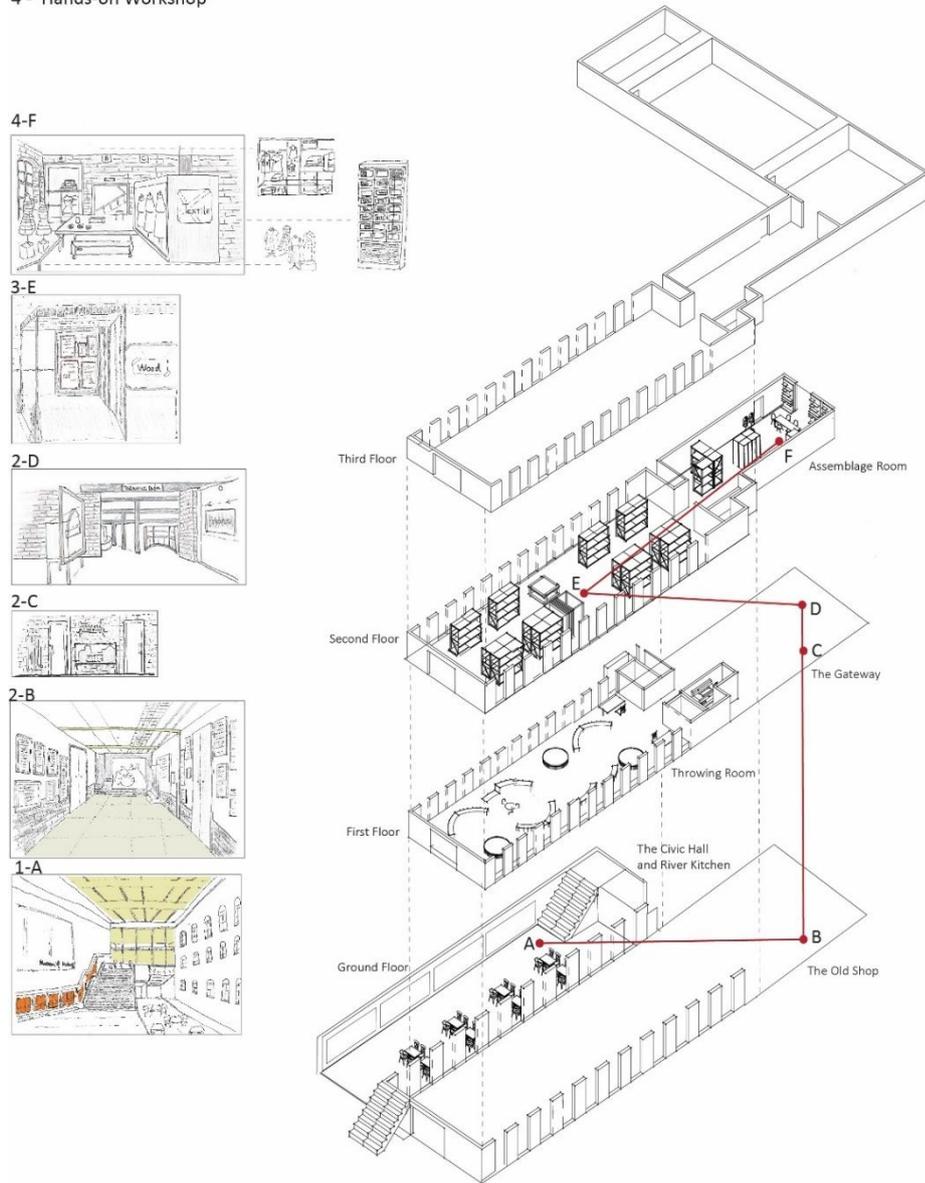
Figure 8 2   Embodied Engagement in the Museum of Making.
(Source: Drawn by the Author)

8.2.3 Transmission of Knowledge

In Western contexts, museums play a major role in the dissemination of knowledge, serving as stimulating environments for learning and the development of new insights (Yu and Hirzel 2024). Within museums, both architecture and interpretation are central to knowledge transmission, shaping how visitors engage with and acquire information. However, how do visitors actually gain knowledge in a museum setting? As discussed in Chapter 7.3.2.4, a bridge exists between museums and visitors, shifting the learning model from monologue to dialogue.

8.2.3.1 Monologue

The majority of industrial museums present their industrial heritage through chronologically structured exhibitions, often housed within original industrial buildings. For instance, the exhibition at Shrewsbury Flaxmill Maltings is arranged in a linear format to introduce its identity as a 'factory of ideas' (Shrewsbury Flaxmill Maltings 2024). Similarly, Ironbridge Gorge, a larger-scale example, places its industrial heritage narrative across multiple sites, including the Museum of Iron and the Old Furnace, the latter standing as a monument to industrial legacy (UNESCO 1986).

In both cases, knowledge transmission relies on passive engagement, where history is silently showcased within its situated space - the industrial heritage itself. However, this approach mirrors traditional formal education, adopting a monologic model of knowledge transmission. According to Hein (Hein 1998), visitors acquiring new information in this format follow a linear, step-by-step process, much like a formal classroom setting.

Industrial museums typically mediate content through exhibitions and artifact displays, often relying on verbal and textual formats (Hanks 2012). This one-way transmission-absorption model positions the museum as an authoritative source of knowledge, aligning with its educational mission. However, knowledge retention depends on individual visitor experiences, resulting in varying levels of recall and understanding (Ben-Eliyahu 2019).

As Serota argues, this type of curated space resembles a historical book, requiring visitors to follow a structured, sequential narrative (Serota 2000). While this model allows for efficient knowledge acquisition, it limits active participation, reducing visitors to passive recipients of information.

A contrasting example is the Heineken Experience, referring to Figure 4 11an industrial museum that integrates spatial

characteristics, architectural materials, and interactive elements to engage visitors. Here, knowledge transmission is structured around guided routes, incorporating visual communication, interactive exhibitions, and hands-on activities. However, in this case, knowledge is often perceived as a commodity, serving both educational and commercial branding purposes (Hooper Greenhill 1992).

Thus, two distinct monologic approaches to knowledge transmission emerge within museums.

One is the Curated Space, which requires visitors to follow a structured narrative, similar to reading a historical book, but limits active participation, reinforcing a passive learning experience.

The other one is the commercialised space, which utilises branding and marketing strategies to frame knowledge as a commodity and engages visitors through interactive storytelling, but often within a commercialised agenda.

Both models reflect different strategies for transmitting knowledge, yet they share a reliance on top-down, structured learning processes that limit visitor autonomy in meaning-making.

8.2.3.2 Dialogue

In contrast to monologue-based interpretation, which is widely adopted in industrial museums for knowledge dissemination, dialogue offers a historically rooted and modern approach to engaging visitors.

Historically, museums originated as the first and foremost study collections, with libraries functioning as repositories of knowledge. Their purpose was not only to display artifacts to the curious but also to make collections accessible to those seeking knowledge, actively contributing to mass education (Vergo 1989). Today, much like in their early beginnings, museum communication has shifted from authoritative, linear models to positioning visitors as active participants in the construction of meaning (Hooper-Greenhill 2000).

As a result, dialogic and participatory approaches have increasingly replaced one-way communication models in modern museum practice (Johansen 2022), allowing visitors to become active interpreters and contributors to the museum experience.

Industrial museums naturally lend themselves to dialogic engagement, as they often incorporate living heritage and craft-based interactions. A notable example is the Gladstone Pottery

Museum, where former pottery workers share first-hand memories and expertise, teaching traditional pottery-making techniques and demonstrating wheel-throwing skills to younger generations. These real-life conversations foster direct and meaningful dialogue between museum practitioners and visitors.

Similarly, referring to 5.2.3.2 Post-Industrial Era, the transition from Derby Silk Mill to the MoM reflects an ongoing dialogue between historical and contemporary culture - from silk thread production to the collaborative slow-stitch quilt project. This continuity in cultural meaning-making exemplifies how industrial museums can connect past and present through participatory engagement.

To develop and sustain authentic dialogue in industrial museums, a community-driven approach is essential. Local communities serve as cultural agency, evoking collective memory and reinforcing the museum's role as a dynamic social space.

Industrial heritage sites - with their preserved buildings and embedded histories - possess a unique advantage in supporting social practices that vary across socio-cultural contexts. This aligns with the situated action theory, which emphasises how

physical environments shape human interaction (Miller and Rudnick 2010).

Within these situated social practices, hands-on engagement becomes a powerful medium for transmitting empirical knowledge. Traditional techniques, passed down through craft-based apprenticeships, gain new relevance as they are experienced and reinvented by contemporary learners. This reflects the philosophy of embodied learning described by Pallasmaa in *The Thinking Hand*, where manual skills and material engagement serve as a bridge between past expertise and future innovation (Pallasmaa 2009).

By integrating community participation, historical expertise, and hands-on interaction, industrial museums can extend their role beyond static exhibitions, fostering sustained dialogue and intergenerational knowledge exchange. This dialogic approach strengthens the social and educational impact of industrial heritage sites, reinforcing their role as living, evolving spaces of learning and cultural continuity.

8.2.3.3 Summary
Museums function as learning spaces, acting as spatial mediums for knowledge transmission. They serve as stimulating environments where visitors can develop new skills and acquire

new knowledge. In industrial museums, sustained dialogue through community engagement plays a crucial role in facilitating meaningful learning experiences. Looking ahead, museum education will increasingly emphasise wholeness - a union of mind, body, and spirit - as a distinctive approach to communication and engagement (Hooks 1994).

Dialogue serves as a dynamic and communicative tool that fosters reflection, action, and critical thinking while promoting active visitor engagement (Freire 2020). At the MoM, dialogue takes two primary forms: one is the written communication, such as visitor reflections and collective storytelling, and the other one is verbal interaction like direct engagement with museum staff and artists, referring to Table 7 19.

Additionally, dialogue in industrial museums is often accompanied by hands-on experiences, creating a culture of touch that enhances visitor-object interaction and deepens tactile learning experiences.

Beyond industrial museums, the Prince Philip Maritime Collection Centre provides an exemplary purpose-built model for fostering visitor engagement. By offering behind-the-scenes experiences, it allows visitors to explore hidden treasures and engage in direct conversations with museum staff. This

approach strongly aligns with the library typology, where visitors actively engage with curated collections and knowledge resources.

Similarly, specific areas within the MoM - such as The Workshop - are evolving into interactive learning spaces, developing hands-on programmes such as 'maker-in-residence' scheme that utilise machinery and equipment. Through strong community engagement, these programmes provide a more immersive and participatory approach to knowledge transmission.

8.3 Comparing Industrial Museum Learning Models

To situate the MoM within wider industrial museum practice, this study compares it with six examples: Ironbridge Gorge Museums, Gladstone Pottery Museum, Black Country Living Museum, Shrewsbury Flaxmill Maltings, Heineken Experience, and Prince Philip Maritime Collections Centre. Of these, the Prince Philip Maritime Collections Centre is newly constructed, while the Black Country Living Museum has been relocated; the remaining four exemplify adaptive reuse of industrial buildings.

Within the scope of adaptive reuse, Ironbridge Gorge Museums, Gladstone Pottery Museum and Shrewsbury Flaxmill Maltings provide the closest parallels to the MoM. Ironbridge, as part of

the Ironbridge Gorge World Heritage Site, is widely recognised as the 'birthplace of the Industrial Revolution', while the MoM is embedded within the Derwent Valley Mills, both UNESCO-designated landscapes. The Coalbrookdale Museum of Iron at Ironbridge shares with the MoM a comparable socio-cultural context: both preserve original equipment and products as artefacts that symbolise the achievements of industrial history. Together with Gladstone Pottery Museum and Shrewsbury Flaxmill Maltings, these institutions exemplify museums that retain a strong, inherited industrial 'DNA' rooted in their locality, where learning emerges organically through sensory perception and emotional engagement with authentic artefacts and environments.

In contrast, the MoM does not rely solely on the atmospheric qualities of industrial heritage to evoke nostalgia. Instead, it seeks to engage visitors through intellect (head), emotion (heart), and creativity (hands). Its spatial configuration is flexible and contemporary, providing open environments that support diverse forms of learning and participation (MS01 2024; Derbymuseums 2023c). This approach both strengthens connections to Derby's industrial and cultural identity and expands opportunities for creative and interactive engagement.

The result is a lighter, more integrated spatial experience that encourages longer visits and fosters deeper learning.

Within the scope of effective learning environments, the Heineken Experience and the Prince Philip Maritime Collections Centre strongly emphasise embodied learning, engaging visitors through multi-sensory, physical, and emotional experiences (Tzortzi 2017). By contrast, the MoM is less orchestrated in terms of staged experience or sensory immersion. While the Heineken Experience carefully guides visitors through a choreographed spatial and narrative journey, the MoM adopts a more dialogic model of engagement. Its emphasis lies in dialogue rather than traditional curatorship. Drawing on Freire (2020) concept of dialogic education, the MoM fosters critical thinking and participatory engagement, positioning visitors as co-creators of meaning rather than passive recipients of knowledge.

In summary, as Table 8.1 shows, the Museum of Making blends qualities of both locality-based and dialogic learning models. Its distinctive contribution lies in fostering two-way communication within an authentic industrial environment, enabling visitors to both absorb information and co-create knowledge through dialogue. This process can be framed through the perspective of

situated culture, which becomes dialogical engagement when

paired with meaningful action (Dine 2021).

Table 8 2 Comparative Summary of Industrial Museums.
(Source: Summarised by the Author)

Museum	Typology & Context	Learning Model	Visitor Engagement	Distinctive Contribution
Ironbridge Gorge Museums	Restored and used as a museum, within the Ironbridge Valley of Invention, a UNESCO World Heritage Site	Locality-based, heritage-driven	Sensory engagement with preserved artefacts, strong industrial 'DNA'	Immersion in authentic industrial heritage through direct material connection
Gladstone Pottery Museum	Restored and used as the pottery museum	Locality-based	Sensory engagement and direct contact with artefacts	Strong rootedness in local craft traditions
Black Country Living Museum	Relocated buildings are used as the museum, and create a reconstructed industrial townscape	Experiential, immersive	Performative, role-played, community narrative design	Engages visitors through reconstructed industrial environments rather than original fabric
Shrewsbury Flaxmill Maltings	Adaptively reused as the workplace and museum exhibition	Educational	Interpretation of structural innovation within an exhibition	Presents industrial history as an architectural and technological milestone
Heineken Experience	Adaptive reuse of a brewery	Orchestrated embodied learning, heritage-driven	Curated spatial and sensory journey; highly choreographed	Effective commercial model of immersive narrative
Prince Philip Maritime Collections Centre	New-build storage and workplace	Guided tour, Behind the scenes	Structured access to collections with the guided tour	Contemporary model of storage-led, visitor-centred education
Museum of Making	Adaptively reused as an integrated museum, within the Derwent Valley Mills UNESCO World Heritage Site	Locality-based, heritage-driven, spontaneous embodied learning	Sensory engagement with a strong industrial 'DNA'. Open-ended, dialogic engagement; participatory workshops	Blends authenticity with co-creation; emphasises situated culture and dialogical engagement

8.4 Active Learning in the 'Real' Museum

Comparison with other industrial museum learning models highlights that the distinctive educational value of industrial museums lies in their engagement with the 'real'. Within the UNESCO World Heritage glossary, the 'real' is closely associated with authenticity, a core criterion for site nomination. Authenticity may be expressed through attributes such as form, materials, function, traditions, and spirit (Glossary 1994).

At the MoM, although architectural form, materials, and functions have been reinterpreted through adaptive reuse, the enduring *spirit of making* remains intact. This continuity constitutes the museum's most authentic dimension. The MoM therefore exemplifies a transitional model of industrial museum practice, bridging traditional industrial heritage with contemporary design.

From a learning perspective, the MoM combines features of both locality-based and dialogic learning models, underpinned by its spatial configuration. Industrial museum spaces, by virtue of their industrial 'DNA', inherently reveal the function, materiality, and cultural resonance of the objects they contain. Rather than constraining artefacts within a prescribed narrative, the MoM fosters perceptual autonomy, activates multiple

senses, and supports deeper experiential understanding. This aligns with Kolb's theory of learning styles, which extends beyond structured educational environments into informal learning contexts. Central to this model is the learner's active involvement in a cyclical process, in which learning may occur through concrete experience, reflective observation, abstract conceptualisation, and active experimentation (Black 2005). The MoM's spatial and material strategies allow visitors to engage bodily and sensorially, thereby reinforcing this cycle of learning through doing, feeling, and reflecting.

Similarly, Falk and Dierking's Contextual Model of Learning (O'Connor et al. 2020) emphasises that museum learning occurs through the interaction of personal, sociocultural, and physical contexts. At the MoM, the personal context is supported by subjective and imaginative engagement; the sociocultural context is embedded in its workshops and community-driven ethos of 'making museums together'; and the physical context is anchored in its adaptive reuse of authentic industrial fabric. Together, these create a multilayered environment where authenticity not only preserves history but also facilitates dynamic learning.

For international visitors, the MoM's architectural form and materials invite imaginative engagement with the past and present. For local communities, it's the embedded industrial spirit that reinforces collective memory and strengthens a sense of place. These experiences are transmitted informally across generations, transforming memory into knowledge through natural learning processes.

Aligned with UNESCO's definition of authenticity, the impact of the 'real' operates at two levels. Tangible authenticity resides in the preserved form, materials, and function, while intangible authenticity is embedded in traditions and spirit. Both dimensions shape the MoM's distinctive learning environment, sustaining personal interpretation and collective memory. Ultimately, this dual authenticity enables the MoM to operate as a site of active learning, where human connection, experiential immersion, and cultural continuity converge.

8.5 Conclusion

The Museum of Making represents a significant evolution in the practice of industrial museums, demonstrating how adaptive reuse can extend beyond the preservation of material heritage to generate meaningful learning experiences. By embedding authenticity in both tangible and intangible dimensions, through

its form, materials, traditions, and spirit. The MoM bridges the industrial past with contemporary cultural and educational needs.

The comparative analysis with other industrial museums highlights how the MoM occupies a distinctive position between locality-based and experiential models. While institutions such as Ironbridge Gorge Museums and Gladstone Pottery Museum emphasise inherited industrial 'DNA', and others like the Heineken Experience foreground orchestrated sensory immersion, the MoM instead advances a dialogic approach. Through open storage, hands-on workshops, and multi-sensory spatial design, it fosters active and participatory learning where visitors co-create meaning rather than passively consume curated narratives.

From a pedagogical perspective, the MoM demonstrates the value of active learning in the 'real' museum, where embodied engagement and dialogic interaction are grounded in authentic environments. In doing so, it supports multiple modes of learning, including cognitive, sensory, and emotional. These align with theories of experiential and dialogic education. For local communities, the MoM reinforces collective memory and

sense of place, while for international visitors it offers an imaginative and immersive encounter with industrial heritage.

In sum, the MoM marks a transitional model for industrial museums, one that integrates heritage authenticity, spatial design, and participatory practice. Its contribution lies not merely in preserving the material traces of industry, but in reconfiguring them as catalysts for critical reflection, creative engagement, and lifelong learning. As industrial museums continue to evolve, the MoM offers a compelling framework for rethinking how the past can inform, inspire, and educate in the present.

Chapter 9 – CONCLUSION

9.1 Introduction

This concluding chapter weaves together the threads of the research, providing an overview of the findings, contributions, limitations, and future research directions that have emerged from this study. By examining the reactivation of industrial buildings converted into museums through the learning experience, the study has uncovered valuable insights into architectural design methods for enhancing visitor experiences.

As this chapter summarises the key findings, it also reflects on the broader significance of the research, acknowledges its limitations, and outlines potential directions for future inquiries.

9.2 Conclusion: Revisiting the Research Questions

The Museum of Making, shortlisted for the Art Fund's 2022 *Museum of the Year Award*, has declared its ambition to use history as a foundation to inspire new creativity. Its distinctive spatial configuration, integrating historical and contemporary elements, offers a valuable case for examining how architecture supports museum activities.

9.2.1 Addressing the First Sub-question

'What key elements influence the adaptive reuse of industrial buildings as museums?'

The first part of the research reveals multiple perspectives on the conceptualisation and realisation of the industrial museum. Drawing on a structuralist paradigm, the analysis integrated both the design intervention process and outcomes, as well as an in-depth study of the MoM. This approach highlights not only the uniqueness of industrial heritage architecture but also the enduring role of authenticity in shaping its value for future generations. To reinterpret structuralism in practice, several relevant examples were examined, including Gladstone Pottery Museum, Salts Mill, and the Black Country Living Museum. In addition, two contrasting strategies of design intervention: imitation and identification, were analysed, demonstrating how industrial museum spatial settings actively sustain cultural continuity and foster a sense of imagined community.

The empirical investigation of the main case study employed a comprehensive methodology. Site-based techniques included documentary research, mapping, sketching, photography, modelling, and observation, while user-focused studies involved time-spent measurements, behavioural trajectory, and semi-structured interviews. This mixed-methods approach ensured a holistic understanding of the adaptive reuse process, from two

perspectives, enabling findings to align directly with the original research objectives.

The findings emphasise two key elements that require careful treatment by architects: the preservation of building form and the conservation of original materials. These are not only vital as tangible components of a 'living artefact' but also function as curatorial devices capable of actively conveying meaning to visitors. On one level, they provide international visitors with concrete points of learning, while on another, the integration of new extensional spaces, particularly those employing natural light, creates distinctive atmospheres that expand industrial museums beyond traditional functions into dynamic social environments.

Finally, this part of the study shows that authenticity, expressed through preserved form and materials, has the potential to guide future models of industrial museums. However, drawing on Merleau-Ponty's notion of bodily intentionality, the findings also suggest that visitor experience could be enhanced further through spatial sequencing. Rather than maintaining a flat, uniform spatial arrangement, subtle architectural interventions, such as changes in floor or ceiling levels or enhancing the transparency of the riverside-faced building, which has been

converted into a public space, can curate movement, evoke

spatial imagination, and further enhance civic participation with

the heritage environment (Figure 9.1).
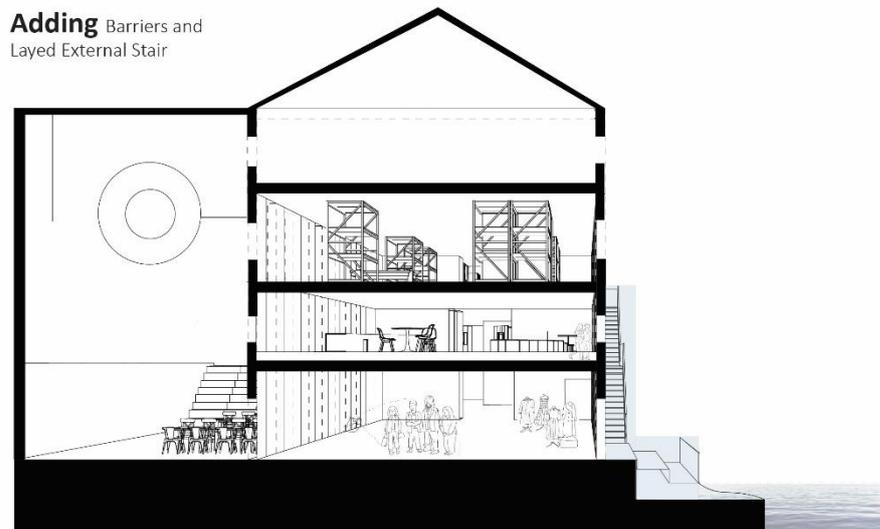
Figure 9 1   The Proposed Idea focuses on Improving Public Accessibility while Enhancing Flood Resilience. (Source: Created by the Author)

9.2.2 Addressing the Second Sub-question

'How do industrial buildings support the museum experience?'

The second stage of this research examined the interpretation practices of the MoM, challenging traditional curatorial strategies by drawing on phenomenology. Here, the situated locality of the industrial building was emphasised to shape visitor experience. Two distinct modes of museum communication were identified: curated, narrative-driven experiences and embodied, bodily engagement. Through the MoM, this study explored how these approaches converge in the creation of a 'third learning space'.

The empirical investigation employed a combination of quantitative and qualitative methods, including modelling, observation, time-spent measurements, patterns of movement/behavioural trajectories tracking, and an online survey. Together, these data provided a comprehensive evaluation of the MoM's interpretative strategies and directly addressed the second research objective, offering insight into how industrial settings influence museum communication under contemporary conditions.

Findings reveal that adaptive reuse of industrial buildings challenges the dominance of coherent, linear narrative structures typically designed to stimulate memory, emotion, and curiosity. Instead, the architectural fabric fosters bodily engagement and situated memory, encouraging visitors to

construct their own knowledge repositories. For residents (natural) visitors, the MoM is experienced as an extension of everyday life, with interpretation that allows autonomy and personal connection. In contrast, recruited (international) visitors often seek a more authoritative, sequential narrative to facilitate structured learning.

In museum practice, a particularly significant example is the Gateway Room, which embodies both authenticity and innovation. By combining the industrial atmosphere with multi-sensory interpretive techniques, the Gateway Room situates the museum within the wider spatial context of the Derwent Valley Mills and anchors it within a temporal continuity spanning more than 300 years. Visitor evaluations consistently identified this space as the most engaging, with both resident and international audiences recognising its ability to convey the 'power of the real' without generating controversy. While the current approach successfully balances authenticity with accessibility, the visitor data suggest that restructuring the interpretive sequence to follow the textile manufacturing process could enhance clarity and comprehension (Figure 9.2).
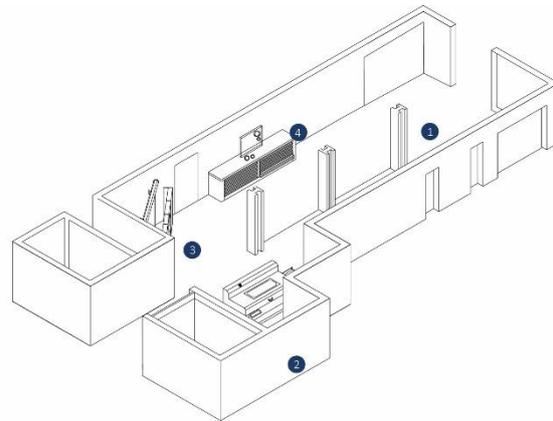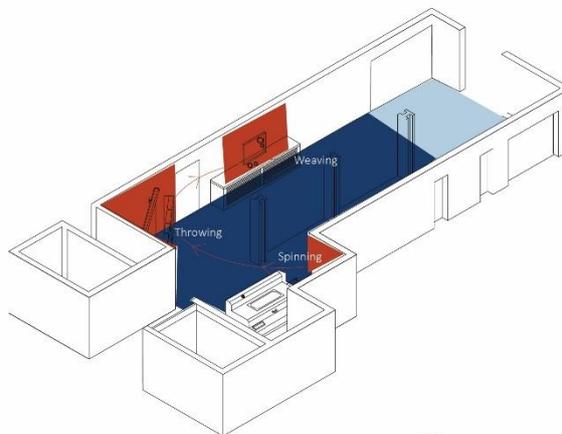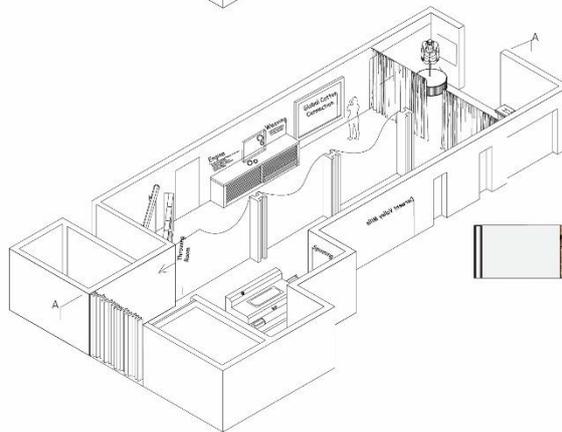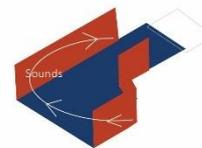
Figure 9 2   The Proposed Idea focuses on Improving Museum Interpretation in the Gateway Room. (Source: Created by the Author)

9.2.3 Addressing the Third Sub-question

'How do visitors engage with the museum through active learning experiences?'

The third stage of this research focused on visitors' learning experiences, drawing on pedagogical theory and empirical data to address the central concept of *enactive engagement*. Building on the idea of the museum as a 'third learning space' introduced earlier, this study shows how traditional monologic learning models are replaced by dialogic forms of interaction between visitors and staff, newcomers and experienced practitioners, collections and audiences, locals and international visitors, as well as between reflection and action.

The primary data were qualitative, collected mainly through semi-structured interviews, and complemented by insights from the earlier stages of the study. A group of STIs (3–6 months after their initial visit) were invited to discuss the perceptual and cognitive learning of the MoM.

Findings indicate that the museum redefines its role by bridging academic and workplace-based informal learning. It fills gaps between theory and practice, supports interdisciplinary understanding, fosters teacher–student engagement, and offers opportunities for direct visualisation. In this way, the museum

becomes an interactive educational environment. In particular, the industrial atmosphere itself is central to this process, supporting connections between people and place, between history and the present, and between present and future.

While the 'power of the real', whether conveyed through the physical setting, staff expertise, hands-on workshops, or even ambient sensory cues such as the sound of waving machines, remains vital to sustaining visitor engagement. However, the findings also suggest the need for more layered narrative strategies. For first-time visitors in particular, greater contrast in spatial and interpretive design could help to leave a stronger and more lasting impression for active learning, as the last two parts suggest.

9.3 Contribution of the Study

9.3.1 Contribution to Knowledge

This study contributes new knowledge by challenging traditional approaches to industrial museum design through the combined perspectives of architecture and interpretation. By examining the MoM as a transitional model, it demonstrates how adaptive reuse can bridge the gap between traditional and contemporary practices in industrial heritage museums.

The research also offers a theoretical contribution by positioning industrial museums as a 'third learning space', settings that function not merely as repositories of historical artefacts but as living environments that foster embodied engagement, spontaneous exploration, and active learning. Building on this, it challenges Nicholas Serota's concept of the modern museum as becoming a 'history book', suggesting instead that industrial museums retain the potential to function as 'cabinets of treasures' where authenticity and participation intersect to enrich visitor experience.

9.3.1.1 Theoretical Development

This research contributes to debates on the future of museum design by focusing on the industrial museum as a distinctive type of cultural space. Building on the book of **The future of museum and gallery design: purpose process, perception**, and the '20 Principles for the Future Museum Design', referring to Appendix D – Future Museum Design. The study refines and extends these frameworks through an in-depth analysis of the MoM.

At the outset, three challenges were selected: *Taking Account of the Locals, Being Multi-sensory, and Being Embedded in the Environment*. By the end of the study, these were reformulated

into three guiding principles: *Be Real, Be Transformative, and Be Multi-sensory*. This shift represents a theoretical advancement in understanding the role of industrial museums within contemporary practice.

- **Be Real** reframes authenticity as a multidimensional concept. Rather than simply responding to local needs, *being real* encompasses the preservation of form, materials, traditions, and cultural spirit. It highlights how industrial museums can act as living artefacts that foster genuine human connection and active engagement.

- **Be Transformative** broadens the idea of embedding museums in their environment towards a model of democratisation. At the MoM, local voices are integrated across design and operation, from co-production in planning to participatory events and community-led initiatives, positioning the museum as a civic platform for shared authorship.

- **Be Multi-sensory** retains its central role, underscoring the embodied and imaginative dimensions of industrial heritage. In the MoM, sensory design elements, such as the Gateway Room, connect visitors intellectually and

bodily to industrial history, generating affective

experiences that extend beyond the museum visit.

Taken together, these refined principles reposition the industrial

museum from a static site of preservation towards a 'dynamic

cultural model' that balances authenticity, democratisation, and

embodied engagement. This theoretical development both

strengthens existing discourse on future museum design and

demonstrates the specific role of industrial museums as

transitional models, bridging heritage conservation and

contemporary cultural participation.

9.3.1.1 Methodological Contribution

This research introduces a diagrammatic approach as an

original methodological contribution. By synthesising city-

museum integration, interior spatial configuration, time-spent

engagement, and visitor feedback into simple visual forms, this

approach enables complex empirical data to be represented in a

clear, comparative, and theoretically relevant way. The diagrams

allowed the empirical analysis to move beyond isolated

observations to test theoretical concepts within real-world

contexts. For example, they revealed how the Gateway room,

shaped by the industrial atmosphere, is an effective

representation of the 'third learning space'. They also made

visible the differing requirements of local and international visitors, while simultaneously highlighting a shared recognition of the importance of authenticity.

Crucially, the diagrammatic method captures both tangible and intangible aspects of interpretation, spatial form, material fabric, and human interaction. Within a single-layered framework, this enables a more holistic evaluation of how museum design and interpretation co-produce visitor experience.

Beyond the MoM case study, this approach offers a transferable tool for cultural heritage and museum research. It provides a means of mapping the interaction between architectural settings, interpretive strategies, and visitor engagement, supporting the theoretical development in the field of museum design.

9.3.1.2 Future Industrial Museum Typology
The evolution of museum typologies can be traced from the early *Cabinet of Curiosity*, which functioned as an exclusive repository of knowledge for scholars and collectors, to contemporary formats that emphasise public access, education, and behind-the-scenes transparency. Recent examples such as the *Kew Millennium Seed Bank* and the *Prince Philip Maritime Collection Centre* illustrate this shift, blending collections management with public learning spaces.

Within this trajectory, the Assemblage Room at the MoM represents an experimental step in the ongoing evolution of the industrial museum. Drawing inspiration from the *Cabinet of Curiosity*, it invites open-ended exploration and participation. Some visitors have described it as a 'treasure trove' or an 'antique shop', pointing to the risk of interpretive ambiguity. Yet, it nonetheless functions as a dynamic learning space, particularly for design and architecture students, by encouraging direct engagement with material culture.

This study proposes that the Assemblage Room anticipates a future typology of the participatory industrial museum. Reimagined as a *Library of Industrial Production*, such spaces could integrate curatorial structure with participatory discovery, offering interactive yet coherent access to industrial heritage. In contrast to Nicholas Serota's characterisation of modern museums as 'history books', where exhibitions follow sequential and curated narratives, this emerging typology embodies a return to the participatory ethos of the Cabinet of Curiosity.

The future industrial museum should therefore be conceived as an adaptive learning environment with bodily engagement: a space where collections, people, and practices co-produce evolving knowledge through bodily imagination and hands-on

activities. Such a typology extends beyond static preservation, positioning industrial museums as active forums for discovery, creativity, and civic participation.

9.3.2 Practical Contribution

The proposed future industrial museum typology offers practical guidance for adaptive reuse, demonstrating how spatial adaptability can preserve industrial heritage while creating new opportunities for public engagement. By highlighting how industrial museum architecture contributes to both historical preservation and engagement with new generations, these findings can inform architects, exhibition designers, and curators in developing adaptive reuse solutions that accommodate contemporary patterns of visiting.

Based on visitor feedback and spatial analysis of the MoM, this research identifies three key recommendations to enhance visitor engagement:

Enhancing spatial sequencing – At present, the MoM's reliance on restored architecture creates a relatively flat spatial journey. While the staircase introduces vertical layering, sequencing could be refined to foster curiosity and improve knowledge retention. Targeted interventions, such as interior barriers to distinguish social and exhibition spaces, or lighting

strategies that highlight interpretive nodes, could produce a more engaging narrative flow.

Improving wayfinding and signage – Feedback revealed frequent confusion due to the integrated social, cultural, and commercial functions of the museum. Colour-coded signage, visual cues for elderly visitors, and more strategically placed navigation markers would support intuitive movement and reduce disorientation.

Deepening curatorial interpretation – The MoM's simplified textual labels provide clarity but lack the depth required for international significance. Exhibitions would benefit from expanded commentary that situates artefacts within broader industrial and technological contexts, offering visitors richer intellectual engagement alongside sensory experience.

Together, these recommendations provide a roadmap for strengthening the MoM's visitor experience. By implementing such targeted interventions, the museum could move beyond its reliance on restored architecture to establish itself as a model for future industrial museum design—balancing authenticity with preservation, accessibility, and innovation.

9.4 Research Limitations

Beyond the methodological limitations outlined in Chapter X, this study faces two main constraints: geographical scope and restricted access to museum spaces.

First, the research is geographically limited to the United Kingdom, with the MoM serving as the primary case study. While this focus allows for in-depth analysis, it limits the generalisability of findings beyond UK-based industrial heritage museums. Comparative studies in other national contexts, particularly in France, Germany, and Italy, where industrial heritage and adaptive reuse have taken distinctive forms, could produce additional insights into the transformation of industrial buildings into museums.

Second, the study concentrates on publicly accessible areas of the MoM, including the ground floor (social space), the first floor (exhibitions), and the second floor (open storage). Several spaces were excluded from direct analysis because they are restricted to members or special events, such as workshops, hireable studios, and co-working areas on the third floor. This limitation means the study does not provide a fully holistic account of the museum's functions. To partly address this, a small group of five workshop participants was recruited to

capture aspects of the learning experience in some of these restricted areas.

Despite these limitations, the findings provide a robust foundation for understanding how industrial architecture and interpretation strategies shape visitor engagement within the MoM, while also suggesting avenues for broader comparative research in future studies.

9.5 Future Research

This study establishes a foundation for further research into enactive engagement within the industrial museum context, addressing both the design process and visitor experience. Future studies could build on this by pursuing one of these directions in greater depth, either examining how enactive principles inform the design and adaptive reuse of industrial heritage sites or investigating how visitors enact learning and engagement within these environments.

Although the framework developed in this study has undergone revision, it remains open to further refinement and enrichment. Future research could advance this work in three key directions: comparative analysis of industrial museums, expansion of museum typology research, and the use of interactive virtual reality (VR) co-design approaches for museum learning.

From a design perspective, two proposed research questions are listed: *How do European and UK industrial museums differ in their adaptive reuse for learning experiences? Could interactive virtual reality co-design approaches reimagine visitor learning and participation in industrial museums?* These directions would not only identify best practices in adaptive reuse but also test how immersive digital technologies can enrich participatory engagement in museum design. From a visitor perspective, a further question is: *How can findings about bodily engagement inform the design of industrial museums in the European Union?* This line of inquiry could expand the classification of museum typologies and refine the understanding of how historical frameworks evolve to meet contemporary societal needs.

By addressing these research gaps, future studies can advance the role of industrial museums as a third learning space. The outcomes will contribute to the growing discourse across architecture, museology, and pedagogy. More importantly, they will guide the design of future industrial museums, ensuring that historical preservation and contemporary learning experiences continue to evolve in response to social and technological change.

BIBLIOGRAPHY

Abbott, H.P. (2008). *The Cambridge Introduction to Narrative*. 2nd ed. Cambridge: Cambridge University Press.

Adamiak, M. and Pokropski, M. (2018). The Landscape of Contemporary Phenomenology. *AVANT. The Journal of the Philosophical-Interdisciplinary Vanguard*, 9(2), pp.9–15. [online]. Available from: http://avant.edu.pl/wp-content/uploads/M_Adamiak_M_Pokropski_Introduction.pdf.

Ahmadi, M. (2019). The experience of movement in the built form and space: A framework for movement evaluation in architecture M. Schedel, ed. *Cogent Arts & Humanities*, 6(1), p.1588090. [online]. Available from: https://www.tandfonline.com/doi/full/10.1080/23311983.2019.1588090.

Ardalan, N. (2016). From Within: On the Spiritual in Art and Architecture. In *Architecture, Culture, and Spirituality*. Routledge, pp. 241–258. [online]. Available from: https://www.taylorfrancis.com/books/9781317179023/chapters/10.4324/9781315567778-27.

Aurasmaa, A. (1970). The conceptualization of time and space in the memory theatre of Giulio Camillo (1480?–1544). *Nordisk Museologi*, (1), p.51. [online]. Available from: https://journals.uio.no/museolog/article/view/3394.

Ballantyne, A. (2016). The unit of survival. *Architectural Research Quarterly*, 20(1), pp.39–44. [online]. Available from: https://www.cambridge.org/core/product/identifier/S1359135516000129/type/journal_article.

Bamford, A. (2023). Royal Botanic Gardens Kew seeks exhibition designers. *Design Week*. [online]. Available from: https://www.designweek.co.uk/issues/6-march-10-march-2023/royal-botanic-gardens-kew-seeks-exhibition-designers/ [Accessed January 15, 2025].

Bandyopadhyay, S. (2010). *The Humanities in Architectural Design : A Contemporary and Historical Perspective.* 1st ed. J. Lomholt, N. Temple, & R. Tobe, eds. London: Taylor & Francis Group.

BBC BITESIZE. How the UK economy is changing in the 21st century - OCR. [online]. Available from: http://bbc.co.uk/bitesize/guides/zqhvmnb/revision/5.

Bennett, T. (1995). *The birth of the museum : history, theory, politics / Tony Bennett*. London: Routledge.

Black, G. (2024). Defining interpretive principles for museum display. In *The Engaging Museum: Developing Museums for Visitor Involvement*. pp. 185–207.

Black, G. (2005). Museums and lifelong learning. In *The Engaging Museum: Developing Museums for Visitor Involvement*. pp. 123–156.

Black, G. (2012). Transforming museums in the twenty-first century. In *The Engaging Museum: Developing Museums for Visitor Involvement*. New York: Routledge, pp. 77–107.

Block, P. (2018). *Community : The Structure of Belonging.* 2nd ed. Oakland: Berrett-Koehler Publishers, Incorporated.

Brandi, C. (2005). *Theory of restoration*. G. Basile et al., eds. Roma : Firenze: Istituto centrale per il restauro; Nardini.

British National Grid. (2024). *1800s_1900s_After 1900s (Derby)*. Digimap.

Brooker, G. (2016). Interior Matter(s): Proximities, Inhabitation, Identities. *Journal of Interior Design*, 41(4), pp.5–12.

Brooker, G. (2004). *Rereadings : interior architecture and the design principles of remodelling existing buildings*. S. Stone, ed. London: RIBA Enterprises.

Brooker, G. (2018). The Dialectics of Appropriation. In G. Marinic, ed. *The Interior Architecture Theory Reader*. Oxon: Routledge, pp. 351–359.

Bubaris, N. (2014). Sound in museums – museums in sound. *Museum Management and Curatorship*, 29(4), pp.391–402. [online]. Available from: http://dx.doi.org/10.1080/09647775.2014.934049.

Butterton, H. (2004). *The Old Derby Silk Mill : a birthplace of the industrial revolution*. Derby: Felix Publisher's 2004.

Carpo, M. (2001). *Architecture in the age of printing : orality, writing, typography, and printed images in the history of architectural theory*. Cambridge, Mass. ; MIT Press.

Caulton, T. (2023). Hands-On Exhibitions : Managing Interactive Museums and Science Centres. In pp. 1–16.

Census 2021. (2022). *How the population changed in Derby:*

Census 2021. [online]. Available from: https://www.ons.gov.uk/.

De Certeau, M. (1984). 'Making do': Uses and Tactics. In *The Practice of Everyday Life*. Berkeley: University of California Press, pp. 29–42.

De Certeau, M. (1998). Plat du jour. In *Practice of Everyday Life*. University of Minnesota Press, pp. 171–198.

Chang, T.-Z. and Gao, S. (2018). Yaji garden: Art under the sky. In O. H. Hing-Kay et al., eds. *The Future of Museum and Gallery Design*. Routledge, pp. 259–276.

Ching, F.D.K. (2014). *Architecture: form, space, & order / Francis D.K. Ching.* Fifth edit. Hoboken, New Jersey: Wiley.

Clapham, A. and Barata, R. (2024). Fighting the Machine : Co-constructing Team Based Evaluation for Non-Formal Learning. *Museum & Society*, 22(July), pp.29–47.

Claxton, G. (2015). *Intelligence in the flesh: Why your mind needs your body much more than it thinks*. New Haven: Yale University Press.

Colomina, B. (2009). The Endless Museum: Le Corbusier and Mies van der Rohe. *Log (New York, N.Y. 2003)*, (15), pp.55–68.

Connolly, W.E. (2010). Materialities of Experience. In D. Coole; & S. Frost, eds. *New Materialisms*. Duke University Press, pp. 178–200. [online]. Available from: http://www.jstor.org/stable/10.2307/j.ctv11cw2wk.11.

Crawley, G. (2012). Staging exhibition: atmosphere of imagination. In S. MacLeod, ed. *Museum Making: Narratives, Architectures, Exhibitions.* Abingdon, Oxon [England]: Routledge, pp. 12–20.

Creative Core. (2025). Celebrating makers of the past, present and future - Museum of Making. [online]. Available from: https://thecreativecore.co.uk/projects/museum-of-making/.

Damasio, A. (2000). *The feeling of what happens : body, emotion and the making of consciousness / Antonio Damasio*. 1st Harves. San Diego, Calif: Harcourt.

Denscombe, M. (2014). *The Good Research Guide For Small-scale Social Research Projects*. Fifth. New York: Open University Press.

Derby City Council. (2022). *Towards a New Vision for Derby*

City Centre - Ambition.

Derby Museums. (2016). *Derby Museums Human-Centred Design & Co-production Handbook*. Derby. [online]. Available from: https://derbymuseums.org/static/f0803d9c4cfa4945beeb826640 664440/DM-HCD-Toolkit-V5.pdf.

Derbymuseums. (2021). *Assemblage*. Talk given by makers.

Derbymuseums. (2024). *Lego Model*. Talk given by artists.

Derbymuseums. (2023a). *Museum of Making Site Induction*. The Museum of Making, Derby: Talk given by Museum Staff.

Derbymuseums. (2023b). *The Impact of The Museum of Making - Social Return On Investment*.

Derbymuseums. (2023c). This is US – Derby Museums Team Day.

Diamond, P. (2013). Joseph Wright of Derby (1734–1797): The importance of a local museum in the formation of an artist's reputation. *The British art journal*, 14(1), pp.18–23.

Diener, E. and Crandell, R. (1978). *Ethics in social and behavioral research*. Chicago: University of Chicago Press.

Dine, S. (2021). Critique, dialogue, and action: Museum representation in Black Panther. *Museum Worlds*, 9(1), pp.19–32. [online]. Available from: http://berghahnjournals.com/view/journals/museum-worlds/9/1/armw090103.xml.

Doucet, I. and Frichot, H. (2018). Resist, reclaim, speculate: Situated perspectives on architecture and the city. *Architectural Theory Review*, 22(1), pp.1–8.

Doward, J. (2021). Building a legacy: world's first factory rises again as a museum of making. *The Guardian*. [online]. Available from: https://www.theguardian.com/culture/2021/jan/03/building-a-legacy-worlds-first-factory-rises-again-as-a-museum-of-making.

DuFour, T. (2022). *Husserl and Spatiality A Phenomenological Ethnography of Space*. Oxford: Routledge.

Edensor, T. (2005). *Industrial ruins : spaces, aesthetics and materiality / Tim Edensor*. Oxford: Berg.

Edwards, S. (2011). AD Classics: Villa Roche / Le Corbusier.

ArchDaily. [online]. Available from: https://www.archdaily.com/151365/ad-classics-villa-roche-le-corbusier [Accessed January 15, 2025].

Ellegård, K. (2019). Thinking Time Geography Concepts, Methods and Applications. In United Kingdom: Routledge, pp. 11–24. [online]. Available from: doi:10. 324/9780203701386.

Emmel, N. (2013). Sampling and choosing cases in qualitative research : a realist approach J. Seaman & F. Kenney, eds.

Etlin, R.A. (2010). A paradoxical avant-garde. *The Architectural Review*. [online]. Available from: https://www.architectural-review.com/archive/a-paradoxical-avant-garde.

Falk, J.H. (2011). Contextualizing Falk's Identity-Related Visitor Motivation Model. *Visitor Studies*, 14(2), pp.141–157. [online]. Available from: http://www.tandfonline.com/doi/abs/10.1080/10645578.2011.608002.

Falk, J.H. and Lynn D., D. (1992). *The museum experience / John H. Falk, Lynn D. Dierking ; foreword by Willard L. Boyd.* Washington, D.C.: Whalesback Books.

Farrelly, L. and Crowson, N. (2014). *Representational Techniques for Architecture*. 2nd ed. London;New York: Bloomsbury Publishing.

Feilden Clegg Bradley Studios. (2014). Middleport Pottery. *The architects' Journal*. [online]. Available from: https://www.ajbuildingslibrary.co.uk/projects/display/id/7213 [Accessed January 15, 2025].

Feilden Clegg Bradley Studios. (2024). Reviving onf of the UK's last victorian potteries. [online]. Available from: https://fcbstudios.com/projects/middleport-pottery/ [Accessed January 15, 2025].

Finch, P. (2011). Retrofit remains the future. *The architects' Journal*. [online]. Available from: https://www.architectsjournal.co.uk/archive/retrofit-remains-the-future.

Fink, L.M. (2006). Museum Archives as Resources for Scholarly Research and Institutional Identity. In J. Marstine, ed. *New Museum Theory and Practice*. Wiley, pp. 292–307. [online]. Available from: https://onlinelibrary.wiley.com/doi/10.1002/9780470776230.ch12

.

Fleming, B. and Ghosn, R. (2024). (Un)Making Worlds. *Journal of Architectural Education*, 78(2), pp.266–270. [online]. Available from: https://www.tandfonline.com/doi/full/10.1080/10464883.2024.2381420.

Forty, A. (2000). *Words and buildings : a vocabulary of modern architecture*. London: Thames & Hudson.

Freire, P. (2020). Pedagogy of the Oppressed. In *The Community Performance Reader*. New York: Routledge, pp. 24–27. [online]. Available from: https://www.taylorfrancis.com/books/9781000116090/chapters/10.4324/9781003060635-5.

Fusco Girard, L. and Gravagnuolo, A. (2024). *Adaptive Reuse of Cultural Heritage : Circular Business, Financial and Governance Models.* 1st ed. Cham: Springer International Publishing AG.

Genette, G. (1983). *Narrative discourse : an essay in method*. J. E. Lewin & J. D. Culler, eds. Ithaca, N.Y: Cornell University Press.

Gibson, E. (2016). Le Corbusier's Maison La Roche-Jeanneret was designed for his brother and a close friend. *Dezeen*. [online]. Available from: https://www.dezeen.com/2016/08/05/maison-la-roche-jeanneret-le-corbusier-paris-residence-france-house-villa/.

Giebelhausen, M. (2006). The Architecture is the Museum. In *New Museum Theory and Practice*. Wiley, pp. 37–63. [online]. Available from: https://onlinelibrary.wiley.com/doi/10.1002/9780470776230.ch1.

Glossary. (1994). Authenticity. *UNESCO World Heritage Convention*. [online]. Available from: https://whc.unesco.org/en/glossary/187 [Accessed January 15, 2025].

Goulding, C., Saren, M. and Pressey, A. (2018). 'Presence' and 'absence' in themed heritage. *Annals of Tourism Research*, 71(August 2017), pp.25–38. [online]. Available from: https://doi.org/10.1016/j.annals.2018.05.001.

Griffiths, S. (2023). Milieu and movement. In *Writing the Materialities of the Past : Cities and the Architectural Topography of Historical Imagination*. Oxford: Taylor & Francis

Group, pp. 72–79.

Groat, L.N. (2013). The Scope of This Book. In *Architectural Research Methods*. Hoboken, New Jersey: Wiley, p. 9.

Grondin, J. (1994). *Introduction to philosophical hermeneutics*. New Haven: Yale University Press.

Hadley, B. and Rieger, J. (2021). Co-designing choice: objectivity, aesthetics and agency in audio-description. *Museum Management and Curatorship*, 36(2), pp.189–203. [online]. Available from: https://doi.org/10.1080/09647775.2021.1878469.

Hale, J. (2011). Architecture, Technology and the Body: From the Prehuman to the Posthuman. In G. Crysler, ed. *he SAGE Handbook of Architectural Theory*. London: SAGE Publications Ltd, pp. 513–526.

Hale, J. (2000). *Building ideas : an introduction to architectural theory / Jonathan A. Hale.* Chichester: John Wiley & Sons.

Hale, J. (2016). Found Spaces and Material Memory: Remarks on the Thickness of Time in Architecture. In M. Mindrup, ed. *The Material Imagination*. Farnham: Routledge, pp. 169–180. [online]. Available from: https://www.taylorfrancis.com/books/9781317024460/chapters/10.4324/9781315555713-12.

Hale, J. (2017). *Merleau-Ponty for architects*. London: Routledge.

Hale, J. (2012). Narrative environments and the paradigm of embodiment. In S. Macleod, L. Hourston Hanks, & J. Hale, eds. *Museum Making : Narratives, Architectures, Exhibitions.* Abingdon, Oxon [England]: Taylor & Francis Group, pp. 192–200.

Hale, J. and Back, C. (2018). From body to body: architecture, movement and meaning in the museum. In S. Macleod et al., eds. *The Future of Museum and Gallery Design*. Oxon: Routledge, pp. 340–351.

Hanks, L.H. (2010). Island identities: the Pier Arts Centre, Orkney. *Architectural Research Quarterly*, 14(3), pp.222–236. [online]. Available from: https://www.cambridge.org/core/product/identifier/S1359135510000989/type/journal_article.

Hanks, L.H. (2015). Narrative, Story, and Discourse: The

Novium, Chichester. *Curator: The Museum Journal*, 58(1), pp.27–39. [online]. Available from: https://onlinelibrary.wiley.com/doi/10.1111/cura.12096.

Hanks, L.H. (2012). Writing spatial stories: textual narratives in the museum. In S. Macleod, L. Hourston Hanks, & J. Hale, eds. *Museum Making : Narratives, Architectures, Exhibitions.* Abingdon, Oxon [England]: Taylor & Francis Group, pp. 21–33.

Heath, T., Oc, T. and Tiesdell, S. (1996). *Revitalising Historic Urban Quarters*. 1st ed. United Kingdom: Routledge.

Hein, G.E. (1998). Educational theory. In *Learning in the Museum*. Oxford: Taylor & Francis, pp. 14–40.

Heritage architecture. (2024). Maison La Roche, Le Corbusier's first architectural promenade. *Architecture photographer's blog_Photographic reports on heritage architecture*. [online]. Available from: https://blog.thal.art/ [Accessed January 15, 2025].

Heritage Schools. (2024). *Derby Local History Video*. [online]. Available from: https://vimeo.com/990474160.

Higgins, C. (2022). Go to Derby: see how a museum can help shape a better future. *The Guardian*. [online]. Available from: https://www.theguardian.com/commentisfree/2022/jul/01/derby-museum-of-making-post-industrial-city.

Historic England. (2018). *Monitoring and Legacy Report*. [online]. Available from: https://historicengland.org.uk/whats-new/in-your-area/midlands/retail-in-derby/.

Holst, J. (2014). Rethinking Dwelling and Building. On Martin Heidegger's conception of Being as Dwelling and Jern Utzon's Architecture of Well-being. *ZARCH*, (2), pp.52–61. [online]. Available from: https://papiro.unizar.es/ojs/index.php/zarch/article/view/9332.

Hooper-Greenhill, E. (1994). Museums: ideal learning environments. In *Museums and Their Visitors*. pp. 140–170.

Hooper-Greenhill, E. (2000). *Museums and the interpretation of visual culture*. London: Routledge.

Hooper Greenhill, E. (1992). The Disciplinary Museum. In *Museums and the Shaping of Knowledge*. Routledge, pp. 177–200. [online]. Available from: https://www.taylorfrancis.com/books/9781134912704/chapters/1

0.4324/9780203415825-11.

Hopkins, O. (2012). *Reading Architecture : A Visual Lexicon.* 1st ed. London: Laurence King Publishing.

House of Commons Library. (2024). *Service industries: Key Economic Indicators*. [online]. Available from: https://commonslibrary.parliament.uk/research-briefings/sn02786/.

Impey, O.R. and MacGregor, A. (2001). *The origins of museums : the cabinet of curiosities in sixteenth and seventeenth century Europe*. O. R. (Oliver R. . Impey & A. MacGregor, eds. London: House of Stratus.

Ironbridge. (2025). Museum of the Gorge. [online]. Available from: https://www.ironbridge.org.uk/visit/museum-of-the-gorge/ [Accessed January 15, 2015].

Johansen, A. (2022). Imagining the Brain, Engaging the Body: Designing Visitor Engagement in Science Exhibition Experiments with Art. *Museum and Society*, 20(2), pp.153–171.

Jones, P.B. (2014). The Primacy of Bodily Experience. In P. B. Jones & M. Meagher, eds. *Architecture and Movement : The Dynamic Experience of Buildings and Landscapes*. Oxford: Taylor & Francis Group, pp. 96–101. [online]. Available from: http://ebookcentral.proquest.com/lib/nottingham/detail.action?docID=1899884.

Jørgensen, D., Robin, L. and Fojuth, M. (2021). Slowing Time in the Museum in a Period of Rapid Extinction. *Museum & Society*, 20(July 2022), pp.1–12.

Kamel-Ahmed, E. (2015). What to Conserve? Heritage, Memory, and Management of Meanings. *International Journal of Architectural Research*, 9(1), pp.67–76. [online]. Available from: https://clok.uclan.ac.uk/11743/.

Kavanaugh, L. (2013). Space is not a Thing. In Murray Fraser, ed. *Design Research in Architecture An Overview*. Oxon: Routledge, pp. 160–184.

Kearney, R. (1994). *Modern movements in European philosophy / Richard Kearney.* 2nd ed. Manchester: Manchester University Press.

Kelly, L. and Gordon, P. (2002). Developing a community of practice: museums and reconciliation in Australia. In R. Sandell,

ed. *Museums, Society, Inequality*. Routledge, pp. 173–194.

Kidder, P. (2012). *Gadamer for Architects.* 1st ed. London: Taylor & Francis Group.

Kim, S. and Kwon, H. ah. (2020). Sustainable regeneration through the cultural conversion of urban heritage. *Sustainability (Switzerland)*, 12(7).

Knight, C. (1843). A DAY at a DERBY SILK MILL. *The Penny Magazine of the Society for the Diffusion of Useful Knowledge*, pp.161–168.

Kohane, P. (1990). Louis I. Kahn and the library: genesis and expression of 'form'. *Via*, 10(10), pp.98–131.

Kuhn, C. (2012). Typology : Schools. *The Architecture Review*, pp.1–8.

Lambert, L. (2013). *The Funambulist pamphlets. 2, Foucault / edited by Léopold Lambert.* L. Lambert, ed. New York: Brooklyn.

Leach, N. (1997a). Hans-Georg Gadmer. In *Rethinking architecture: a reader in cultural theory*. London: Routledge, pp. 125–137.

Leach, N. (1997b). Roland Barthes. In *Rethinking architecture : a reader in cultural theory / edited by Neil Leach.* London: Routledge, p. 158.

Leach, N. (1997c). Umberto Eco. In *Rethinking architecture: a reader in cultural theory*. London: Routledge, pp. 173–193.

Legacy, I. (2020). Perception Embodiment, experience and narrative The. , 40(2018), pp.1–23.

Liebenrood, M. (2024). Museum Closure in the UK : Themes , Issues , and Trends. *Museum & Society*, 22(July), pp.15–28.

Littlefield, D. and Lewis, S. (2007). *Architectural voices : listening to old buildings*. Chichester: Wiley.

Lucas, R. (2016). *Research Methods for Architecture*. London: Laurence King Publishing Ltd.

Lumley, R. (1988). *The Museum time-machine : putting cultures on display*. R. Lumley, ed. London: Routledge.

Lynch, K. (1972). *What time is this place?* Cambridge Mass. ; London : M.I.T. Press.

Lynch, K. and Hack, G. (1985). *Site Planning*. 3rd ed.

Cambridge, Massachusetts, and London, England: MIT Press.

MacGregor, A. (2007). *Curiosity and enlightenment : collectors and collections from the sixteenth to the nineteenth century*. New Haven, Conn.: Yale University Press.

MacLeod, S. (2020a). Derby Silk Mill Museum of Making, Derby, UK, 2020. *Museums and Design for Creative Lives*, pp.90–97.

MacLeod, S. (2020b). Design for creative lives: new museum design cultures. In *Museums and design for creative lives / Suzanne MacLeod.* Abingdon, Oxon ; New York, NY : Routledge, 2021.: Routledge, pp. 46–65. [online]. Available from: https://www.taylorfrancis.com/books/9780429676888/chapters/10.4324/9780429398698-5.

MacLeod, S. et al. (2018). *The Future of Museum and Gallery Design Purpose, Process, Perception*. Abingdon, Oxon [England]: Routledge.

Maleuvre, D. (1999). *Museum memories : history, technology, art*. Stanford, Calif: Stanford University Press.

Mallgrave, H.F. (2018a). A Cultural Model for Design. In *From object to experience : the new culture of architectural design.* London: Bloomsbury Publishing USA, pp. 43–46.

Mallgrave, H.F. (2018b). *From Object to Experience: The New Culture of Architectural Design*. London: Bloomsbury Publishing Plc.

Malnar, Joy Monice., and Frank, V. (2004). *Sensory Design*. Minneapolis: University of Minnesota Press.

Marder, M. (2011). Phenomenology of distraction, or attention in the fissuring of time and space. *Research in Phenomenology*, 41(3), pp.396–419.

Marotta, A. (2012). Typology : Museums. *The Architecture Review*, pp.1–18.

Marstine, J. (2006). *New museum theory and practice : an introduction*. Oxford: Blackwell.

Mehdi Ait Oukhzame, E. (2021). 'Globalizing the Local, Localizing the Global': Writing Space in the Arab Gulf Region. *Architecture _ MPS*, (5), pp.1–15.

Menary, R. (2012). The extended mind. *The Extended Mind*,

(January), pp.1–382.

Merleau-Ponty, M. (2012). "Attention'" and 'Judgment'". In *Phenomenology of Perception*. Florence: Taylor & Francis Group, pp. 28–51.

Mijksenaar. Wayfinding in de wereld van Heineken. [online]. Available from: https://www.mijksenaar.com/nl/project/the-heineken-experience/ [Accessed January 15, 2025].

Miller, D.B. and Rudnick, L. (2010). The Case for Situated Theory in Modern Peacebuilding Practice. *Journal of Peacebuilding & Development*, 5(2), pp.62–74. [online]. Available from: https://journals.sagepub.com/doi/10.1080/15423166.2010.62868 6559959.

Mitrovic, B. (2011). *Philosophy for architects*. New York: Princeton Architectural Press.

Moore, K. (2000). *Museums and Popular Culture*. London: Leicester University Pressss.

Morse, N. (2021). The problem of engagement. In *The Museum As a Space of Social Care*. Oxford: Taylor & Francis Group, pp. 41–42.

Mostafavi, M. and Leatherbarrow, D. (1993). *On weathering : the life of buildings in time*. Cambridge, Mass.: MIT Press.

MS01. (2024). *Museum Staff Interview*. The Museum of Making, Derby: Interviewed by Xijing Chen.

Muroi, R. (2022). Literacy and tactility: An experience of writing in Kuzuhara Kôtô Nikki (Kuzuhara Kôtô's diary). *Educational Philosophy and Theory*, 54(9), pp.1377–1385. [online]. Available from: https://doi.org/10.1080/00131857.2021.1897572.

Museums + Heritage Advisor. (2014). The World's First Factory – still making history. [online]. Available from: https://museumsandheritage.com/advisor/posts/the-worlds-first-factory-still-making-history/ [Accessed November 8, 2024].

Napier Clarke Architect. (2024). Black Country Musuem. [online]. Available from: https://napierclarke.co.uk/projects/black-country-living-museum/.

Nathania, K. and Wahid, A.R. (2022). Spatialising time: Perceiving multiple layers of time in narrative environment. *Arsnet*, 2(2), pp.108–123.

National Museum Directors' Council. (2006). Museums and Galleries in Britain: Economic, social and creative impacts. *NMDC press releases*. [online]. Available from: https://www.nationalmuseums.org.uk/resources/press_releases/pr_travers_report/#:~:text=In 2005-06 there were,of museum and gallery income.

National Trust for Scotland. Old & New Towns of Edinburgh. [online]. Available from: https://www.nts.org.uk/visit/things-to-do/scottish-world-heritage-sites [Accessed January 15, 2025a].

National Trust for Scotland. Preston Mill & Phantassie Doocot. [online]. Available from: https://www.nts.org.uk/visit/places/preston-mill [Accessed January 15, 2025b].

National Trust for Scotland. Weaver's Cottage. [online]. Available from: https://www.nts.org.uk/visit/places/weavers-cottage [Accessed January 15, 2025c].

Nielsen, J.K. (2017). Museum communication and storytelling: articulating understandings within the museum structure. *Museum Management and Curatorship*, 32(5), pp.440–455. [online]. Available from: https://doi.org/10.1080/09647775.2017.1284019.

Norberg-Schulz, C. (1988). *Architecture : meaning and place : selected essays*. New York, N.Y: Rizzoli International Publications.

Norberg-Schulz, C. (1980). *Genius loci : towards a phenomenology of architecture*. London: Academy Editions.

Norberg-Schulz, C. (1965). *Intentions in Architecture*. Cambridge, Mass.: M.I.T. Press.

North, K. (2022). Salts Mill, Building Centre. [online]. Available from: https://90years.buildingcentre.co.uk/building/salts-mill/ [Accessed October 21, 2022].

O'Connor, M.C. et al. (2020). Exploring How Awareness-making Elicits Meaning-making in Museum Visitors: A Mixed-methods Study. *Journal of Museum Education*, 45(2), pp.187–199. [online]. Available from: https://doi.org/10.1080/10598650.2020.1739466.

Oevermann, H., Walczak, B.M. and Watson, M. (2022). *The Heritage of the Textile Industry*. [online]. Available from: www.ticcih.org.

Oldenburg, R. (1999). *The great good place : cafés, coffee shops, bookstores, bars, hair salons, and other hangouts at the heart of a community*. Cambridge, Mass: Da Capo Press.

Oliver Architecture. (2024). IRONBRIDGE, SHROPSHIRE. [online]. Available from: https://www.oliver-architecture.co.uk/ironbridge-gorge-museums-trust.html.

Olley, J. (1995). The Art of Reading: A new library and image for Cork Regional Technical College. *Architectural Research Quarterly*, 1(2), pp.30–41.

OV01. (2024). *Occasional Visitors Interview*. The Museum of Making, Derby: Interviewed by Xijing Chen.

OV02. (2024). *Occasional Visitors Interview*. The Museum of Making, Derby: Interviewed by Xijing Chen.

OV07. (2024). *Occasional Visitors Interview*. The Museum of Making, Derby: Interviewed by Xijing Chen.

Palazzo Medici Riccardi. The Palace. [online]. Available from: https://www.palazzomediciriccardi.it/ [Accessed January 15, 2025].

Pallasmaa, J. (2011). *he embodied image : imagination and imagery in architecture / Juhani Pallasmaa.* Chichester: John Wiley.

Pallasmaa, J. (2012). *The eyes of the skin : architecture and the senses.* 3rd ed. Chichester: Wiley.

Parada, F.J. and Rossi, A. (2021). Perfect timing: Mobile brain/body imaging scaffolds the 4E-cognition research program. *European Journal of Neuroscience*, 54(12), pp.8081–8091. [online]. Available from: https://onlinelibrary.wiley.com/doi/10.1111/ejn.14783.

Parry, R. and Sawyer, A. (2005). Reshaping Museum Space. In S. Macleod, ed. *Reshaping Museum Space: Architecture, Design, Exhibitions*. Routledge, pp. 39–52. [online]. Available from: https://www.taylorfrancis.com/books/9781134289981.

Paul, H. (1993). FOUCAULT AND ARCHITECTURE. *AA Files*, (26), pp.52–60. [online]. Available from: http://www.jstor.org/stable/10.2307/j.ctt13x00mw.13.

Pearman, H. (2021). Bauman Lyons gets heritage mill back to work as Museum of Making. *The RIBA Journal*, (September 2021), pp.1–15.

Penner, B. (2013). Redesigning for the Body: Users and Bathrooms. In G. Brooker, ed. *The Handbook of Interior Architecture and Design*. Bloomsbury Publishing Plc, pp. 261–277. [online]. Available from: https://www.bloomsburyvisualarts.com/encyclopedia-chapter?docid=b-9781474294096&tocid=b-9781474294096-chapter19.

Phillips, L. and Bamford, L. (2023). Co-producing Pickford's House, Derby. *University of Birmingham*. [online]. Available from: https://www.birmingham.ac.uk/research/projects/midlands-art-papers/issue-7/co-producing-pickfords-house-derby [Accessed January 15, 2025].

Pitt Rivers Museum. (2019). The World in a Box: Cabinets of Curiosity (Online Talk). [online]. Available from: https://www.prm.ox.ac.uk/event/the-world-in-a-box-cabinets-of-curiosity [Accessed January 15, 2025].

Plevoets, B. and Van Cleempoel, K. (2020). Imagined interiors–imagined collections. *Interiors: Design, Architecture, Culture*, 11(1), pp.17–29. [online]. Available from: https://doi.org/10.1080/20419112.2020.1857979.

Pontin, J. (2014). The Importance of Feelings. *MIT Technology Review*. [online]. Available from: https://www.technologyreview.com/2014/06/17/172310/the-importance-of-feelings/.

Poon, S. (2018). Examining the Phenomenology of Human Experience in Design Process and Characteristics of Architectural Approaches. *IOP Conference Series: Earth and Environmental Science*, 146(1), p.012079. [online]. Available from: https://iopscience.iop.org/article/10.1088/1755-1315/146/1/012079.

Postman, N. (1995). Museum as dialogue. In G. Kavanagh, ed. *Museum Provision and Professionalism*. London: Routledge.

Pragnell, H.J. (2021). *Industrial Britain: An Architectural History*. 2nd Revise. London: Batsford Books.

Psarra, S. (2009). The formation of space and cultural meaning. In *Architecture and Narrative: The Formation of Space and Cultural Meaning*. Oxford: Taylor & Francis Group, p. 242.

Relph, E.C. (2008). *Place and placelessness*. Los Angeles: SAGE.

Remartin. (2024). Museum of Making at Derby Silk Mill. [online]. Available from: https://remartin.com/museum-of-making.

Robson, D. and Posingis, S. (2019). *BAWA Staircases*. Singapore: Laurence King Publishing Ltd.

Rossi, A. (1984). *The architecture of the city / Aldo Rossi ; introduction by Peter Eisenman ; translation by Diane Ghirardo and Joan Ockman ; revised for the American edition by Aldo Rossi and Peter Eisenman.* First Amer. P. Eisenman et al., eds. Cambridge, Massachusetts: The MIT Press.

Rovelli, C. (2022). The big idea: why relationships are the key to existence. *The Guardian*. [online]. Available from: https://www.theguardian.com/books/2022/sep/05/the-big-idea-why-relationships-are-the-key-to-existence.

Royal Botanic Gardens, K. Millennium Seed Bank. [online]. Available from: https://www.kew.org/wakehurst/whats-at-wakehurst/millennium-seed-bank [Accessed January 15, 2025].

Royal Museums Greenwich. The Prince Philip Maritime Collections Centre. [online]. Available from: https://www.rmg.co.uk/collections/prince-philip-maritime-collections-centre [Accessed January 15, 2025].

Samuel, F. (2010). *Le Corbusier and the architectural promenade*. Basel: Birkhäuser.

Savenije, G.M. and de Bruijn, P. (2017). Historical empathy in a museum: uniting contextualisation and emotional engagement. *International Journal of Heritage Studies*, 23(9), pp.832–845. [online]. Available from: https://www.tandfonline.com/doi/full/10.1080/13527258.2017.1339108.

Scott, F. (2008a). *On Altering Architecture*. London: Routledge.

Scott, F. (2008b). *On altering architecture / Fred Scott*. Abingdon: Routledge.

Seip, O.S. (2020). *Theatres of Knowledge in the Early Modern period*. University of Manchester.

Serota, Nicholas. (2000). *Experience or interpretation: the dilemma of modern art museums*. London: Thames & Hudson.

Sharr, A. (2012a). Heidegger for Architects. , 20(1983), pp.61–68.

Sharr, A. (2007). *Heidegger for architects / Adam Sharr.* Abingdon: Routledge.

Sharr, A. (2012b). *Reading Architecture and Culture : Researching Buildings, Spaces and Documents.* 1st ed. London: Taylor & Francis Group.

Shrewsbury Flaxmill Maltings. (2024). A history of innovation and evolution. [online]. Available from: https://www.shrewsburyflaxmillmaltings.org.uk/story/history/.

Silverman, H.J. (1991). *Gadamer and Hermeneutics (Continental Philosophy)*. Routledge.

Silverman, L.H. (1995). Visitor Meaning-Making in Museums for a New Age. *Curator: The Museum Journal*, 38(3), pp.161–170.

Skolnick, L.H. (2012). Beyond Narrative: Designing Epiphanies. In L. H. Hanks, J. Hale, & S. MacLeod, eds. *Museum Making*. Routledge, pp. 83–94.

Slater, N. (2024). Derby's Museum of Making reopens after three-month flood closure. *BBC News*. [online]. Available from: https://www.bbc.co.uk/news/uk-england-derbyshire-68101387.

Söderqvist, L. (2011). Structuralism in architecture: a definition. *Journal of Aesthetics & Culture*, 3(1), p.5414. [online]. Available from: https://www.tandfonline.com/doi/full/10.3402/jac.v3i0.5414.

Stanton Williams. (2000). Millennium Seed Bank. [online]. Available from: https://stantonwilliams.com/fr/projets/millennium-seed-bank.

Steane, M.A. (2011). *The Architecture of Light : Recent Approaches to Designing with Natural Light.* 1st ed. London: Taylor & Francis Group.

Stickells, L. (2010). Conceiving an architecture of movement. *Architectural Research Quarterly*, 14(1), pp.41–51.

Stride Treglown. (2018). Prince Philip Maritime Collections Centre. [online]. Available from: https://stridetreglown.com/projects/national-maritime-museum/#:~:text=Josh Blackledge%2C Project Architect&text="The building represents that we're here to deliver." [Accessed December 15, 2024].

Swabey, W.C. (1922). Kant's Analogies of Experience. *The Philosophical Review*, 31(1), pp.41–57.

Swan, J. (2016). The History of Derby Silk Mill: Birthplace of the Industrial Revolution. *University of Derby*. [online]. Available from: https://www.derby.ac.uk/blog/derby-silk-mill/.

The British Land Company PLC. (2024). 1800 - Weaver's cottage. *British Land Educational Broadsheet Houses*. [online]. Available from: https://www.locallocalhistory.co.uk/brit-land/houses/page09.htm.

The National Lottery. (2022). Derby Silk Mill - Museum of Making. [online]. Available from: https://www.lotterygoodcauses.org.uk/near-you/projects/derby-silk-mill.

The Saltaire Village Website, W.H.S. The Saltaire Journey. [online]. Available from: https://saltairevillage.info/ [Accessed October 21, 2022].

Tomlinson, C. (2021). City of culture, city of transformation: bringing together the urban past and urban present in The Hull Blitz Trail. *Urban History*, 48(2), pp.351–363. [online]. Available from: https://www.cambridge.org/core/product/identifier/S0963926819001172/type/journal_article.

Tschumi, B. (1994). *Event-cities : praxis*. N. Y. . Museum of Modern Art (New York, ed. Cambridge, Mass: MIT Press.

Tuan, Y. (1977b). *Space and place : the perspective of experience / Yi-Fu Tuan.* London: Edward Arnold.

Tzortzi, K. (2016). Displaying cities: museum space as a presentational device. *Interiors*, 7(1), pp.91–109. [online]. Available from: http://dx.doi.org/10.1080/20419112.2016.1169748.

Tzortzi, K. (2017). Museum architectures for embodied experience. *Museum Management and Curatorship*, 32(5), pp.491–508. [online]. Available from: https://doi.org/10.1080/09647775.2017.1367258.

Tzortzi, K. (2015a). The Museum as a Kind of Building. In *Museum space : where architecture meets museology*. pp. 29–60.

Tzortzi, K. (2015b). The Museum as Organized Space. In *Museum space: where architecture meets museology*. Farnham: Ashgate, pp. 81–102.

UK Goverment. (2024). People-centred and participatory policymaking. [online]. Available from: https://openpolicy.blog.gov.uk/2024/11/19/people-centred-and-participatory-policymaking/.

UNESCO. (1986). Ironbridge Gorge. [online]. Available from: https://whc.unesco.org/en/list/371/ [Accessed January 15, 2025].

UNESCO. (2001). New Lanark. [online]. Available from: https://whc.unesco.org/en/list/429/ [Accessed January 15, 2025].

UNESCO. (2016). The Architectural Work of Le Corbusier, an Outstanding Contribution to the Modern Movement. [online]. Available from: https://whc.unesco.org/en/list/1321/ [Accessed January 15, 2025].

V&A. Palladianism – an introduction. [online]. Available from: https://www.vam.ac.uk/articles/palladianism-an-introduction?srsltid=AfmBOopKOGhA3gLGSauy1JAWw2cMbSd GbSt4y7vlhCWVkmkhOPVoHTE_#slideshow=877499804&slide =0.

Varela, F.J. (2017). *The Embodied Mind : Cognitive Science and Human Experience*. 2nd ed. E. Thompson, E. Rosch, & J. Kabat-Zinn, eds. Cumberland: MIT Press.

Walker, D. (2004). White space in northern light: Two churches analysed. *Architectural Research Quarterly*, 8(1), pp.61–81.

Wang, D. and Groat, L. (2013). What's Your Questions? Literature Review and Research Design. In *Architectural Research Methods*. Hoboken, New Jersey: Wiley, p. 148.

Welbourne, M. (1979). The Transmission of Knowledge. *The Philosophical Quarterly*, 29(114), p.1. [online]. Available from: https://academic.oup.com/pq/article-lookup/doi/10.2307/2219178.

Wells, M. (2021). *Survey: Architecture Iconographies*. S. Handelman, ed. Zurich: Park Books.

Weston, T. (2024). *The UK economy in the 1970s*. [online]. Available from: https://lordslibrary.parliament.uk/the-uk-economy-in-the-1970s/.

Wiedmann, F. (2022a). Research Skill MArch Lecture I. , p.9.

Wiedmann, F. (2022b). Research Skill MArch Lecture II. , p.5.

Wong, L. (2017). *Adaptive reuse : extending the lives of*

buildings / Liliane Wong. Basel: BirkhaÌ□user.

WP04. (2024). *Occasional Visitors Interview*. Interviewed by Xijing Chen.

Yaneva, A. (2022). *Latour for Architects: Thinkers for Architects*. 1st ed. Routledge.

Yu, Z. and Hirzel, T. (2024). Museum text translation in the Chinese context: the museum role and text production. *Museum Management and Curatorship*, 39(2), pp.188–202. [online]. Available from: https://doi.org/10.1080/09647775.2022.2132992.

Zumthor, P. (2006). *Atmospheres : architectural environments, surrounding objects / Peter Zumthor.* Basel: Birkhäuser.

APPENDICES

Appendix A - Industrial Museum Database

Region – UK	
	Edited Time: 07.12.2024

	Name	Type	Industry	Location	Year of Built	Architect	Website and Drawing
1	Abbeydale Industrial Hamlet	Working museum of a former steel-working site	Iron Forging	Sheffield	2016	Walker Cunnington Architects	http://www.simt.co.uk/abbeydale-industrial-hamlet

2	Black Country Living Museum	Portray life spanning 300 years of history, 1850-1950	Industrial Land	Birmingham	1978	Napier Clarke Architects	https://bclm.com/
3	Bradford Industrial Museum	Relics of local industry	Printing and Textile Machinery	Bradford	1974	W&J Whitehead	https://bradfordmuseums.org/bradford-industrial-museum/
4	Calderdale Industrial Museum	This special collection represents a wide cross-section of the industry that operated in and around Calderdale	A wide cross-section of the industry	Halifax	1987		
5	Etruria Industrial Museum	Well-preserved example of a nineteenth-century British Steam-powered Potter's Mill	Steam-powered Potter's Mill	Etruria	1991		https://www.etruriamuseum.org.uk/

6	Gladstone Pottery Museum	Woking Museum of a medium-sized coal-fired pottery	Pottery	Longton Stoke-On-Trent	1974	Baart Harries Newall	https://www.stokemuseums.org.uk/gpm/
7	Hat Works	Displaying Hatting equipment	Hats Works	Manchester	2000		
8	Ironbridge Gorge Museum Trust (Coalbrookdale Museum of Iron)	Industrial Revolution	This is an industrial heritage organisation which runs ten museums	Shropshire	1970		https://www.ironbridge.org.uk/

9	Kelham Island Museum	Exhibition on Science and Sheffield Industry	Reconstructed little mesters' workshops and England's largest surviving Bessemer Converter	Sheffield	1982	Jefferson Sheard Architects	http://www.simt.co.uk/kelham-island-museum
10	Kirkaldy Testing Museum	David Kirkaldy's former testing works	Testing Machines	London	1971		
11	Leeds Industrial Museum at Armley Mills	Museum includes collections of textile machinery, railway equipment and heavy engineering amongst others	Woollen Mill	Leeds	1982		https://museumsandgalleries.leeds.gov.uk/leeds-industrial-museum/
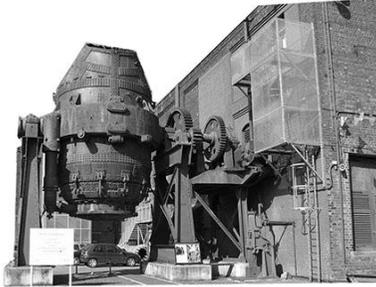
12	West Cheshire Museum	Last remaining open salt works	Pan Salt	Marston	1986	Thomas Meakin Lockwood	https://lionsaltworks.westcheshiremuseums.co.uk/
13	Merseyside Maritime Museum	Historical museum to reflect Liverpool's seafaring heritage as a gateway to the world	Shipping	Liverpool	1985	Brock Carmichael Associates	https://www.liverpoolmuseums.org.uk/maritime-museum
14	National Waterfront Museum	Wales' history of industrial revolution and innovation	Warehouse	Swansea	2005	Wilkinson Eyre	https://museum.wales/swansea/

15	National Wool Museum	Woollen industry in Wales, including spinning and weaving	Woollen Industry	Wales	2004		https://museum.wales/wool/
16	Museum of Making		Textile Industry	Derby	2021		
17	Nottingham Industrial Museum	Display local textile machinery, transport, telecommunications, mining, and engineering technology	Textile Industry	Nottingham	1971		https://nottinghamindustrialmuseum.org.uk/

18	Science and Industry Museum	Emphasis on the city's achievements	Transport	Manchester	2012	Walker Simpson Architects	https://www.scienceandindustrymuseum.org.uk/
19	Summerlee, Museum of Scottish Industrial life	Industrial and Social History Museum	Iron Work	Coatbridge	1950		
20	Verdant Works	The tales of the mill worker	Textile	Dundee	2015	James F.Stephen Architects	https://www.verdantworks.co.uk/
21	Wandle Industrial Museum	History about the 1st public railway	Railway	Mitcham	1983		
22	Helmshore Textile Museum	Wool Story, Cotton Story, The Spinning Floor	Textile	Helmshore, Lancashire	1985		https://www.lancashire.gov.uk/leisure-and-culture/museums/helmshore-mills-textile-museum/

23	The Old Mill Museum		Grist and Flour	Lower Slaughter, Gloucestershire	1995		
24	Crabble Corn Mill	Working Museum		Dover	1990		https://www.ccmt.org.uk/
25	New Lanark Visitor Centre	Visitor Attraction	Cotton Mill, Model Factory Village	Lanarkshire, Glasgow Scotland	2006		https://www.newlanark.org/
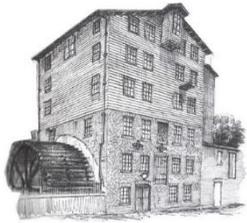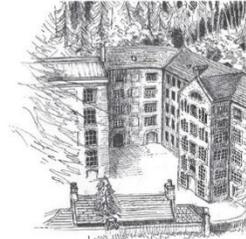
26	Barry Mill	Working Water-powered Museum	Oat and Oatmeal	Eastern Scotland	1984		
27	Preston Mill	Watermill	Oatmeal	Scotland	1959		
28	Robert Smail's Printing Works	Printing Works	Printing Works	Scotland	1990		

29	Weavers' cottage	Hand-woven textiles	Textile	Scotland	1914		
30	Nether Alderley Mill	Water Mill	Corn	Cheshire	1970		
31	Quarry Bank Mill	Cotton Mill	Textile	Cheshire	1969		
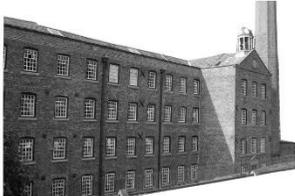
32	Middleport Pottery	The last working Victorian pottery	Pottery	Stoke-on-Trent	2014	Feilden Clegg Bradley Studios	
33	Shrewsbury Flaxmill Maltings	A precursor to the skyscraper due to its iron-frame construction	Flax Malting	Shrewsbury	2022	Feilden Clegg Bradley Studios	
34	Stanley Mills	Cotton Mill	Textile	Stanley	1786		
35	Cotehele Mill	Water Mill	Workshop	Cornwall	19c		
36	Houghton Mill	Water Mill	Flour	Cambridgeshire	1979		
37	Stainsby Mill	Water Mill	Flour	Derbyshire	19c		
38	Shalford Mill	Water Mill			18c		

39	Patterson's Spade Mill	Water Mill	Flax and Corn Paper	Northern Ireland	1837		
40	White Mill	Water Mill	Corn	Dorset	18c		
41	Lode Water Mill		Corn	Cambridgeshire	18c		
42	Wellbrook Beetling Mill	Watermill	linen	Northern Ireland	1764		
43	Bourne Mill	Watermill	Fulling and Corn		19c		
44	Clyston Mill	Watermill	Grain	Devon	1880		

	Name	Type	Industry	Location	Year of Built	Architect	Website
1	Ruhr Museum		Coal mine	Essen, Germany	1993	Rem Koolhaas	https://ruhrmuseum.de/
2	Augsburg Textile and Industry Museum	Textile Equipment for exhibition	Textile	Bavaria, Germany	2010	Klaus Kada	https://www.timbayern.de/
3	Bundeswehr Military History of Museum	The human aspect of the war	Military	Bundeswehr, Germany	2011	Daniel Libeskind	https://www.mhmbw.de/
4	LVR-Industriemuseum	It is a decentralized museum with six	Textile (Cotton Spinning)	Rheineland, Germany	1996		https://industriemuseum.lvr.de/de/startseite.html

		locations in Rhineland					
5	Elbphilharmonie Hamburg	A new centre of social, cultural and daily life	Harbour Warehouse	Hamburg Germany	2016	Herzog & de Meuron	https://www.elbphilharmonie.de/de/
6	Museum of Industry (Ghent)	The Museum of Industry, Work and Textiles	Textile (Cotton)	Ghent Belgium	1977		https://visit.gent.be/en/see-do/museum-industry
7	Museum of Work	Memory collections and documentation, Center for Political Illustration Art	Weaving Mill	Norrköping Sweden	1970		https://www.arbetetsmuseum.se/about-the-museum/
8	Textile Museum (Similar case with Museum of Making)	Textile Lab	Textile	Tilburg Netherlands	2008	cepezed	https://textielmuseum.nl/en/
9	Crespi d'Adda	Company Town for Industrial archelogy	Textile	Capriate San Gervasio BG Italy		Ernesto Pirovano	(Similar case with Derwent Valley Mills)

10	Cukrarna Space for Contemporary Art	Multi-functional space for contemporary art	Sugar Refinery, Tobacco, Textile, Military	Ljubljana Slovenia	2021	Spacelab	
11	Noblessneri Valukoda	Art Centre	Marin Factory	Noblessner Estonia	2013		https://noblessner.ee/en/noblessner-foundry/#/
12	Royal Delft Museum						
13	Heineken Experience						https://www.heinekenexperience.com/en/
14	Dijonval cloth manufactory	Museum	Cloth Factory	Sedan France	1960		
15	Textilfabrik Cromford, Germany	Museum	Cotton Spinning Mill	Ratingen Germany			

Appendix B – Phenomenological Observation

B.1 Tracking movement patterns of the first group.

| Date	Timetable	Location and Floor
23.05.20 (Sat)	15:00 -17:00	Assemblage (2nd)
23.07.07 (Fri)	11:00 -12:30	Museum of Making
23.08.08 (Tus)	11:00 -14:00	Assemblage (2nd)
23.08.10 (Thurs)	14:00 -16:00	Assemblage (2nd)
23.08.17 (Thurs)	11:00 -15:00	Italia Mill (Event)
23.09.07 (Thurs)	11:00-13:00	Museum and Art Gallery
23.09.15 (Fri)	10:30-13:00	Throwing Room (1st)
23.09.21 (Thurs)	13:30-16:00	Throwing Room (1st)
23.10.06 (Fri)	12:00-14:00	Throwing Room (1st)
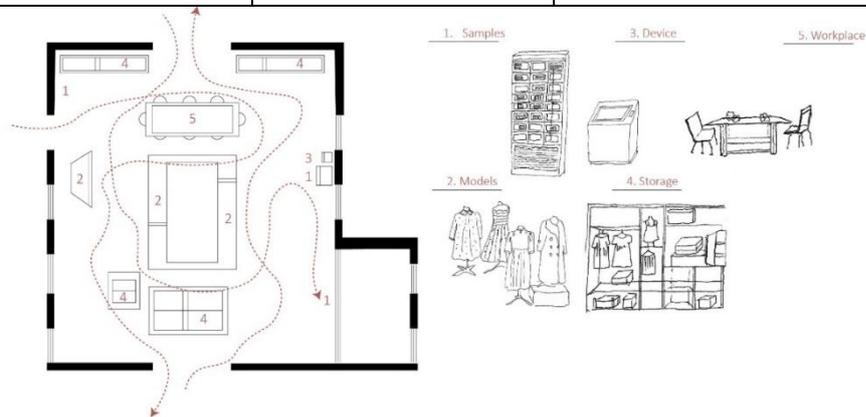
Figure 1: Visitors are categorised as groups of low interest, medium interest, and high interest in the Assemblage room.

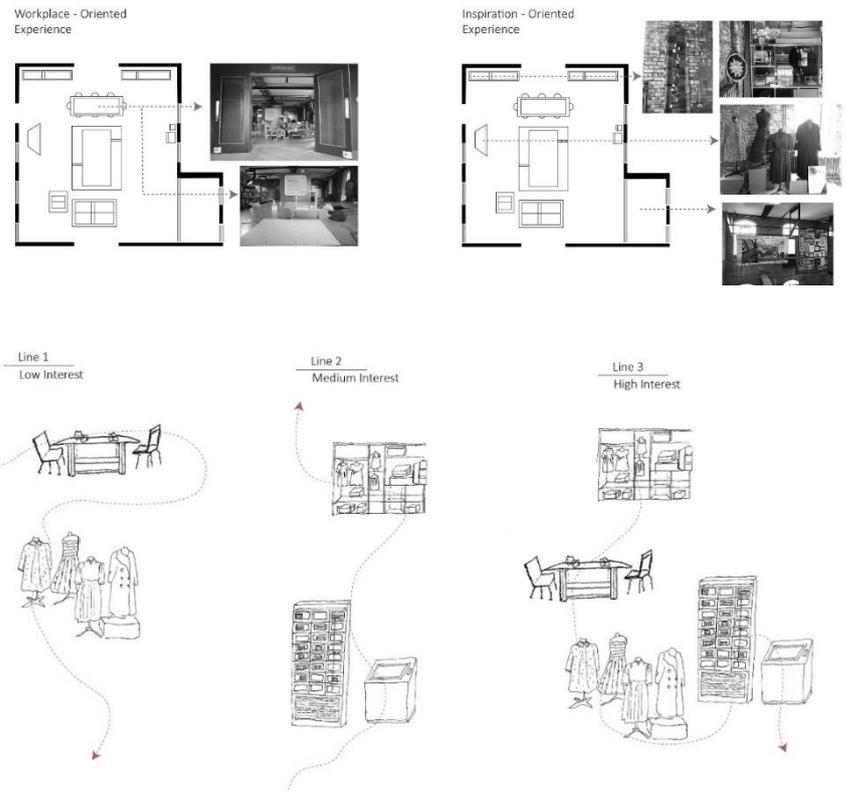Figure 2: Inspiration-oriented experience and Workplace-oriented experience in the Assemblage room.

Figure 3: 1-hour groups and a 20 mins group Visitor Routes in the First Observation

Figure 4: 1-hour groups and a 20 mins group Visitor Routes in the Second Observation

B.2 Tracking behavioural trajectories of the second group.

B.2.1 Ethics Approval

The University of Nottingham

Ethics Committee Reviewer Decision

This form must be completed by each reviewer. Each application will be reviewed by two members of the ethics committee. Reviews may be completed electronically and sent to the Faculty ethics administrator from a University of Nottingham email address, or may be completed in paper form and delivered to the Faculty of Engineering Research Office.

Applicant full name   Xijing Chen

Reviewed by:

Name   G12

Signature   (paper   based   only)

………………………………………………………………………………………………………

Date   18/12/23

☐   Approval awarded - no changes required

■   Approval awarded - subject to required changes (see comments below)

Just two small issues now in highlight.

☐   Approval pending - further information & resubmission required (see comments)

☐   Approval declined – reasons given below

Comments:

- Will you put notices in the museum that this activity is taking place? This only matters if data collection will take place within the museum, I'm not clear if that applies or not. Also, I assume

that any data collection within the museum will be approved by the museum manager – please clarify. – t**he part about notices doesn't seem to have been addressed. Please put posters in the museum explaining the study and what people should do (i.e. visitors, not study participants) if they don't want to be photographed or if they want their photos completely deleted (i.e. contact the researcher, who would then delete them.)**.

- A minor issue, but you don't actually ask them their age, only the age range. So I'm not clear what you're asking them to consent to here. Please check the consent form is compatible with the demographic data being recorded.

Please note:

1. The approval only covers the participants and trials specified on the form and further approval must be requested for any repetition or extension to the investigation.
2. The approval covers the ethical requirements for the techniques and procedures described in the protocol but does not replace a safety or risk assessment.
3. Approval is not intended to convey any judgement on the quality of the research, experimental design or techniques.
4. Normally, all queries raised by reviewers should be addressed. In the case of conflicting or incomplete views, the ethics committee chair will review the comments and relay these to the applicant via email. All email correspondence related to the application must be copied to the Faculty research ethics administrator.

Any problems which arise during the course of the investigation must be reported to the Faculty Research Ethics Committee

B.2.2 Participant Information Sheet

Participant Information Sheet for Occasional Museum Visitors

Title of Study

Enactive Visitor Engagement in an Industrial Heritage Museum

A case study of the Museum of Making

Name of Researcher: Xijing Chen (Ph.D. student in Architecture, University of Nottingham), under the supervision of Prof. Jonathan Hale, and Dr Laura Hanks, University of Nottingham, UK)

We would like to invite you to participate in my research study, which received no specific grant from any funding programs. Before you decide, we would like you to understand why the research is being done and what it would involve for you.

The Purpose of Study:

1. Collect Visitors' Comments and Opinions
    1) Gather feedback from visitors regarding intellectual and embodied learning experiences within the Museum of Making.
    2) Evaluate the effects of these experiences, considering architecture's functional aspects (e.g. lights), aesthetic elements, and historical significance.

2. Identifying Enacted Learning Experience
    1) Examine the extent to which visitors enact learning experiences.
    2) Explore how architectural contexts contribute to and support these enacted learning experiences.

A Brief Description of the Study Design:

The outcomes of this study will be included in the PhD thesis entitled *Enactive Visitor Engagement in an Industrial Heritage Museum*, and presented at relevant academic conferences and published in academic journal papers.

You Are Being Invited to Take Part for One of the Following Reasons:

As the occasional museum visitor, you have a fresh museum experience for approximately 45 minutes , and there are two routes you can choose.

Route 1: Focusing on the intellectual experience of the permanent gallery, *two exhibitions* located in the Civic Hall and the Old Shop on the ground floor, and *two exhibitions* located in the Gateway and the Throwing Room on the first floor. (you need to choose two or three exhibitions based on their own interests)

Route 2: Focusing on the embodied experience of the *open storage* located in the Assemblage on the second floor, *hands-on experience* in the throwing room and *a temporary exhibition* on the third floor or participating in a *museum workshop*. (you need to choose one exhibition or one workshop based on your own interests)

The semi-structured interview will be held in person and last approximately 15 minutes, you will be asked to describe your experience, regarding museum architecture and exhibition, after you visit the museum. One month, two months and three months later, you might be selected to execute the following online interviews to test your learning outcome of this museum visit.

During The Study, You Will Be Asked to:

1) Provide feedback regarding intellectual and embodied learning experiences within the Museum of Making.
2) Provide your personal experiences, considering architecture's functional aspects (e.g. circulation, space layout, lighting and materials), aesthetic elements, and historical significance.

The Results of the Research Study will be Presented in Two Ways:

1. A part of a PhD project. The results of the research study will be written up as a part of a Ph.D. Thesis by XIJING CHEN.

2. It might also be published in an academic journal or presented at relevant conferences at some point. A copy of the results can be obtained by contacting the researcher using the contact details at the end of this information sheet.

The Authorship/Anonymity of the Data:

For museum visitors, your personal information will not be recorded in the data collection, nor will it be shown in the PhD thesis and published papers. Demographic data will be anonymised and photos of people will be edited to obscure any personally specific and identifying features.

Further information and contact details:
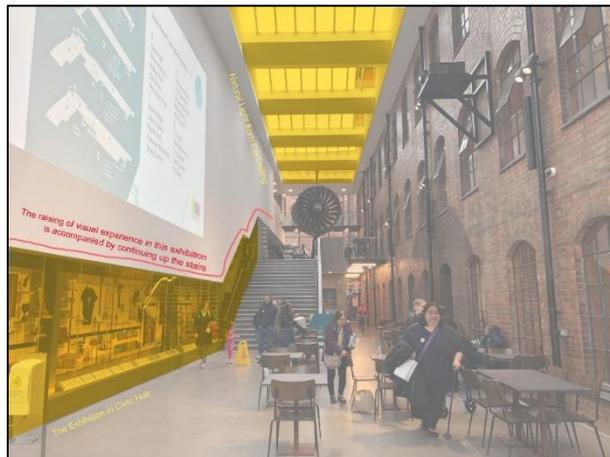
Xijing Chen, Ph.D. student in Architecture.

Address: Sustainable Research Building, Department of Architecture and Built Environment, Faculty of Engineering University of Nottingham, NG7 2RD.
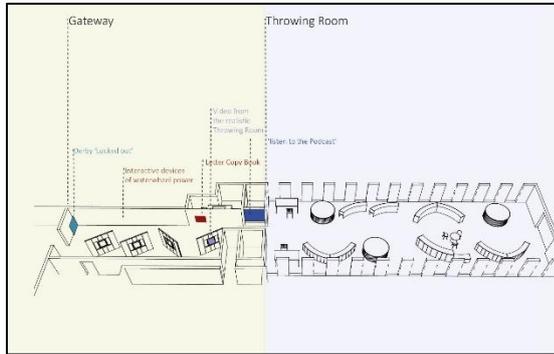
Email: xijing.chen@nottingham.ac.uk

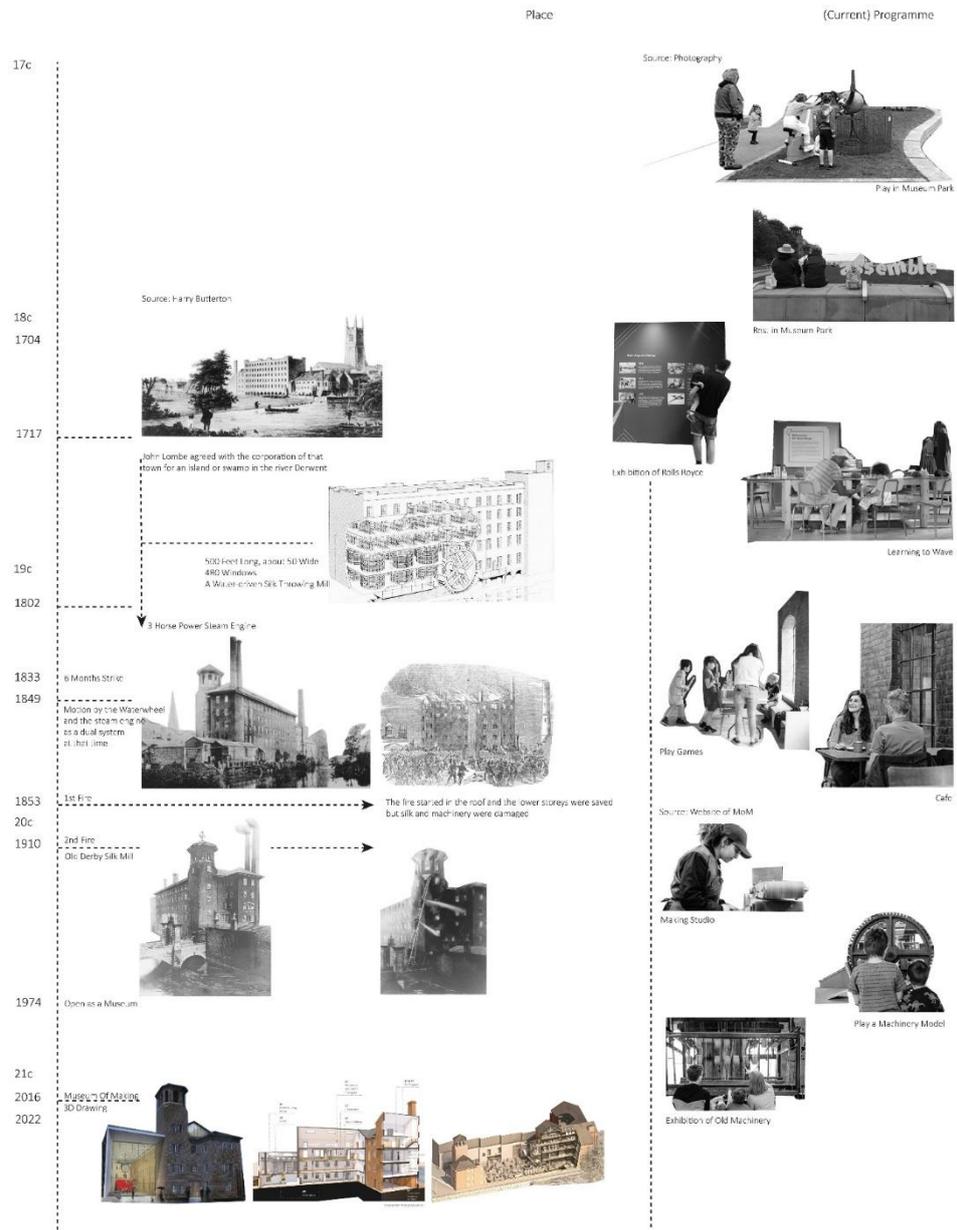## Route 1: Two Exhibitions on the Ground Floor

Two Exhibitions on the First Floor

Route 2: Hands-on Experience on the Second Floor

Appendix C – Case Study

C.1 5P Programmes

Place

(Current) Programme

Source: Photography

Play in Museum Park

Rest in Museum Park

Exhibition of Rolls Royce

Learning to Wave

Play Games

Cafe

Source: Website of MoM

Making Studio

Play a Machinery Model

Exhibition of Old Machinery

Source: Harry Butterton

17c

18c
1704

1717

John Lombe agreed with the corporation of that town for an island or swamp in the river Derwent

500 Feet Long, about 50 Wide
480 Windows
A Water-driven Silk Throwing Mill

19c

1802

3 Horse Power Steam Engine

1833 6 Months Strike
1849

Motion by the Waterwheel and the steam engine as a dual system at that time

1853 1st Fire

The fire started in the roof and the lower storeys were saved but silk and machinery were damaged

20c

1910 2nd Fire

Old Derby Silk Mill

1974 Open as a Museum

21c

2016 Museum Of Making
3D Drawing

2022

Product   Process   People

17c

Hatched
and Unhatched eggs   Female Cocoon   Shank of Raw Silk

18c

Shank of fine Italian Reeled Silk   Hanks of Silk   Process

Surgeon's pure
sewing silk on card   Silk Ligature   Suture silk   Winding - Machine

19c

Source: Science Museum Group   Spinning - Machine or Engine

Derby Silk Mill

20c   Throwing - Machine

Derby Lock Out

Machine for Cutting and Hollowing Tags

Source: Museum of Making

21c

2022   Machine for Fixing Tags to the laces   Today

C.2 Time-Spent Measurement

C.3 Online Survey

2024.03.14 - Google Review (4.5 stars)

Key Words: Café (140), Floor (52), Poppies (39), Model Railway (31), Manufacturing (24), Silk Mill (17), Jet Engineer (10), Toyota (10), Industrial Heritage (9), Lego (8)

- **1 Star:**

The building has been nicely renovated. Previously it was an industrial museum that illustrated Derby's proud industrial history. Now, it isn't even a shadow of what it was. Where have the exhibits gone? Why is it so empty and soulless?

The exhibits are rarely described and a mismatch of items.

It just seems to come over as a fantastic setting for some mediocre displays. It feels more like a storage facility. We were really disappointed.

lots to look at but no explanation of what items are or were used for or where found. I remember the old industrial museum which in my opinion was better.

There is no logical progression here, or for that matter any labels or explanations, It's a bit like a huge version of grandad's old garage.

Poorly curated. Objects organised by material leaves them without context or resonance.

- **2 Stars:**

Most of the museum is function rooms and while I understand the museum needs them to fund the exhibits, there are few exhibits. I do find in modern museums they are usually light of detail but big on large atriums, cafes and shops.

Not what I expected a few exhibits with little information, most exhibits were just put in drawers which you pulled out to view.

As a lover of the old Derby Industrial Museum, I was delighted to see that it had reopened but on visiting I was sadly disappointed to see that it is pale shadow of its former self.

Lots of stuff, not a lot of detail. It's was a silk mill but little about it.

Totally confusing experience.

- **3 Stars:**

Friendly museum, good cafe, interesting collection. More a museum of Made rather than Making as could have more explanation of how the objects were made and used.

I was particularly interested in the jet engine, but apart from the engine itself the information about it was limited to a few wall signs.

The ground floor seemed largely empty, minus a few more train related maps/imagery. The 1st floor had obviously had the most thought. It felt like there was more story and journey to explore.The below archive floor (floor 2) was a little more engaging with plenty to see however very little seemed relevant to the museum of making.

The third floor (Assemblage) is the worse, with items just thrown in, making it hard to know what item is where. Plus, there's not much explanation of the items.

If you plan to take children they will be bored because there is not enough interaction for them. The exhibits are not labelled and even adults don't know what things are.

Very family oriented. But the layout, display and information on items let's it down.

It feels very unfocussed, there doesn't seem to be a clear thematic thread running through the museum, with the second floor feeling more like browsing a junk shop than visiting a museum.

I didn't find anything to really engage with. I expected the Museum of Making to show me the full story and range of Derby's industrial history, so I could see and understand the history and practice of the industrial processes (textiles, railways, ceramics, precision engineering) from early days to the present.

Given the size of the building, it would have been better to devote separate floors to (1) silk manufacturing and the story of silk, (2) heavy industry in Derby (railways and Rolls Royce etc). There was also little or nothing about either the industrialists of Derby or the socio-economic impacts of industrialisation.

Some great artifacts but could be vastly improved by information boards.

Nice spacious setting in the museum itself.

- **4 Stars:**

I walked round interesting and stimulating displays on the ground and first floors, and used and enjoyed the shop, but only found out that there was more to see on the 2nd and 3rd floors on reading the guide at leisure when I got home. More signage in the building, with perhaps a suggested route to see everything in a logical order would be a helpful improvement.

I was lucky to visit the place being accompanied by one of the volunteers who spend their time and effort without pay, and she had some information to provide on objects which I might have otherwise dismissed as marginal. Within these limitations, it's certainly a must-see attraction in Derby now, and there's also a very nice café/restaurant on the ground floor.

Very interesting with lots of exhibits to interest all ages.

This could easily take up at least half a day if you like to look at things closely, and read everything.

The inclusion of a place for local artisans to sell items that they had made was a nice touch too. Some of the layout, though, was confusing, however, it was a great visit.

Great cafe!

Loved the various floors of exhibitions and the activities dotted about, which we had a go at.

There is a fair amount of hands-on for younger family members.

Good experience but some of the exhibits were a bit random.

Interesting (if relatively few) exhibits, lots of things for children to get hands on with, nice cafe in spacious setting.

Great interactive opportunities for children of all ages and various workshops but these need to be booked in advance.

Displays don't flow very well they are a bit fragmented.

An excellent place to visit, full of historical memorabilia brought back good memories for me also has good facilities where you can enjoy a drink and something to eat all in all worth a visit.

It's an odd museum, it kind of feels like loads of stuff has been dumped into the shelves for people to look at, but it really works and is an enjoyable place.

- **5 Stars:**

Really interesting, modern and engaging museum. All the displays are really up to date with lots of interesting objects. Very good for children as lots of interactive experiences including model railway.

Loved the workshop on the lower floor, if we lived here we'd be members for sure!

Adult will enjoy history, smell of old walls and tons of memories on the shelves; while children can enjoy different ways if making by themselves (drawing, lego, wood making,etc).

The archive room is a real treasure trove and needs to be seen to be believed. Lots of hands-on activities for children and grown-ups. Fantastic location to catch up for a coffee or to take friends and family.

The music, the set and the atmosphere were brilliant (Event). I would highly recommend this experience.

Not your normal museum where you trail from display to cabinet. Instead they have everything out to see. It's a glorious chaos where if you discover something that tweaks your curiosity, and you will, then a little digging will explain it for you. Excellent coffee shop/cafe too.

A great space, with exhibits and commentary rightly emphasising Derby's place at the centre of industry, with its scientific and technological advances over the years driving great developments. But also an honest appraisal of the impact on wider society and the environment. Beautiful renovation of the building and a good view of the developing riverside from the top floor.
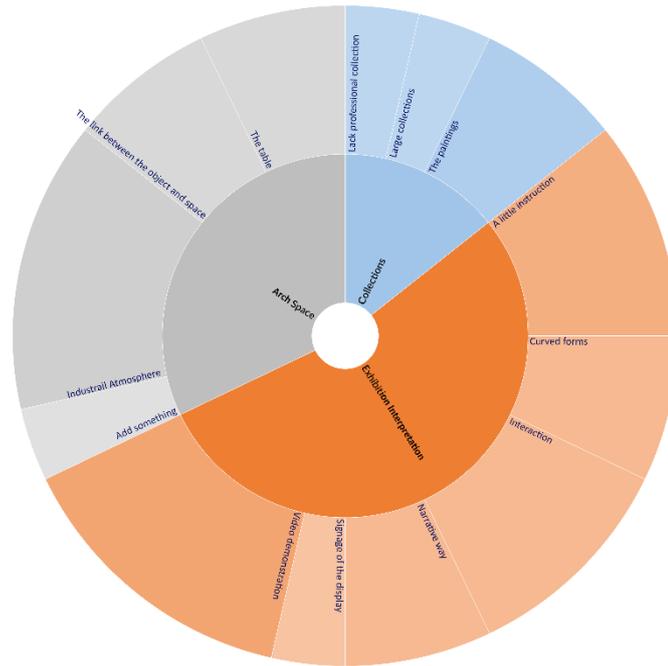
Great refurbishment of Derby's former Silk Mill, telling the story of the mill's history but then also domstrating Derby's "making" heritage through heavy industry to the present digital and crafts era.

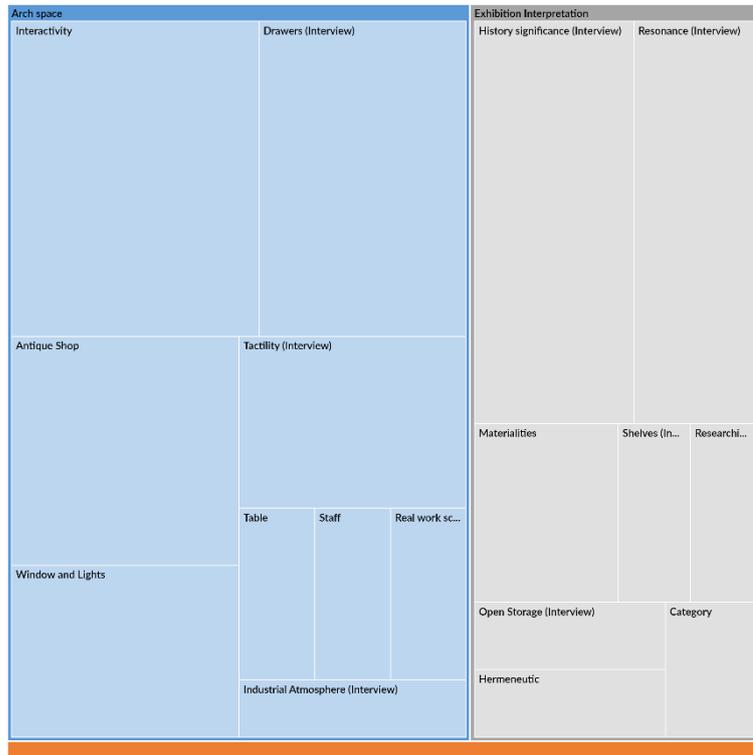# C.4 Data Analysis

Interviews of the Civic Hall and Old Shop:

Interviews of the Gateway and Throwing Room:

Interviews of the Assemblage Room and Workshop:

Arch space

- Interactivity
- Drawers (Interview)
- Antique Shop
- Tactility (Interview)
- Window and Lights
- Table
- Staff
- Real work sc...
- Industrial Atmosphere (Interview)

Exhibition Interpretation

- History significance (Interview)
- Resonance (Interview)
- Materialities
- Shelves (In...)
- Researchi...
- Open Storage (Interview)
- Category
- Hermeneutic

Workshop

- Industrial Atmosphere (Interview)
- Tools (Interview)
- Aspiration (Interview)
- Flexbility (Interview)
- Window and lights (Inte...)
- Inspire by display (Inte...)
- Dedicated space and ti...
- Artistic Word (Interview)
- Spatial Sequence (Interview)
- Disjointd (Interview)
- Accomplishment (...
- Staff guide (Interview)
- Historical Significance (Interview)
- Color Scheme (Interview)

Appendix D – Future Museum Design

1. *Be inclusive*
2. *Be collaborative*
3. *Be non-hierarchical*
4. *Develop new strategies for participation and co-curation*
5. *Be multi-sensory*
6. *Prioritise social interaction*
7. *Be action-oriented*
8. *Trust museum visitors to construct their own narratives and recognise the role of the museum maker as one of creating opportunities to access new ways of knowing*
9. *Take account of the local*
10. *Be embedded in its environment*
11. *Find new and ethical ways of working which take account of the role of museums as socially responsible organisations and agents of social change*
12. *Be real*
13. *Be human*
14. *Be underpinned by high-quality research*
15. *Reach beyond narrow definitions of design*
16. *Inspire*
17. *Cross boundaries*
18. *Be strategic, visible, connected and organised*
19. *Be varied*
20. *Be transformative*

(MacLeod et al. 2018)