

A Design Methodology to Maintain Authenticity in Contemporary Restoration & Renovation Projects

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Abstract: The growing instability of present circumstances has raised global anxiety and cognitive crisis. Designers start to doubt and rethink the relationship between space, people, and the future. In the ten wings of Yi (which is also known as I Ching or Book of Changes), ancient Chinese philosophers state that knowing the past is the key to learning about the future. Design plays a big role in the heritage of historical architecture, and the history will always be a critical source for design. In order to maintain authenticity of the space, this research structures the proposal of a new design methodology that will link the target space with the history of the site and set out design schemes, creating catalog of criteria and reviewing the old construction to understand the value of the past in the design practice of restoration and renovation projects.

Keywords: Spatial Design; Methodology, History; Authenticity; Restoration and Renovation

1. Introduction

As the world enters the second decade of the second millennium, it finds itself in an unpredictable and constantly changing environment. Globally, people are living in an era of uncertainty where news is breaking at the speed of light, the environment is suffering from the ill-effects of industrialization, and the economy has been hit by global crises. People are not just worried, but confused and overwhelmed by what is happening around them. Design takes on a new definition as the world enters the 21st century. As cutting-edge developments and creative minds collaborate to merge design and technology, the importance of technology in our lives is undeniable. Even though the rapid transformation may sometimes leave us feeling perplexed. The individual begins to question, "What aspects of life are we

missing amidst these changes?" These questions prompt contemplation regarding our responsibilities and legacies as spatial designers, leading to a different way of looking at things. The ancient Chinese text, Yi (I Ching or Book of Change), dating back to the 9th century BC, explores the philosophy of change and emphasizes that change is the basis of all things. The ten wings of Yi highlight the relationship between past, future, and change. This wisdom encourages people to think in reverse and turn knowledge, experience into new discoveries for the future. History provides insight into a moving life process, and designers have a responsibility to honor the past while creating unique spaces for today's consumers.

This study investigates how to incorporate historical elements and preserve the original character of a space during restoration and renovation processes. It explores various design strategies, materials, and techniques that can be employed to maintain the authenticity of the original structure while meeting the functional and aesthetic needs of modern occupants. The findings of this study aim to provide insights and guidelines for architects and designers involved in the preservation and revitalization of historical buildings.

This research was developed based on the following assumptions: (1) preserving the authenticity of historical spaces is essential for maintaining cultural heritage and promoting a sense of continuity in our built environment; (2) understanding the historical context and significance of a building is crucial in order to make informed design decisions during the restoration and renovation process; (3) there is a need for effective design strategies and approaches that can not only preserve the authenticity of historical elements but also evoke the intended emotional responses and connections with users. Based on these assumptions, this research aims to contribute to the body of knowledge in the field of spatial

design for historical preservation and provide practical recommendations for professionals working in this domain.

2. Literature Review

2.1 Authenticity in Restoration

Authenticity in architecture is now an international heritage doctrine and was discussed in the Nara Document in 1994. This document suggested using renovation and restoration as the intervention method for execution. In 1996, the Declaration of St. Antonio[1] emphasized that authenticity of cultural heritage is linked to our cultural identity and can be determined by the values assigned by the communities involved. It focused on the protection, management, authentication, and monitoring of cultural heritage, with the goal of understanding historical values and achieving the necessary reforms and modernizations. The ultimate aim of restoration is to ensure a high level of authenticity.

Ehteshami and Soltaninejad[2] review the different views on authenticity in the Nara Document and the Charter of Venice and suggest a new list of authenticity indicators. They recognize the importance of authenticity by introducing authenticity indicators in a design domain, which is usually missed in the conventional design process. Understanding authenticity as a historical matter is crucial to fully comprehend the cultural heritage, as it encompasses various aspects. These indicators will be used as a comprehensive criterion for analysing various design elements and determining the level of authenticity. (see Figure 1)

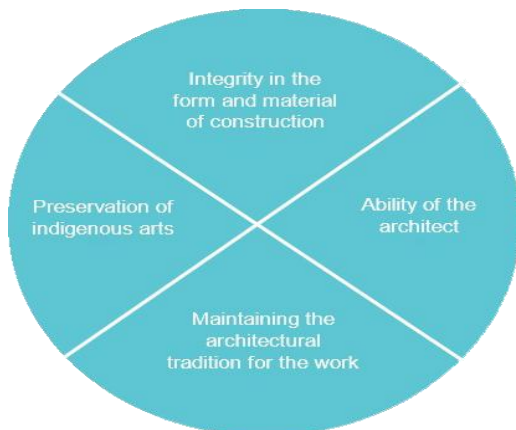


Figure 1. Chart of the four Primary Authenticity Indicators

According to their research, the primary elements that contribute to authenticity are ability of the architect, preservation of indigenous arts, maintaining the architectural tradition for the work and integrity in the form and material of construction. Integrity involves maintaining the original form, materials, and design of the structure, as well as preserving the unique artistic styles and cultural values of each region with the active involvement of the local community.

2.2 Emotional Design Theory

Preserving historical spaces is not only about maintaining physical elements; it is also about preserving the emotional and cultural significance that these spaces hold. Donald Norman[3] states that people have a complex emotional response to products. His emotional design theory recognizes that the aesthetic and experiential qualities of a product can evoke emotions and create a sense of attachment and meaning for users. To create products that will elicit appropriate emotions, he developed three levels of emotional design aiming at providing positive experience for the users. (see Figure 2)

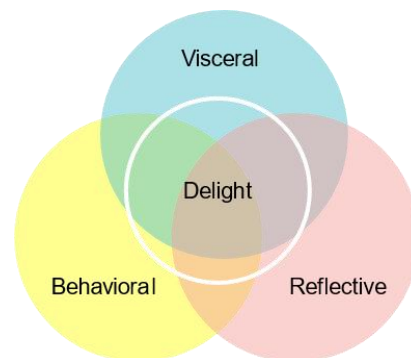


Figure 2. Donald Norman's Three Levels of Emotional Design

The initial level, referred to as the visceral level, is determined by the forms, volumes, and styles of objects. It creates a sensual experience and is the first impression of users to the product. It appeals to our sense of beauty, and it is what called "aesthetics". The second level is the behavioral level, in which a person's feelings about a product are affected by their performance with that product. The behavioral level is concerned with the functionality of the product. The third level is the reflective level, a reflective design considers how the product relates to the user and the rationalization and

intellectualization of a product. It can be accomplished by storytelling or through creating an emotional connection with the user and creating something familiar to them. Design elements that reminds users of their past or memory can be turn-ons. At its core, emotional design is about helping users feel comfortable and delighted using the product. Delight should be achieved by creating an environment where the users' three levels of expectations has met.

Nowadays, people are not satisfied with just superficial exchanges; they seek deeper satisfaction in their psychological needs, aesthetic appreciation, emotional experiences, and the conveyance of emotions through design. Design should fully express these notions and organize external details and personal feelings into clear concepts and artistic forms, optimizing the designing process[4]. When it comes to historical preservation, emotional connections and experiences play a significant role in the way people perceive and value these spaces. People often feel a connection to the past and a sense of awe or reverence for the stories and events that took place there. The emotional design theory is important for this research because it emphasizes the role of emotions in human experiences and interactions with built environments. This can help promote a sense of continuity and cultural heritage, as well as enhance the overall user experience. This connection to the past and the sense of identity it provides make these spaces timeless, as they continue to hold meaning and importance for the people who experience them.

3. Methods

3.1 Research Framework

Restoration and renovation projects involve the preservation and enhancement of historical buildings, sites, or artifacts. These projects aim to protect the cultural and historical significance of these assets while making necessary updates to meet contemporary standards and needs. By looking at these existing restoration and renovation projects from a deconstructive point of view, namely how it 'works.', they can be simply decomposed into three categories: past elements, present elements, and elements of continuity. Here's an explanation of each category:

(1). Past Elements: These refer to the original

architectural features, materials, and designs of the building or structure. It includes elements that existed during the historical period in which the building was created or any significant additions made to it over time.

(2). Present Elements: These are the contemporary features and materials that have been added or modified in the building or structure over time. Present elements can include artistic creations[5] or modern extensions, which provide additional space or functionality to the structure. For example, the inclusion of digital technology adoption[6] refers to the integration of various digital systems and devices such as smart home technology, automation and remote control systems and advanced monitoring and security systems. In the context of sustainable energy standards[7], present elements may include renovations aimed at improving the energy efficiency of the building. This could involve upgrading the plumbing or electrical systems to reduce water or energy consumption. Installing energy-efficient lighting fixtures or appliances, as well as insulation improvements, are also common elements of sustainable renovations.

(3). Elements of Continuity: These are the aspects that bridge the past and present, creating a sense of harmony between the two. Elements of continuity are implemented to ensure that the restoration or renovation project respects the historical context while accommodating the needs of the present or future. It comes from a demand for universal outlook upon the world[8]. Elements of continuity can include maintaining the building's original layout, or integrating contemporary features in a way that blends seamlessly with the existing design. Additionally, storytelling can form an integral part of continuity in space by connecting the past, present, and future. When users interact with the space, they are essentially engaging with a story that has been crafted to convey the space's origins, its current state, and its potential future evolution. Storytelling can help products and communication hook the imagination of users and invite actions and behaviors[9]. By narrating the evolution of the space, the storytelling can emphasize the heritage and roots, while also providing glimpses of innovation and modernization. This narrative thread creates a connection between the historical aspects of the space and its contemporary features, allowing

users to understand how they fit into the overall story and vision.

The process of restoring or renovating a building requires careful consideration of its historical past, while also accommodating the needs and preferences of the present time. The past elements of a building, such as its architectural style, materials, and design details, must be preserved and maintained throughout the

restoration process. Meanwhile, the present elements may include new technology, materials or artistic creation that can enhance the building's functionality, structural safety[10] and appearance. Finally, the elements of continuity refer to the design principles and concepts that unify the past and present elements into a cohesive whole.

Table 1. A Framework for Qualitative & Quantitative Research with a Focus on Maintaining Authenticity

	Qualitative	Quantitative
Past elements	Preservation of indigenous arts	Original stonework, wooden beams, ornate decorations, or historical paintings
Present elements	Maintaining the architectural tradition for the work	Material renovations involving functional improvements, energy efficiency, accessibility, or adapting the space for a modern purpose
	Ability of the architect	Education, experience, and previous work of the architect
Elements of continuity	Integrity in the form and material of construction, and storytelling	Conformation to its original form and materials, and coordination with environmental stressors

However, there is a delicate balance that must be achieved in order to maintain authenticity during the restoration and renovation process. It is not simply about recreating a historical appearance, but also about preserving the essence and integrity of the original structure or artifact. According to the four primary elements that contribute to authenticity: ability of the architect, preservation of indigenous arts, maintaining the architectural tradition for the work and integrity in the form and material of construction, a framework for qualitative & quantitative research with a focus on maintaining authenticity is made. (see Table 1)

Indigenous arts of the space such as traditional art forms and craftsmanship contributes to the authenticity of the design. Examples include original stonework, wooden beams, ornate decorations, or historical paintings. The preservation of past elements involves careful research, documentation, and analysis to ensure accuracy and authenticity. Attention to detail is crucial in maintaining authenticity. This includes preserving or restoring architectural elements, finishes, and decorative elements that define the historical character of the structure or artifact. It may involve replicating original paint colors, recreating intricate patterns or motifs, or restoring historic wallpapers. Finally, ongoing maintenance and monitoring are essential in preserving the authenticity of restored and

renovated structures or artifacts. Regular inspections, maintenance plans, and education programs can help ensure that the historical integrity and significance of these assets are protected for future generations.

While restoring past elements aims to preserve historical authenticity, dealing with present elements requires a different approach. In order to maintaining architectural tradition, the design should reflect the local architectural tradition and style. This criterion can be evaluated by examining how the design incorporates local architectural features, such as roof shapes, doorways, and windows. This criterion can be evaluated by examining how the design incorporates local materials, techniques, and aesthetics. Authenticity also involves the use of appropriate materials and techniques. When possible, original materials should be salvaged and reused. However, if this is not feasible, efforts should be made to source materials that closely replicate the original ones in terms of appearance and quality.

Renovations involving present elements may prioritize functional improvements, energy efficiency, accessibility, or adapting the space for a modern purpose while respecting the building's historical context. The skills and knowledge of the architect play a crucial role in maintaining the authenticity of the design. This criterion can be evaluated by assessing the

education, experience, and previous work of the architect. In addition to research, collaboration with experts in the field such as historians, archaeologists, architects, and craftsmen is vital. Their expertise helps ensure that the restoration and renovation work aligns with the historical context and craftsmanship of the original design. Another aspect of maintaining authenticity is ensuring that any additions or modifications made during the restoration and renovation process are distinguishable from the original elements. This helps viewers understand the history of the structure or artifact and differentiate between what is original and what is new.

Integrity in form and material bridges the past and present of the space, which is about a sense of continuity and harmony. The design should be true to its form and materials. This criterion can be evaluated by examining how well the design conforms to its original form and materials, and how well it withstands environmental stressors. One of the key challenges in maintaining authenticity of integration is determining the materials of the structure or artifact. The availability of suitable materials for construction can be a limiting factor, particularly when trying to achieve continuity and integrity. Finding materials that match the existing structure in terms of both

quality and appearance can be difficult, particularly if the original materials are no longer available. Also, finding skilled labour that can work with traditional materials and techniques can be difficult, particularly in areas where these skills are no longer commonly used. The project of Yin Xiang Bar begins with a careful analysis of the historical architectural style, material palette, native culture and its supporting systems. The spatial designer focuses on bringing the best of past and present together from an aesthetic point of view. Ensuring that historical elements are preserved while still creating a concept that is for the future heritage of culture.

By focusing on the three elements, the designer can create restoration and renovation projects that honour the building's history while also meeting the needs of modern users. The research explores the methods of bringing the past into the present through the process of restoration and renovation, with a focus on maintaining authenticity. In this project, the designer pays more attention to transforming the cultural elements into symbolic language of the design. (see Figure 3) "the historical architecture speaks the past itself and it is strong," Buildings accumulate history, they are repositories of the past, they speak of previous users, their lives, habits and influences.

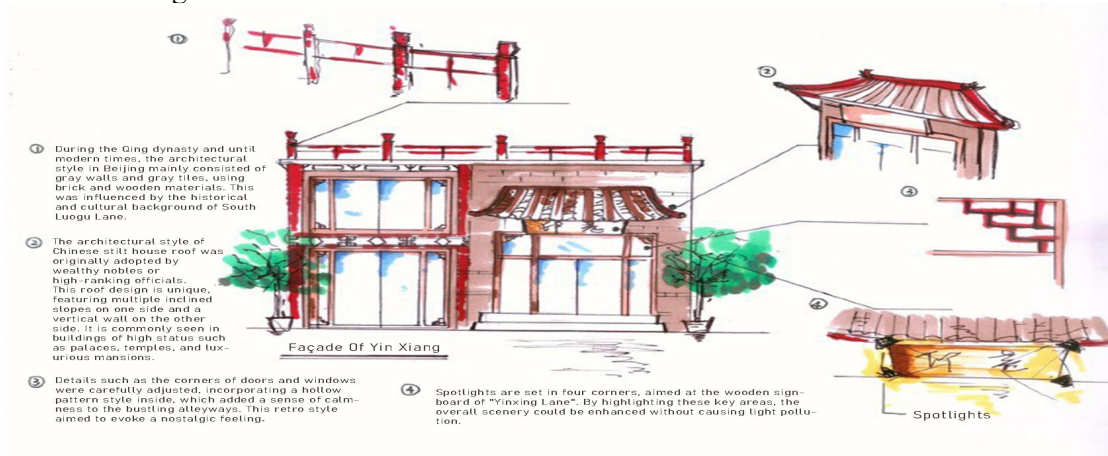


Figure 3. Yin Xiang Bar Qualitative Research

3.2 Criteria Framework

Informed by the principles of emotional design theory, the criteria framework aims to assess how well space elicits emotions, satisfaction in users on visceral level, behavioral level and reflective level. This framework specifically focuses on the concept of "sense of continuity," which emphasizes the importance of creating a

coherent and uninterrupted experience that resonates with users' emotional needs and expectations.

4. Results

The table below outlines the 4 key activities and objectives involved in the design process. (see Table 2)

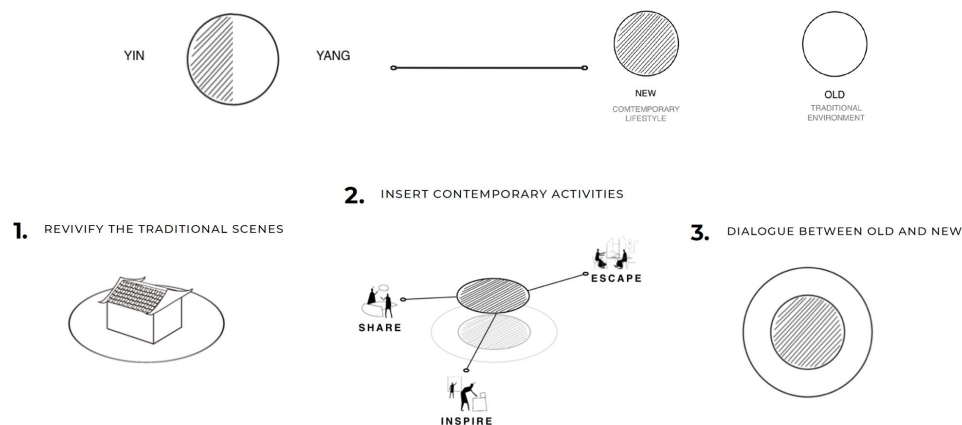
Table 2. Design Process

Key activity	Objective
Brainstorming	Generate a diverse range of ideas and solutions to the space
Idea simulation	Explore and test different scenarios for spatial design with different layouts, configurations, and materials
Synthesis	Based on the research, develop a concept that maintains authenticity and integrates the past and the present
Visualization	Create virtual simulations of the proposed design such as 3D models and renderings to help visualize how the restored or renovated space will look and feel, allowing for adjustments and refinements before implementing them in real life

Yin-yang land is a renovation project in Beijing

that aims to preserve the architectural authenticity of a traditional courtyard. The historical buildings "Si He Yuan" that once characterized the charm of those urban settlements were rapidly substituted by new buildings.

By encouraging free-flowing and open discussion, brainstorming helps to foster creativity and innovation. Designed to meet the needs of the future, the Yin-yang land is a unique commercial development shaped by aesthetics of the past. It is about affection - creating emotional connections and strong bonds between users and the product. Design is about more than aesthetics, form and function. It touches on emotions and stories that users can connect to. In the case of Yin-yang land, the main focus is to attracting local people by building emotional connections through the traditional architecture and holding different activities. (see Figure 4)

**Figure 4. Yin-Yang Land Brainstorming**

The design process of Yin-Yang land takes a user-centred approach. (see Figure 5) The designers use narratives to send a message to people about the value of knowing and preserving our history. The design is a combination of both future-focused concept design and classic craftsmanship. In terms of the form and material of construction, local traditional materials such as grey bricks are being used, and the original red columns and roof are being preserved. Modern shapes and lines are being introduced, creating a circular space for furniture and the courtyard. The design aims to balance the conflicts between traditional and modern elements and create a harmonious environment where people can enjoy modern living in a traditional setting.

The comparison of research hotspots in four stages of the application of data visualization technology in library after data cleaning is shown in Table 1.

After the software analysis results are cleaned and the words such as library and data visualization are removed for comparison, it can be found that the research on the application of data visualization in the field of library is more and more focused on the service goal of smart library [12].

When we enter historical spaces, we often feel a connection to the past and a sense of awe or reverence for the stories and events that took place there. Designers strive to create timeless experiences in the project of Yin-Yang land. The ancient Chinese text, the Yi, emphasizes the philosophy of change and suggests that wisdom

involves looking into the past to create for the future. History is seen as a moving process of life and provides insights for designers. It is the

responsibility of designers to continue the legacy of the past while catering to today's consumers. (see Figure 6)

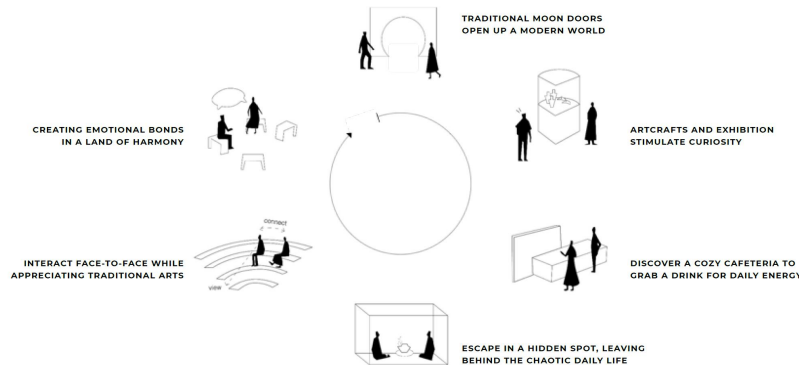


Figure 5. Yin-Yang Land Idea Simulation

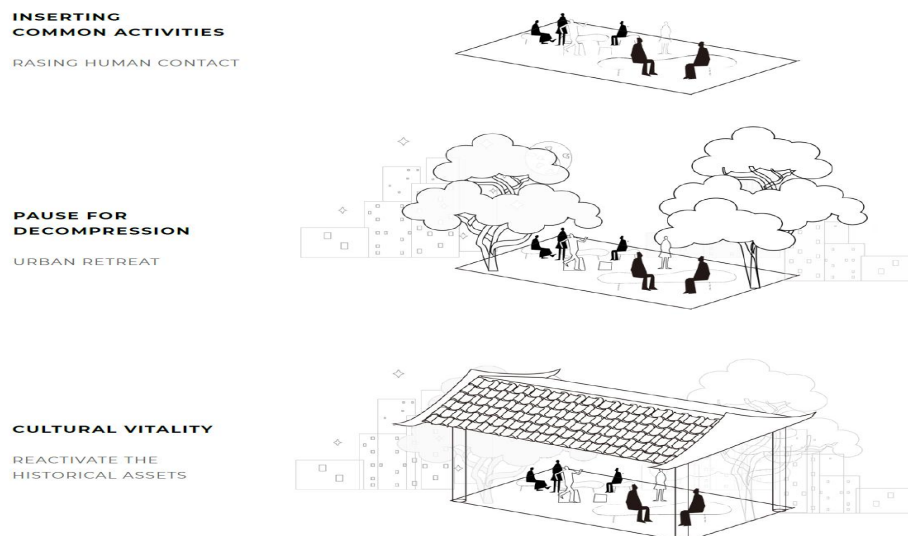


Figure 6. Yin-Yang land Synthesis

"Si He Yuan" is characterized by its rectangular shape, enclosed by buildings on all four sides. It is common for multiple generations of a family to live together in a "Si He Yuan", promoting family cohesion and the sharing of responsibilities. One of the key features of a "Si He Yuan" is the central courtyard, which serves as an outdoor space for the residents. It is a place for family gatherings, socializing, and various activities. At the behavioral level, the focus is on maintaining the original use and functionality of the courtyard as a space for people to gather and interact. The four houses facing each other, which is a classic feature of Beijing architecture, are being kept intact. The design aims to create a harmonious and fluid space where people can

meet and connect. (see Figure 7)

At the reflective level, the project aims to attract young people back to the old town area by infusing contemporary designs and activities into the architecture. The goal is to evoke the memories and emotions of the old building and create a space that resonates with the younger generation. The design is centred around the needs of the people who lived here, preserving the original structure while bringing new life to it.

The traditional moon door, circular openings in a garden wall, serving as a very inviting entrance, is the entrance towards contemporary world. Today the youngster are seeking for culture connection under the modern lifestyle. That's

why to insert the contemporary art installation for attraction. Entering the traditional architecture, the layering traditional moon door is entrance towards contemporary world. Circular island “floating” upon water which connects north, west, and east houses. Entering the main door,

circular islands and water courtyard. At the glance, opens up the view of all houses. It is a picture of communal living of the old Beijing, a public fluent space for people to convene, drink, gossip, to socialize, to break up the monotony of life, to stay in touch with their friends.

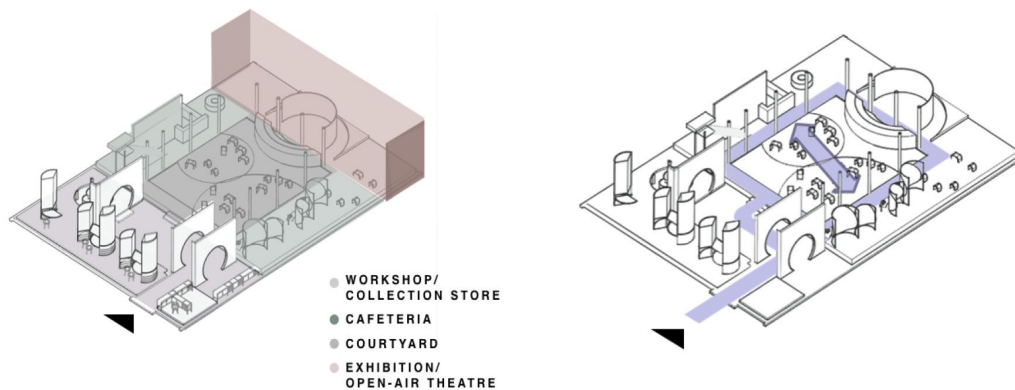


Figure 7. Yin-Yang Land Zoning and Flow

Ultimately, the elements chosen by the designer are meant to be comprehensible and evoke a sense of familiarity as people enter and experience the space. The design should be complete, leaving a lasting impression on the users throughout their journey in and out of the space. The elements of design are carefully considered to create a cohesive space. Lines, shapes, and dots are used in a deliberate and

orderly manner. Limited colors are used, with a preference for maintaining the original colors of the building and harmonizing the restoration with the existing architecture. The textures and materials used in the design add layers and variety while still maintaining color harmony. The overall pattern of the space is consistent, with a cohesive design that appeals to the senses as a whole. (see Figure 8)

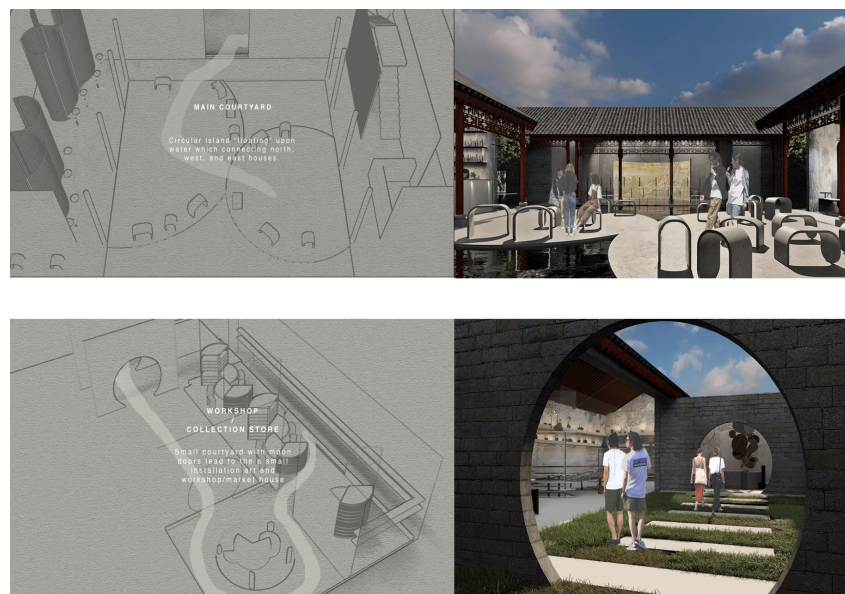


Figure 8. Yin-Yang Land Visualisation

5. Conclusions

Overall, the research underscores a new

methodology in contemporary restoration and renovation projects, which preserves the authenticity of the original space. When looking

to restore a building, the future is seen as something that emerges from the present as much as it emerges from the past. Authenticity should be designed to achieve a state of perfect harmony where design and original invention seamlessly intertwine. Contemporary restoration & renovation is about creating a space that is timeless, versatile, and can adapt to suit future needs. By preserving historical spaces and understanding their significance, designers can create a built environment that bridges the gap between the past and the present, fostering a deeper connection to our cultural heritage.

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