

Schematizing Museum Architecture: Interpreting Spatial Relations through Diagrams

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Abstract: In contemporary architectural discourse, the museum emerges as a distinct phenomenon—a convergence point of diverse spatial-temporal determinants and values. By undergoing a paradigmatic transformation during the 20th century, museums ceased to serve merely as passive repositories of artworks and were redefined as experiential spaces that actively communicate—both with the viewer and with their architectural and spatial context. Within this dynamic interaction, exhibition design has been identified as a significant mediating layer in the relationship between architecture and the exhibit. Moreover, additional spatial determinants can be recognized as contributing to the overall experience, including dichotomies such as exterior–interior, known–unknown, room–path, skin–content, protection–presentation, and real–virtual. Accordingly, this study explores the architecture of contemporary museums through the lens of organizational-formal interconnectedness, spatial structure, and perception. In this framework, museums are considered as specific patterns—both semiotic and experiential—subsequently interpreted through cognitive schemata into spatial constructs. The research methodology is primarily inductive, beginning with a literature review and analysis of relevant examples from contemporary architectural practice. This is followed by the classification and schematization of observed spatial constructs (regularities, principles, conclusions). The objective is to enable a form of unlayering of the museum’s integral whole through visual translation into diagrammatic structures. The study aims to contribute to a deeper understanding of the complex structural-functional relationships within contemporary museum architecture, while also opening avenues for the development of novel spatial relationships and interactive, innovative practices—particularly through the application of advanced technologies.

Keywords: schematization, architecture, contemporary museums, spatial relationships, diagram

1. Theoretical Review: Museum Architecture as an Active Membrane

The process of networking and communication between different spatial levels began with a departure from the archetypal appearance of museums in the 1930s and 1940s. This shift marked a move away from the idea of the museum as a "cold testimony"—a grandiose, rigid, and symmetrical architectural structure functioning as a storage facility, devoid of immediate interaction between space and artworks. Notable examples that initiated change and introduced innovative approaches to both architectural form and exhibition concepts include the *Museum of Modern Art* (MoMA) and the *Guggenheim Museum* in New York (Thompson 1991; Bishop 2013; Tzortzi 2016). Significant contributions to exhibition design and curatorial approaches were also made by avant-garde movements. For the first time, art was musealized at the moment of its creation, and the same individual assumed responsibility for both the artistic artifacts and their mode of presentation (Bayer 1961). However, from the perspective of organizational-structural and perceptual networking, the most consequential transformations occurred in the 1970s with the emergence of "new museology", which brought profound changes to museum practice. This paradigm shift relocated the focus from the object to the human as consumer, integrating the present into the past through relevant themes. As a result, static typologies were transcended in favor of spatial conceptualization; museums began to accommodate elements of entertainment and to prioritize the overall experience offered by the space, rather than the mere transmission of static information (Jones and MacLeod 2016). Exhibition design emerged as a superimposed layer in the architecture–exhibition relationship (Pilegaard 2021), opening up new possibilities for an integrated dialogue between the architectural framework and the curatorial content.

2. Identification of Significant Relationships in the Creation of an Integral Experience

In physical terms, the museum takes shape as a space that embodies and constrains the entire visitor experience. Several of the identified boundary elements—that is, spatial dualities—will be further elaborated upon and visually interpreted through schematization and diagrammatic representation in the sections that follow.

2.1. The Exterior–Interior Relationship

The architecture of the museum has evolved in parallel with theoretical developments, while maintaining the representational character of the museum building. Its appeal has not necessarily relied solely on external appearance, but also on the development of the interior, articulated through specific spatial atmospheres. When considering the museum through the lens of a *phenomenological-formal dichotomy*, two significant and opposing approaches to museum architecture can be identified: those oriented outward, and those oriented inward (Fig.

1). In the first category, "outward" orientation may refer to the development of the architectural envelope through volumetric and formal expression, but it can also be understood more broadly as a focus on the development of the city and larger spatial frameworks. This particularly includes the strategic use of museum architecture as a catalyst for urban development—a phenomenon now widely referred to as the Bilbao Effect, named after Frank Gehry's *Museum of Contemporary Art*. In this way, the boundaries of the museum experience extend beyond the physical limits of the museum building itself. A comparable recent example is the *Plateforme 10* arts district in Lausanne, which, by integrating three newly built museum buildings, seeks to act as an urban activator of interdisciplinary character, accessible to a broad audience. Conversely, inward-oriented architecture focuses on the development of interior atmospheres, with the aim of evoking specific emotional responses in visitors. This approach is most commonly found in museums dealing with war events or human suffering, such as the *Jewish Museum in Berlin*, designed by architect Daniel Libeskind (MacLeod 2005). An illustrative example from a similar period is the *Chichu Art Museum* in Japan, designed by architect Tadao Ando, which, by minimizing its external visibility, maximizes the perceptual experience and encourages viewer contemplation. These two principles rarely exist in isolation; they often interact and evolve into new or transitional frameworks. In the case of museums, the relationship between interior and exterior can also be significant due to the existence of typologies such as open-air museums. Thus, *The Twist*, designed by Bjarke Ingels Group (BIG) within the *Kistefos Museum*, functions simultaneously as a museum object, a bridge, and a sculptural centerpiece within its open-air sculpture park.

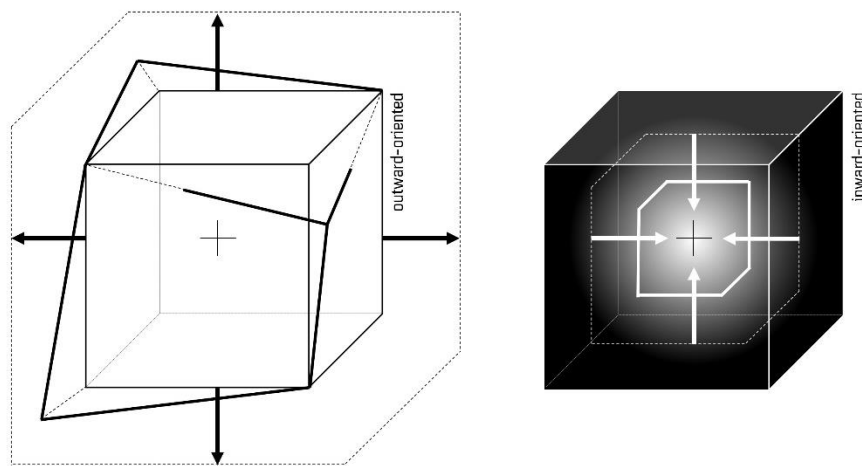


Figure 1. Schematizing exterior–interior relationship (space oriented inward/outward)

2.2. The Protection–Presentation Relationship

The organizational structure of the museum institution is conditioned by the full range of museological activities carried out within it, such that—regardless of the institution's size or complexity—it must support preservation, research, and communication with visitors. From these foundational functions arise the key spatial divisions: areas for preservation and research (as a unified operational category), and public-oriented zones, which are treated as a distinct segment. In this context, one may speak of a *functional-use dichotomy*—namely, the boundaries between preservation and exhibition, or, more specifically, the use by staff versus visitors (Fig. 2). The preservation of museum objects involves storage areas and conservation/restoration workshops equipped with high-quality conditions for safeguarding collections. For economic reasons, these facilities are often shared by multiple museum institutions. When located within a single museum building, the spaces designated for preservation must have a separate entrance with a controlled access regime. Conversely, research spaces are typically subject to less restricted access. In addition to being used by staff, they may be accessible to a segment of the public, primarily external researchers (Maroević 1993). The segment intended for the public may integrate a wide array of functions, for active learning and for leisure (Lindsay 2020); however, it is primarily composed of exhibition spaces for (a) permanent and (b) temporary displays, as well as (c) multifunctional rooms designed for lectures, discussions, screenings, and similar activities. In addition to their polyvalent nature, these spaces are often characterized by a high degree of flexibility, wherein certain sub-units may operate as shared rooms, extensions, or transitional spaces between functions (Fig. 3). An example that illustrates the complex and multilayered relationship between presentation and protection at the level of the exhibit itself is provided by

Lascaux IV: The International Museum for Cave Art, where a faithful replica of the Paleolithic paintings is displayed to facilitate direct visitor engagement—departing from the conventional practice of safeguarding originals behind glass and within controlled environmental conditions.

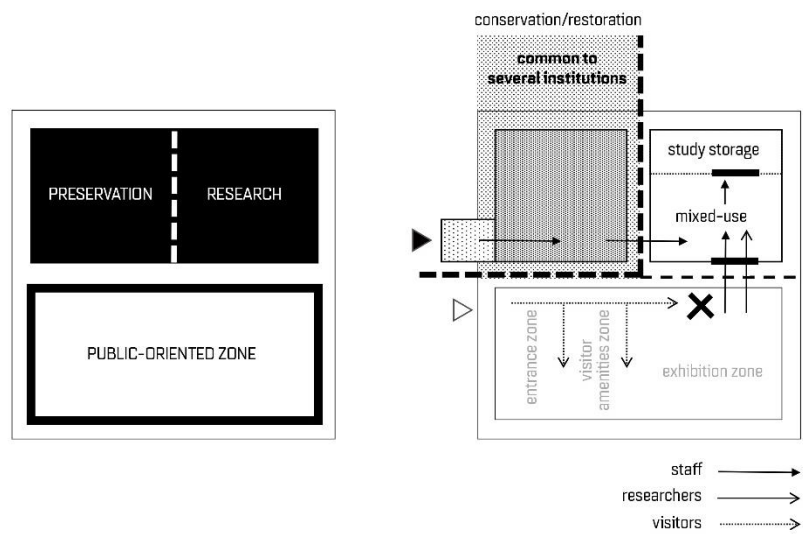


Figure 2. Schematizing protection–presentation relationship

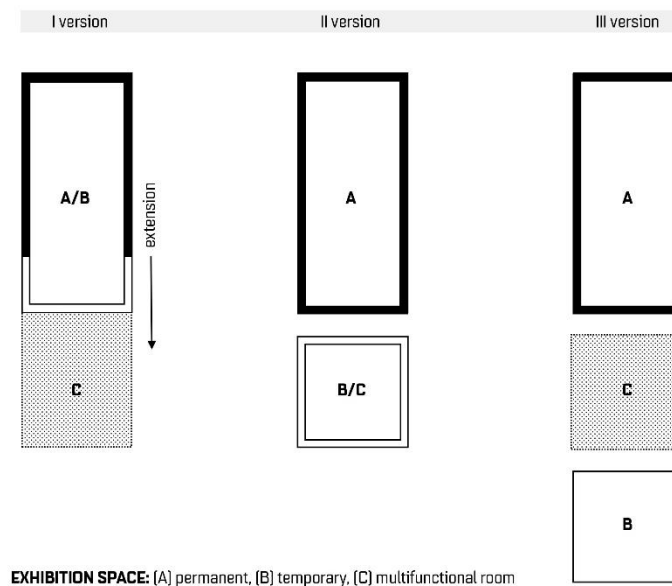


Figure 3. Diagram of exhibition zone

2.3. The Known–Unknown Relationship

The museum can be perceived as a heterotopia—a "counter-site"—a space that often stands in contrast to what lies outside of it, whether in terms of its physical characteristics or its deviation from the prevailing order, thematic focus, or conceptual framework (Foucault 1986; Schorch and McCarthy 2019). When considering its spatiotemporal coordinates, elements of dislocation (a displacement from the immediate reality) and discontinuity (a frequent detachment from the linear flow of time, through a shift toward the past or future) become evident. From a perceptual standpoint, the entrance functions as a buffer zone and a cognitively recognizable site, thereby reinforcing the biological need of the individual for orientational anchors (Wise 1974). As such, the entrance zone may be interpreted as the point of origin for a *perceptual-organizational dichotomy*—a threshold where the unknown begins through the interruption of the known, and vice versa (Fig. 4). The movement scheme within the museum is typically organized in such a way that it allows a return to this "known

place", either after completing the entire exhibition—as is characteristic of a circular movement pattern—or after visiting smaller units, in the case of a centripetal movement pattern. These patterns may range from highly simplified to more complex and combinatory configurations, generating circular movement in either open or closed forms, developed along horizontal or vertical planes. Spiral movement, another frequently encountered form, can likewise facilitate a return to the initial point. Only linear circulation, however, implies a separation between the point of entry and the point of exit, thus establishing them as two distinct zones of apperception (Fig. 5).

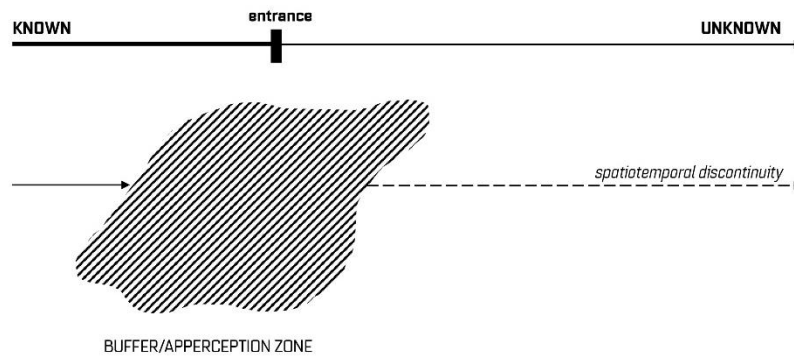


Figure 4. Schematizing known–unknown relationship

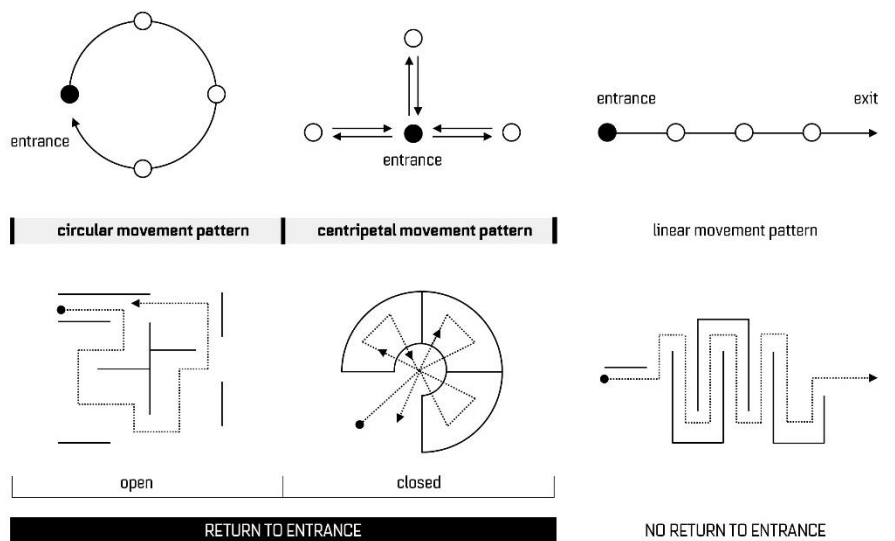


Figure 5. Movement pattern diagram

2.4. The Room–Path Relationship

In the conceptualization of an architectural object, formal principles pertain not only to the architecture itself but also to the structure of interior space. As such, they directly inform future concepts in exhibition design, serving as the spatial framework upon which such displays are constructed. Two fundamental principles can be identified: the museum as a room or system of rooms, and the museum as a pathway or itinerary (Batakoja 2023). In most cases, these principles of *conceptual-structural dichotomy* do not exist in entirely separate forms; rather, they tend to be interwoven and mutually reinforcing. To provide a clearer illustration and elaboration of this distinction, several examples will be presented in which a pronounced differentiation—or dominance—of one of the two spatial structure concepts can be observed (Fig. 6). In Le Corbusier’s *Museum of Unlimited Growth*, which served as a prototypical model for the realization of several museums, the dominant principle is that of a spiraling pathway. Although shaped through a series of subsequent expansions and the addition of connective elements between distinct architectural units, the principle of the path remains evident in the *Louisiana Museum of Modern Art* as well. Conversely, the concept of the room as a strong spatial-structural motif is observed in the

21st Century Museum of Contemporary Art in Japan, designed by Kazuyo Sejima and Ryue Nishizawa, as well as in the LIMAC by Productora. Both examples illustrate a condition of free, non-linear movement through a system of rooms, the latter characterized by the transformation of structural columns into spatial enclosures.

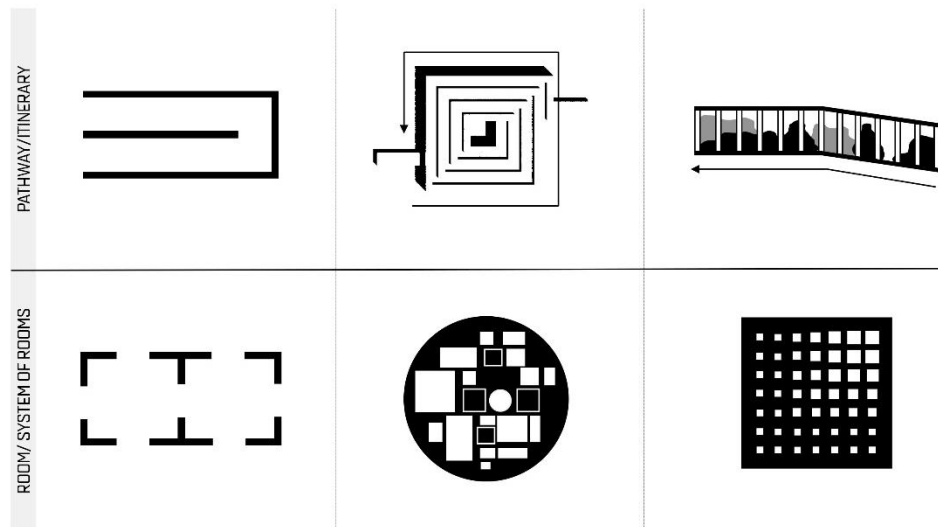


Figure 6. Schematizing room–path relationship

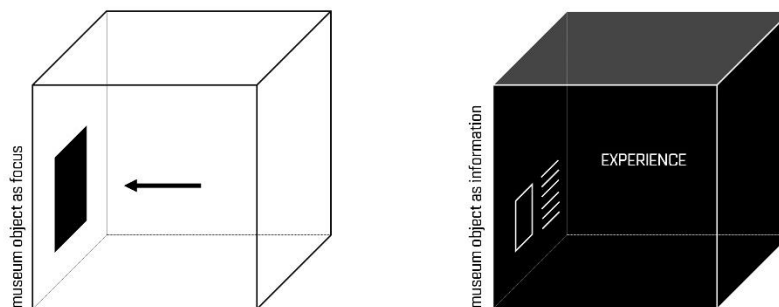


Figure 7. Schematizing skin–content relationship

2.5. The Skin–Content Relationship

The communication of content and the architectural skin as its container emerges from the development of exhibition design as an intermediate layer. Depending on the type of museum, a *dichotomy in exhibition design approaches* can be identified: (a) object-centred, and (b) experience-centred, where the museum object becomes a medium of information (Fig. 7). In the first approach, most common in contemporary art museums, the relationship with the architectural skin is secondary; it functions merely as a physical container—a "white cube" blank space—that highlights the artwork without competing for attention. In contrast, the opposing approach, typical of specialized thematic museums, prioritizes a more direct and primary relationship with the skin, aimed at creating an immersive overall experience or conveying specific messages (Hourston Hanks 2021). In this context, there are numerous cases where museums are designed in direct response to the specific characteristics of the exhibited artifacts. A notable example is the *Museum of Apoxyomenos* in Mali Lošinj, which illustrates the reuse of a 19th-century building façade, while the interior has been entirely adapted and subordinated to the display of a single, key object. Beyond the two fundamental approaches, when discussing the relationship between the container and content, additional subcategories of various dichotomies can be identified (Fig. 8). Criteria for differentiation may include the object's display mode (direct or indirect), use of supplementary elements (pedestals or technical equipment), lighting type (artificial or mixed), visual framing (holistic or fragmented), grouping method (synchronic or diachronic), and spatial distancing. An extreme example

of the skin–content relationship, seen as the interplay between architectural form and experiential content, is James Turrell’s *Roden Crater*. Although it does not function as a conventional museum, but rather as a kind of anti-museum (Franklin 2019), it embodies features of a site-specific installation with museological qualities. Instead of displaying a traditional collection, the space itself becomes the medium, where light, time, and atmosphere are curated as core experiential elements.

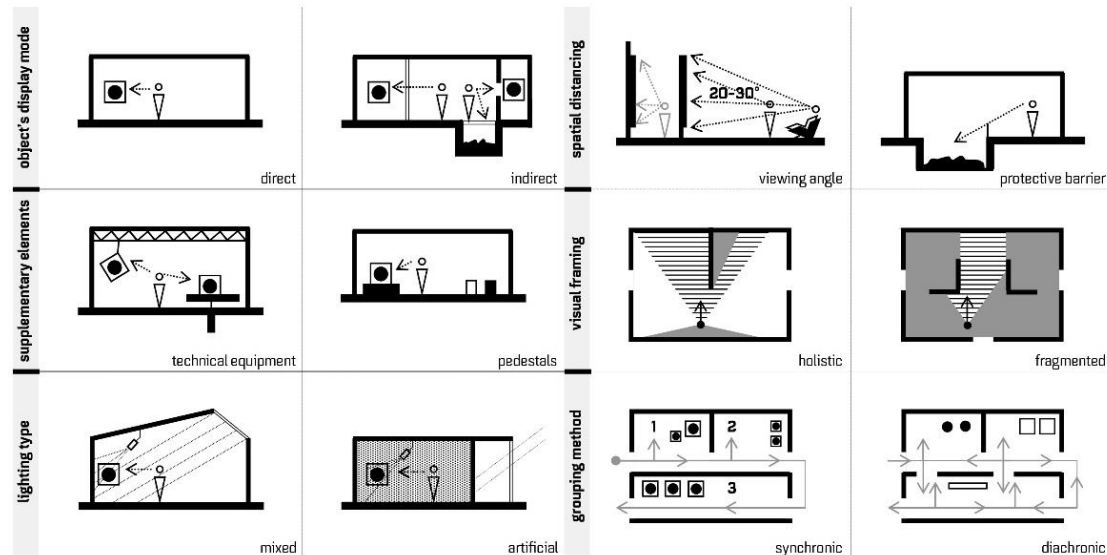


Figure 8. Diagram of skin-content relationship subcategories

2.6. The Real–Virtual Relationship

In addition to all previously mentioned aspects, the museum today is increasingly confronted with a fundamental reexamination of the necessity of its existence in the traditional sense of the word—prompted by the rise of virtual museums, new technologies, and media whose ephemeral nature challenges the tangible object as the primary bearer of information. This relationship could also be described as an *experiential dichotomy*, distinguishing between physical and virtual modes of engagement (Fig. 9). In the context of the tension between the physical and the virtual, some authors highlight the role of mobile phones as an intermediary step in interpreting museum narratives, referring to this transitional phase as a hybrid model (Waern, Sundnes Løvlie et al. 2025).

3. Discussion: The Creation of a Synthetic Diagram

Considering the museum as an integrated whole that synthesizes previously examined relationships, and by constructing a synthetic diagram (Fig. 10), several reflections on the nature and transformation of contemporary museum spaces have been identified. Firstly, it is observed that nearly all examined relationships involve certain forms of opposition—dichotomous approaches—offered as theoretically simplified classifications that, in practice, tend to evolve, grow more complex, or intertwine. Building upon this, the activation of the architectural envelope has proven to be a fundamental precondition for the articulation of spatial relationships, primarily through the redefinition of the interior–exterior connection, whereby the museum building ceases to function as a closed, rigid volume. The dialogue between interior environments and the architectural skin is becoming increasingly prominent, with a growing tendency toward the creation of layered, multidimensional spatial configurations. Furthermore, the potential for establishing a relationship between the public and research-oriented content is recognized, even if only in an indirect form, thereby gradually dissolving the boundaries between the public and professional domains. It is also observed that a spatial organization system based on 'rooms' offers users greater freedom, encouraging personalized movement through the exhibition and the construction of individual narratives, thereby overcoming the necessity of strictly chronological displays. Although a small number of museums—primarily those focused on contemporary art—continue to prioritize the artifact itself, increasing emphasis is being placed on spatial impressiveness and the visitor’s emotional experience. Within this context, the role of new technologies becomes particularly significant— not only in terms of redefining exhibition strategies but also through their direct influence on broader spatial concepts—ultimately raising questions about the future existence of the museum as a physical space in the traditional sense.

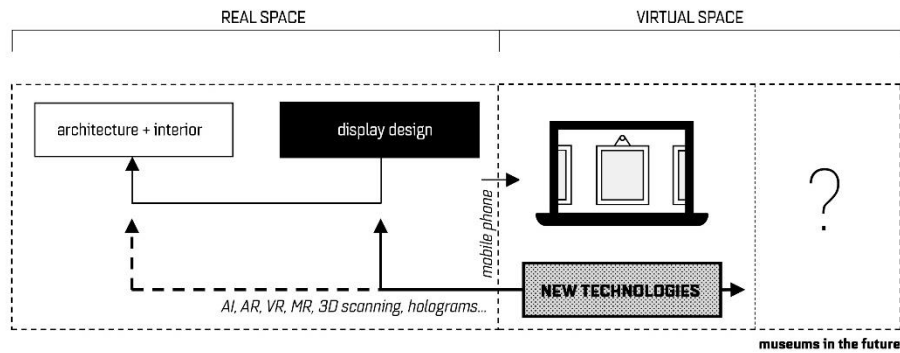


Figure 9. Schematizing real-virtual relationship

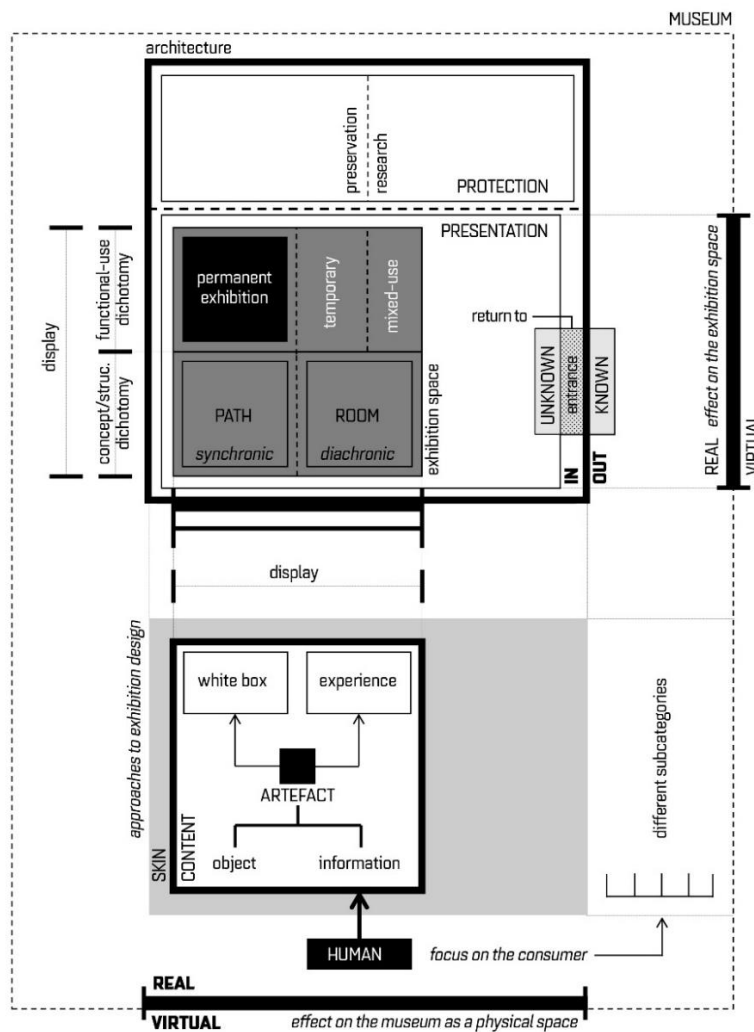


Figure 10. Synthetic diagram

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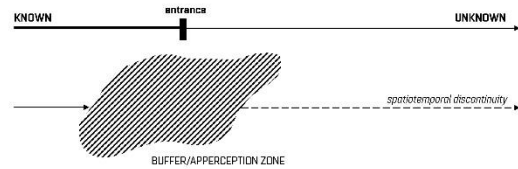
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RESEARCH

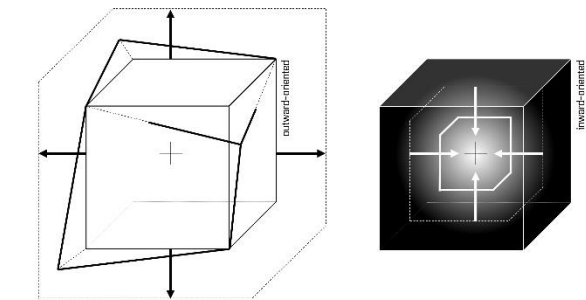
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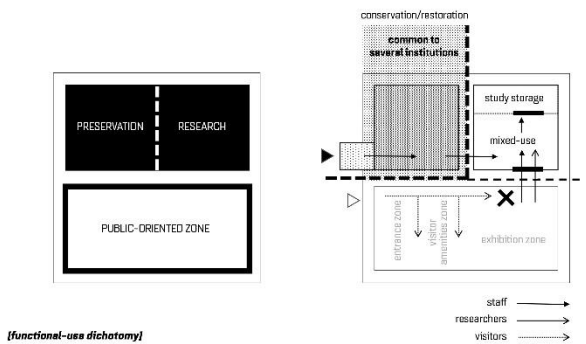
[perceptual-organizational dichotomy]

known-unknown relationship



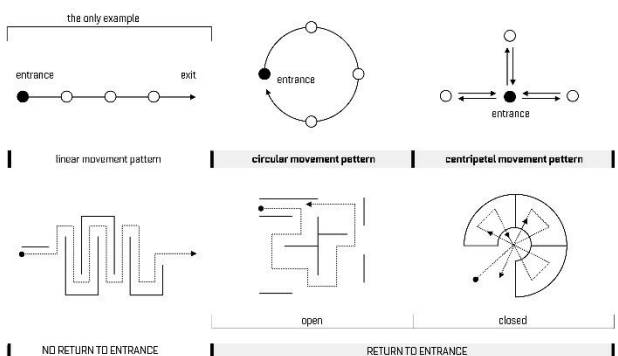
[phenomenological-formal dichotomy]

exterior-interior relationship

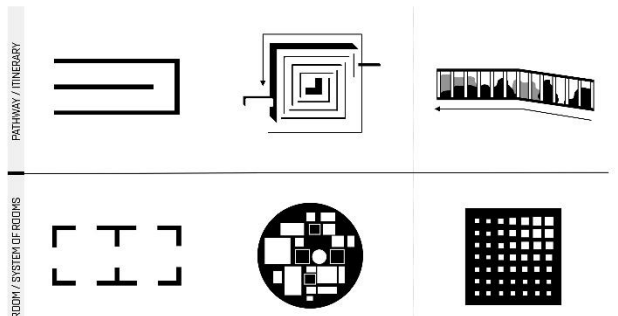


[functional-use dichotomy]

protection-presentation relationship



room-path relationship (with elements of the known-unknown relationship)

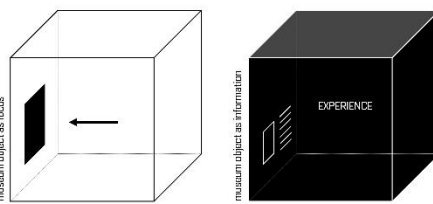


[conceptual-structural dichotomy]

object's display mode	direct	indirect
	[diagrams showing direct and indirect display modes]	
supplementary elements	technical equipment	pedestals
	[diagrams showing technical equipment and pedestals]	
lighting type	mixed	artificial
	[diagrams showing mixed and artificial lighting]	
visual framing	holistic	fragmented
	[diagrams showing holistic and fragmented visual framing]	
grouping method	synchronic	diachronic
	[diagrams showing synchronic and diachronic grouping]	

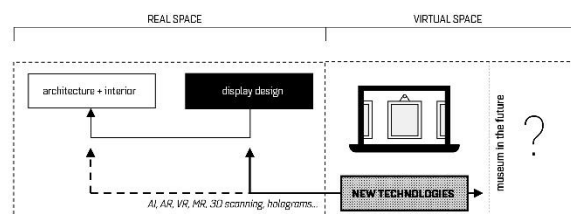
subcategories

skin-content relationship



main categories

[dichotomies in exhibition design approaches]



[experiential dichotomy]

real-virtual relationship