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Performative Architectural Skins: Towards A Performance-Oriented Theory

Ayman Kassem [1], Taher El Danaf [1], Jihad Awad [1*], Dina Ibrahim [1]

[1] College of Architecture, Art and Design, Ajman University, UAE.

*Corresponding author: j.awad@ajman.ac.ae

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ABSTRACT

The concepts of "performance" and "performative" are gaining significant attention in spatial design discourse. "Performative" is often linked with qualities such as open-form flexibility and scenic or theatrical attributes. It highlights the interaction between intentional and accidental elements, as well as the dynamic nature of environments. Some literature characterizes performative spatial design as the ability to execute multiple functions either simultaneously or individually, while others interpret it as a means of conveying content. Most discussions focus on three-dimensional spaces or architectural scales. This essay delves into the theories behind the term "performative" and its application in analyzing and describing the two-dimensional aspects of urban spaces, interiors, and architecture. It explores the semantic range and applications of "performative" and "performance" beyond simple analogies to the performing arts, aiming to articulate innovative and complex qualities of architectural skins and interior surfaces, including their capacity to communicate, narrate content, convey knowledge, and embed cultural references.

1.0 INTRODUCTION

The term "performative" is increasingly prominent in architectural and spatial design discourse, characterized by its expansive and multifaceted semantics. A thorough literature review reveals a spectrum of interpretations and applications, yet at its core, "performative" encapsulates the ideas of open-form adaptability, spatial flexibility, and the inherent theatricality of environments. It embodies the fluid interaction between the intentional and the spontaneous, emphasizing a space's capacity to transcend its initial design and evolve in response to changing contexts and needs. Performative architecture, therefore, not only engages with traditional spatial considerations but also integrates principles borrowed from the realm of performance art, making space a dynamic participant.

In performative-oriented spatial design, the space itself is viewed as an active agent capable of fulfilling multiple functions and communicating diverse narratives. Despite the broad semantic range of "performative," the various definitions converge around the central themes of dynamism, openness, and adaptability. These qualities challenge static interpretations of space, instead advocating for an understanding of architecture as a living, breathing entity that interacts with its users and environment.

When we narrow this discussion to the micro-level of interior surfaces, architectural skins, and cladding materials, questions arise regarding the applicability of performative concepts to these two-dimensional elements. Can textiles, paint, and other interior finishes embody the qualities of openness, flexibility, and dynamism typically associated with performative space? How can we critically examine these components through the lens of performance? Is it possible for a two-dimensional element to engage in a communicative role, or are discussions limited to physical and chemical properties?

Historically, two-dimensional components like frescos played multifaceted roles within interiors and architecture. Beyond their aesthetic and decorative functions, they conveyed religious and symbolic narratives, created optical illusions, and contributed to the immersive experience of a space. In some cases, they even served functional purposes, such as providing insulation. In contemporary design, these roles have become increasingly complex and diversified. Modern parametric cladding materials, biomorphic textiles, and media-integrated surfaces are now expected to perform a wide array of functions. These surfaces are not only decorative but also serve protective roles, enhance fire resistance, absorb bacteria, purify air, and support media content. They are interactive, narrative, and capable of creating optical illusions, thus redefining the potential of two-dimensional elements in interior spaces.

Given the expanding capabilities and expectations placed upon these surfaces, there is a pressing need for an updated and comprehensive literature review. This review should explore new analytical frameworks that go beyond conventional understandings of material performance, examining how these surfaces can contribute to the narrative, experiential, and performative qualities of interior spaces. Such an analysis will enrich the existing body of knowledge and provide valuable insights into how interior surfaces can be designed to meet the evolving demands of contemporary spaces, where functionality, aesthetics, and communication are increasingly intertwined.

This paper aim to delve deeper into the theoretical implications of "performative" in design, exploring both historical and contemporary contexts and emphasizing the need for further research and analysis in this evolving field.

1.1. Essay's Organization and Methodology

Part one of the essay begins with a literature review examining the semantics and terminologies of "performance" and "performative," while exploring their uses in spatial design theories/discourses from interior and exhibition design to urban and architectural design.

Part two involves a focused literature review analysis, examining these concepts specifically in discussions about the two-dimensional components of space: the skin, while gathering representative examples.

Part three elaborates on the discourse of performative skin through a descriptive analysis of selected case studies from exhibition and interior design, architecture, and urban design based on observation collected via literature and visits. The cases were chosen and analyzed based on the performative qualities of their skins, facades, and surfaces: their ability to embed and communicate content qualities, their ability to advocate a transformative effect. Underlying the theoretical reasoning filtered in part two. The chosen cases cover three scales: urban, architecture and interior.

The limitation of the study is faced within the semantic width of the terms performative and performance in general and their limited but growing presence in architectural discourses and theories. To be noted, some scholarly essays that adopted similar objectives, techniques and theoretical reasoning:

“The façade fills the frame: the uses and meanings of the elevational view” by Hugh Campbell delves into how the façade acts not only as a functional element but also as a powerful symbolic and communicative tool. Campbell situates the discussion of façades within a broader historical and theoretical context, while reflecting on examples of buildings that have undergone façadist transformations. The argument is that the façade can be seen as both a literal and metaphorical screen that mediates between the outside world and the inner workings of a building (Campbell, H. 2016). While “Juxtaposing inside and outside: façadism as a strategy for building adaptation” by Bie Plevoets, is a paper that attempts to situate façadism within broader architectural and conservation movements. It examines how façadism became prominent in the late 20th and early 21st centuries while engaging with critiques of facadism (Plevoets, B. 2021).

Finally, the conclusion reflects on performative spatial skins as a body of knowledge and theory that shall impact future research and practice, as well as practical and design pedagogical discourses.

2.0 PERFORMANCE AND PERFORMATIVE IN SPATIAL DESIGN

The term "performative" encompasses various dimensions of spatial design, emphasizing open-form flexibility that invites improvisation and change (Signore, 2015). It is also associated with the scenic and theatrical qualities of spaces that evoke specific moods or atmospheres (Janson, 2015). Performative design reflects the interplay between intentional and unintentional elements, the planned and the unplanned, highlighting the space's dynamic capacity to evolve beyond its original intended use (Leatherbarrow, 2005). It suggests a project in progress, characterized by networked and non-linear processes (McKenzie, 2002). Performative design allows architecture to transcend disciplinary boundaries, incorporating tools from performance arts (Lavin, 2011). Additionally, "performative" and "performance" refer to the creation of dynamic environments (Hensel, 2013). Performative-oriented spatial design emphasizes a space's ability to execute multiple tasks simultaneously or individually as needed (Kassem, 2019) and its capacity to convey content (Kassem, 2022). Despite the diversity of definitions, they all converge on the ideas of flexibility and the communicative potential of space.

While Performance may often be used to refers to the functional and operational aspects of a space. It focuses on how well a space meets the needs of its users. Performative encompasses the dynamic, flexible, and adaptive qualities of a space. It also includes the aesthetic and experiential dimensions, such as creating an engaging theatrical environment able to communicate a content.

The following literature review analysis summarizes the main uses and interpretations of Performance and performative:

2.1. A performing Space

A performance is a theatrical event where artists present their work to an audience, typically preceded by rehearsals. While Performance measurement involves analyzing and evaluating the performance of an individual, organization, or system (Upadhaya, Munir & Blount, 2014). These two different concepts can actually be directly applied to architectural discourse. The terms 'event' and 'performance' relate to the 'spectacular' and 'temporal' nature of exhibition spaces, often designed to create memorable experiences for communicative, commercial, and entertainment purposes (Dernie, 2006). Furthermore, museums and exhibitions are increasingly seen as pure events intended to attract public interest, making them appear more like performances. The performance of an exhibition space can be measured by visitor interaction, impact, and public attraction. To understand how 'performative' and 'performance' can be attributed to space and spatial components, it is useful to study the space as the 'performer.' This approach focuses on the performance of spaces rather than performances in spaces.

Performers in the arts adjust their appearance using costumes, makeup, lighting, décor, and sound. Similarly, in architecture, if the space is the performer, the architect or designer acts as the stage director, using tools and spatial arrangements to achieve the intended performance. Performance involves presenting a performance to an audience in a fine art context, with elements of time, space, the performer’s body, and the relationship between performer and audience. This genre provides a framework to understand the performance of architectural spaces. In regards of architectural discourse, some trans-scalar publications, and writings, from

exhibition and interior design, arriving to the architectural and urban design, use a lexicon related to *performance, while shaping* metaphors and analogies with performance and theatre. *'Starchitecture: Scenes, Actors and Spectacles in Contemporary Cities'* (Ponzini & Nastasi, 2012) and '*Mettere in scena, Mettere in mostra*', (Basso Peressut, Bosoni & Salvadeo, 2014), or 'Exhibiting and displaying' are examples of publications that uses a performance-belonging vocabulary to discuss urban design and architecture (Kassem, 2017).

In the mid-20th century, Performance and the Performative Turn emerged in the humanities, social sciences, and linguistics. The performative turn, an intellectual movement, theorized performance as a social and cultural element, providing a new perspective to understand human behavior (Licoppe, C. 2010). Performance became a metaphor and analytical tool to frame and analyze social and cultural phenomena (Hensel, 2013). Performance studies, influenced by theorists like Victor Turner and Richard Schechner, view performance as a continuum encompassing artistic and non-artistic social behaviors (Hensel, 2013). This performative turn suggests that architecture can benefit from reconnecting with performance art traditions, emphasizing participatory, ephemeral, and experiential aspects. (Gadanho, 2012).

In architectural discourse, the term Performance is often used analogously with theater or events. This analogy, however, is not straightforward, as it must account for both scripted and unscripted aspects of space, highlighting the unpredictable and unique nature of each situation. David Leatherbarrow discusses how the performance of a building is expressed through its actions, requiring an understanding beyond technological and aesthetic explanations. Leatherbarrow suggests that performativity involves qualities that cannot be fully rationalized or objectively studied. The performance of architecture is not merely about functionality or aesthetics but about how the space works and interacts with its users. The building's performance is revealed through its actions and impact on users. (Leatherbarrow, 2005, pp. 7-10).

Leatherbarrow introduced the term 'eventmental' to describe the event-character of spatial situations, suggesting that the 'eventmental' nature emphasizes the unpredictability and singularity of spatial experiences. This unplanned 'unfolding' is crucial to understanding the performative nature of architecture. Beyond planned events, spaces naturally unfold, revealing their true performance beyond scheduled activities. Therefore, the performance of a space includes unexpected qualities and unforeseen events, which cannot be fully scripted or measured objectively. (Leatherbarrow, D. 2005, pp. 101-12). Understanding architecture's performative character requires acknowledging these unpredictable and evolving aspects as analytical lenses.

2.2. Kinetical performance and sustainability

The term 'performativity' in architecture often relates to movement and mobility of architectural elements, emphasizing the adjustability of structures. This involves actions where parts of a building, such as apertures, screens, and movable walls, are designed to move, either manually or mechanically, responding to human or environmental prompts. Examples include Renzo Piano's Aurora Place in Sydney, which adjusts to environmental conditions like sun, wind, and rain (Mahadev, 2005, pp. 223). Architecture in this context is dynamic, adapting to seasonal changes and environmental factors. High-performance architecture is measured by its flexibility, as seen in projects like Cedric Price's Fun Palace and the Centre Georges Pompidou by Renzo Piano and Richard Rogers, which showcase adjustable and reversible interiors and exteriors. These examples illustrate architecture as a dynamic machine, capable of transforming its environment.

The concept of performativity in architecture, where structures and facades are kinetic and designed to move, adjust, and respond to various stimuli. These architectural elements are not static; they adapt to environmental conditions, user needs, or aesthetic considerations, creating dynamic and responsive spaces. Below are additional examples that highlight this concept:

Media-TIC Building, Barcelona, by Enric Ruiz-Geli (Cloud 9)

The Media-TIC Building features a facade made of ETFE (Ethylene Tetrafluoroethylene) cushions that adjust their opacity in response to the sun's position. The cushions are filled with nitrogen, which changes the building's thermal insulation properties, thereby reducing the need for mechanical cooling. This responsive facade creates a dynamic interaction between the building and its environment, illustrating how kinetic architecture can enhance energy efficiency.

Al Bahar Towers, Abu Dhabi, by Aedas Architects

The Al Bahar Towers feature a unique facade inspired by traditional Islamic Mashrabiya screens. The facade consists of a series of umbrella-like elements that open and close in response to the sun's movement. These elements reduce solar gain and glare while allowing natural light to penetrate the building, thereby reducing energy consumption. The facade's kinetic nature is a prime example of performative architecture that adapts to the environment.

Yas Hotel, Abu Dhabi, by Asymptote Architecture

The Yas Hotel in Abu Dhabi has a striking kinetic lighting system embedded in its grid shell facade. The facade is covered with a sweeping LED lighting system that can change colors and patterns, creating a dynamic visual experience. While not as responsive to environmental factors as other examples, the kinetic lighting transforms the building into a performative piece of architecture, reacting to different events and times of day.

The Shed, New York City, by Diller Scofidio + Renfro

The Shed is a cultural center with a telescoping outer shell that can expand and contract to accommodate different events and performances. This kinetic structure allows the building to adapt to various programming needs, offering a versatile space that can be transformed in minutes. The movable shell adds a performative element to the architecture, making the building itself part of the performance.

These examples demonstrate how kinetic and performative architecture goes beyond static design, integrating movement, adaptability, and responsiveness to create spaces that are in tune with their environment and the needs of their users. This approach to architecture not only enhances the functionality and sustainability of buildings but also opens new possibilities for aesthetic expression and interaction.

2.3. Performance, transformability, and scenic qualities

Another aspect of architectural performance is its resistance to environmental forces, maintaining structural, thermal, and material stability. Buildings perform by resisting gravity, wind, and sunlight, with their performance evident in structural elements like columns, beams, and cladding systems. This resistance is a measure of a building's capacity to respond to both foreseen and unforeseen environmental factors. Architects like Jean Nouvel work with this type of performance, creating buildings that interact with their surroundings, showcasing fluctuating qualities like transparency and reflectivity. Leatherbarrow notes that buildings identify with their milieu, animating their performativity through their connections to environmental and social contexts (Leatherbarrow, 2005, pp. 14). This type of performance, although technical, includes concepts like 'prediction of outcomes' and 'contextual responsiveness,' which can be extended to a broader discussion of performance in social and cultural terms.

Performance in architecture is also considered revelatory, showing how spaces can transform social orders and contexts. Performance is intentional and, when successful, does cultural work in the world (Marvin, C.2008. p. 9). This transformative potential is key to understanding performative architecture, where spaces change according to use, influencing and being influenced by users. Erika Fischer-Lichte characterizes performative spaces by unpredictability, ambivalence, perception as a performative process, and transformative power. These features highlight how architecture can create new realities and experiences, beyond the original design intentions. The performative power of architecture lies in its ability to adapt and transform, making it relevant for analyzing spatial design practices (Fischer-Lichte, pp. 31-33).

On the other hand, architectural performativity also refers to Scenic potential in architecture indicating to the creation of new realities and experiences through spatial design. Architectural situations are experienced as performances, with elements like movement and perception playing key roles. Alban Janson describes how spaces like Balthasar Neumann's staircase in Bruchsal Palace create theatrical and scenic experiences for users, turning everyday movements into dramatic performances (Janson, 2015, pp. 164-7). Architectural theory can utilize this performative understanding to enhance the scenic potential of spaces, creating transformative experiences. This approach views architectural situations as complex performances, where users engage with space in a reflexive manner, experiencing their activities scenically.

Scenic potential in architecture emphasizes the capacity of spaces to create transformative immersive, theatrical experiences through the intentional design of movement, perception, and spatial interactions. This concept suggests that architectural environments can transform everyday activities into dramatic performances,

making the act of moving through or inhabiting a space an experience in itself. Below are examples and elaborations on how this concept is applied in architectural design:

Balthasar Neumann's Staircase in Bruchsal Palace, Germany

As mentioned, Balthasar Neumann's staircase in Bruchsal Palace is an iconic example of scenic potential in architecture. The grand staircase is not merely a functional element but a carefully designed spatial experience. The sweeping curves, the play of light and shadow, and the intricate details of the balustrades create a sense of drama and grandeur. As one ascends or descends the staircase, the space unfolds like a theatrical scene, with the movement of the individual becoming part of the performance. The staircase transforms the simple act of walking into a scenographic experience, where the architecture choreographs the user's journey.

Casa Batlló, Barcelona, by Antoni Gaudí

Casa Batlló is a perfect example of how architecture can transform everyday life into a scenic experience. Gaudí's design is filled with organic shapes, vibrant colors, and fluid forms that create a sense of movement even when the structure is still. As one moves through the house, the unique design elements guide the eye and body through a series of visual and tactile experiences. The curved walls, undulating surfaces, and intricate details create a sense of theatricality, where every room feels like a stage set for a different act in a play.

The Blur Building, Yverdon-les-Bains, Switzerland, by Diller Scofidio + Renfro

The Blur Building is a unique example where architecture creates a scenic experience through the manipulation of perception. The building is a pavilion made of fog, generated by thousands of nozzles spraying fine mist into the air. As visitors move through the cloud-like structure, their sense of space, sight, and sound is dramatically altered. The building itself becomes a performance, where the boundary between architecture and environment blurs, creating an ethereal, immersive experience that is as much about the journey as the destination.

These examples illustrate how the scenic potential of architecture can transform spaces into stages for human experience, where the movement, perception, and interaction of users are integral to the architectural narrative. By viewing architecture as a performative art, designers can create spaces that offer transformative theatrical experiences.

2.4. Performance, Atmosphere and openness

The performance of spaces is closely related to atmosphere, affecting how spaces are perceived and experienced. Atmospheres, created by materiality, proportions, smells, and light, are key to the performative quality of spaces. Gernot Böhme's concept of atmosphere emphasizes how spaces affect people, creating transformative experiences (Janson, 2015, pp. 164-7). Thus, the performativity of spaces becomes apparent through the sensations and experiences they evoke. This discourse, dating back to the 19th century, highlights how spaces and objects perform on psychological and physiological levels, influencing human behavior and perception (Pringle, P. 2010, pp. 192). Architectural performance includes both tangible and intangible components, creating immersive experiences that transform users.

Other literature sees the performative project as designed to be open to change, welcoming transformations and allowing for user interpretation. This concept opposes the rigid, definitive forms of late modernity, embracing uncertainty and incompleteness. Performative projects, like open form, adapt to social and economic contexts, encouraging user engagement and flexibility (Signore, 2015, p. 172) Valentina Signore describes this shift as moving from predicting programs to leaving room for the unexpected. Performative projects let users influence space, contrasting with the controlled environments of modernism. This approach embraces nomadic, flexible mechanisms and non-linear temporalities, creating spaces that are open-ended and dynamic.

Judith Butler's concept of performativity extends to objects and spaces, emphasizing their active role in shaping human subjectivity. Performativity is a dynamic quality of subject-object relations, where spaces and objects act as active agents (Taylor, 2010, p. 225). This concept is relevant for reactivating and transforming existing spaces, as seen in the works of Marcel Duchamp (Rota, 2014, pp. 109-110). Activation involves making spaces perform, stimulating their latent potentials through interventions. This approach is crucial for building reuse and spatial interventions, where new performative states and qualities emerge. By activating spaces, new performances are created, transforming their behavior and impact on users.

3.0 PERFORMATIVE SPATIAL QUALITIES

Scenic and theatrical qualities can be achieved using projection mapping on walls to create dynamic visual environments. This technique can transform a plain wall into a vibrant, animated surface, creating an immersive experience. The latent walls serve as canvases for digital art, transforming the space to suit different exhibits and events.

Furthermore, dynamic and multitasking capabilities can be found in examples of smart textiles that change color or opacity in response to environmental conditions. These materials can provide privacy when needed or become transparent to allow light, adapting to different functional needs.

Innovative Materials and Technologies are attempting to achieve such qualities. For example, the ETFE (ethylene tetrafluoroethylene) cladding used in structures like the Eden Project in the UK which is lightweight, flexible, and can incorporate LED lighting used to create dynamic, illuminated surfaces. Performative surfaces and façades enhance the visitor experience by creating a unique visual environment/*mediatechture*.

3.1. Skins with Narrative, symbolic and cultural gestures

Embedding narrative, symbolic, and cultural gestures into the two-dimensional component of the space such as in textiles, tapestries, interior cladding, facades and architectural skins add layers of meaning to the space, transforming it into an environment that communicates stories, values, and cultural heritage. By thoughtfully incorporating narrative, symbolic, and cultural elements into textiles, interior cladding, and architectural skins, designers can create spaces that are not only functional and beautiful but also rich with meaning and cultural significance. Such practices may be based on research and engagement of the cultural context while trying to understand the cultural significance of materials and patterns. Telling stories through design via using colors, materials, techniques and motifs that convey stories and knowledges. For example, a wall cladding made from reclaimed materials can tell a story of sustainability and environmental awareness inherited from a nation's ancestors. Blending tradition with modernity and combining traditional techniques with modern design shall create a dialogue between the past and present, making cultural gestures relevant in contemporary contexts.

In many cultures, textiles are imbued with symbolism through colors, patterns, and techniques. The use of specific colors or patterns can represent local traditions, social status, or spiritual beliefs. For instance, the kente cloth from Ghana features intricate patterns that each have specific meanings, such as wealth, spirituality, or political stance. While in in Japan, the traditional art of Sashiko embroidery not only adds aesthetic value but also reflects cultural practices of mending and sustainability. This technique can be used in modern interiors to highlight a commitment to sustainability and cultural heritage. The use of traditional Moroccan tiles (*zellige*) in contemporary interiors can infuse a space with cultural identity and craftsmanship. The intricate geometric patterns and hand-cut tiles reflect Moroccan artistic traditions and add a rich cultural layer to the interior design. Modern examples include textile installations by artists like El Anatsui, whose large-scale works made from discarded bottle caps weave narratives of history, memory, and the environment.

On the level of interior cladding, the Norwegian National Opera and Ballet in Oslo features a marble cladding that tells the story of the region's geology. The undulating surfaces and patterns in the marble evoke the natural landscape of Norway, creating a narrative connection between the building and its environment. The use of reclaimed wood in interior cladding can symbolize sustainability and environmental responsibility thus embed knowledge od wisdom of sustainability. The Ace Hotel in New York City uses reclaimed wood from water towers, embedding a narrative of urban history and environmental consciousness into its design.

Conveying meanings and symbolism through color pragmatics and ornamentation is detected in Taoist temples built in the 19th century in Klang Valley. The study revealed that their design and color symbolism reflect a blend of Southern Chinese influences and local Malay vernacular architecture, particularly the use of ventilated roofs. While elements of royal identity (RI) were diminished, the temples integrated orthodox RI with local design. This fusion not only enriches knowledge for the Chinese community and design practitioners but also enhances cultural tourism. Interestingly, most of the roofs featured red hues, likely due to temperature effects during tile production in tropical climates and the traditional belief in red as a protective and auspicious color in Chinese culture. This may reflect the diaspora's desire for spiritual security in a foreign land (Yeong, Y.M., et. al. 2023).

The Louvre Abu Dhabi's dome is an architectural skin that tells a narrative of cultural convergence. Its intricate pattern allows light to filter through, creating a "rain of light" effect that evokes traditional Islamic architecture while symbolizing the museum's role as a bridge between cultures. Thus, the example serves a knowledge-based medium that communicate such concepts. The use of perforated metal screens (*mashrabiya*) in Middle Eastern vernacular historical architecture served both functional and symbolic purposes. These screens provide shade and ventilation while also symbolizing privacy and modesty, important cultural values in the region.

3.2. Biomimicry as a form of performativity

Biomimicry is a concept that has evolved recently with the aim of addressing human needs and challenges through inspiration from nature. Benyus (1997) divides the representations of this notion into performative and performance biomimicry. Performative biomimicry focuses on making designs that are sustainable by copying biological processes and functions. Performance biomimicry, on the other hand, focuses on using bio-inspired designs to reach specific functional goals. Developed primarily with a focus on biomimicry, bio-performative materials purposefully plan to achieve specific tasks, demonstrating a steady adaptive property like those observed in nature (Pawlyn, 2011). Biomimicry and bio-performative material innovations have significantly influenced the design and sematic functionality of two-dimensional interior surfaces.

When an interior designer refers to a design being influenced by nature, they are typically referring to its visual characteristics, specifically its organic shape. Biomimetics is not solely about replicating or being inspired by natural-looking forms, textures, and colors, but nature serves as a valuable instructor in this aspect. Biomimetics must incorporate biological elements and scientific principles derived from nature, rather than just imitating its appearance (El-Zeiny, 2012). However, the crucial aspect in comprehending the significance of biomimicry in interior architecture lies in recognizing that the success of a design does not solely rely on its connection to a natural concept, but rather on its embodiment of exceptional design. Biomimicry is a philosophical approach that can provide unique concepts and inventive solutions with numerous potential benefits, such as improved functionality and sustainability.

For instance, the Senosiain Arquitectos designed a curled spiral shell house that was inspired by the shape of a seashell. Within the house, the unconventional shapes of the outside persist, interconnecting and linking each individual area. The interior of the space resembles an outside environment, with abundant plant life, natural patterns, and flowing stone pathways. The design relies on replicating the forms, patterns, and colors seen in nature. It may possess some degree of sustainability as it is capable of resisting earthquakes and requires very little maintenance (El-Zeiny, 2012). What interests us here is that the discourse of Performance can be examined on two main levels: first, the communication of the scientific knowledge embedded in the design concept, second, in the performance of the two dimensional that attempts to replicate the aesthetics and mechanisms of the natural element, and the effects created by it.

3.3. Bio-Performative materials

Self-cleaning is a significative example of an active performing two-dimensional component of a space. It involves the ability to reject contaminants such as dirt, harmful chemicals, and germs from many types of surfaces. Hydrophobic and hydrophilic coatings are frequently employed in the creation of a surface that is capable of cleaning itself. Nanoparticles are crucial in the development of self-cleaning glasses, goggles, windows, paints, building materials, medical equipment, fabrics, and materials that resist corrosion (Somasundaram & Kumaravel, 2019). Some plants have hydrophobic properties. An example that is frequently encountered is the lotus plant. Both the flower and leaf of the lotus plant possess a rough, uneven outer surface that effectively repels dust and grime, resulting in a spotless appearance. Even the tiniest gusts of wind can slightly alter the plant's angle, facilitating effortless removal of soil (Lodson & Jahromi, 2018). Any water droplet that slides off the leaf also carries dirt along with it.

The German company, Ispo, undertook research on the water repelling tendency and successfully developed a paint with similar capabilities. The paint utilizes a micro-structure that imitates the hydrophobic leaves of the lotus plant. This structure reduces the surface area for water and dirt contact, resulting in a natural resistance. This paint is both economical and ecologically friendly, making it a sustainable product. The concept has resulted in the creation of more building materials such as paints, tiles, fabrics, and glass, that require less maintenance and involve low expenses for material replacement (Lodson & Jahromi, 2018).

Incorporating biomimicry as a fundamental design principle can result in architectural and interior design solutions that are both more sustainable and inventive. By prioritizing the comprehension and reproduction of biological principles, designers can construct places that possess both aesthetic allure and operational effectiveness while also being environmentally friendly. This technique promotes a transition from just copying natural shapes to incorporating the fundamental ideas that make these shapes successful.

3.4. Biophilic Interiors

The biophilic design hypothesis, which centers around integrating nature-based elements into the built environment, aims to optimize human health and well-being. This approach emphasizes the use of key interior design components such as color, light, and materiality to create spaces that evoke a connection with nature. By incorporating natural materials, abundant natural light, and an abstraction of natural forms, designers can foster a harmonious interaction between individuals and their environments (McGee, 2022). Surfaces play a crucial role in this design approach, as they serve as the canvas upon which the elements of biophilic design are expressed. The selection of materials for surfaces, such as walls, floors, and ceilings, is fundamental in creating a nature-inspired atmosphere. For instance, the use of wood, stone, and other organic materials can provide tactile and visual cues that resonate with the natural world, promoting a sense of calm and comfort. Additionally, the texture and finish of these surfaces—whether smooth, rough, reflective, or matte—can significantly influence the perception of space and its connection to nature.

Color, another vital component, can be used strategically to mimic the hues found in nature, from the earthy tones of soil and foliage to the calming blues of the sky and water. These colors can be applied to various surfaces within the interior, such as painted walls, textiles, and decorative elements, to create a cohesive and immersive environment that echoes the natural world. Lighting, both natural and artificial, is also critical in biophilic design. The way light interacts with surfaces can enhance the perception of depth, texture, and color, further reinforcing the connection to nature. Natural light, in particular, can be harnessed through the careful placement of windows, skylights, and reflective surfaces to maximize daylight penetration and create dynamic, ever-changing spaces.

While the biophilic design hypothesis has proven effective in promoting well-being through these elements, further inquiry is needed to explore how surfaces, in particular, can be more diversely and creatively integrated into this design philosophy. Understanding the interplay between surface materials, textures, colors, and light will be essential in developing nature-like interior environments that not only meet aesthetic goals but also optimize human health and well-being (McGee, 2022).

3.5. Performativity of the two-dimensional

3.5.1. Visual illusions

One of the earliest strategies for creating spatial performativity can be observed in the arts of optical illusion, such as anamorphic art, trompe l'oeil, and later in cyclorama and panorama. These art forms animate space by making its surfaces perform, engaging the viewer's position and point of view (Kassem, 2017). Anamorphic art first emerged in the renaissance, while contemporary artists, like Felice Varini, continue to explore anamorphosis in their installations, which require viewers to find specific vantage points to perceive the intended images. Anamorphic art and trompe l'oeil make two-dimensional surfaces performative. Trompe l'oeil, in particular, seeks to create a spatial-visual illusion on a flat surface. Numerous historical examples, especially in Italy, combine both trompe l'oeil and anamorphic techniques. For instance, the Church of Santa Maria presso San Satiro in Milan, designed by Donato Bramante employs anamorphosis in its interior architecture. Upon entering the church, a long hallway and deep void behind the altar seem to appear. However, as one approaches, this illusion is revealed to be a shallow plaster bas-relief of only one meter in depth, achieved by systematically distorting architectural details (Spiliotis, A., 2008).

In the 19th century, new forms of optical illusion emerged, such as the panorama. These early performative spatial installations served as "edutainment" media, blending exhibition, architectural space, scenography, and art. The panorama, invented in 1787 by Robert Barker, offered a 360-degree panoramic view, creating an immersive experience similar to a large trompe l'oeil. With dimensions of up to 115 × 14-15 meters, panoramas were popular mass media and entertainment between 1800 and 1830, often depicting military and patriotic scenes during the Franco-German war (Bourbaki Panorama Luzern, 2015). Optical illusions can animate and bring performativity to architectural spaces, interior designs, and scenography. These techniques create spectacular effects through spatial illusions. Such methods are also applied in textile and furniture design,

resulting in innovative materials with unique visual and sensory properties. These experiments align with the concept of designing experiences through animating the inanimate (Kassem, 2017).

3.5.2.Making surfaces perform

"Making surfaces perform" is one of the most fundamental strategies, yet it remains widely used. The expression “making spaces perform” echoes the title of the book “Making Spaces Talk” by Atelier Bruckner, which discusses the studio's various projects and strategies for making spaces perform (Brueckner, 2011). Transforming the surfaces of an existing space is a subtle and lightweight intervention. Whether temporary or permanent, this is achieved by applying two-dimensional arts such as graphics, calligraphy, projections, mapping, and anamorphic art. This approach is considered performative because of its transformative power, capable of animating abandoned spaces with new spatial performances (Kassem, 2017).

For example, in the "Guinness" exhibition, the design studio Imagination used large-scale graphics applied directly to walls and windows, turning the building itself into a vehicle of communication. Every surface was utilized to house interactive screens, with words, arrows, and colors becoming architectural elements. Graphics were conceived as a three-dimensional field woven between other display elements, with some screens placed within equipment or built into display structures. This approach revisits poetic methods such as collage, montage, and using two-dimensional arts, graphics, and text to interpret and communicate exhibition content) (Dernie, 2006, pp.38-41).

3.5.3.Exhibitions: Spaces for content

Exhibition design can follow a "scenography strategy," treating spaces, surfaces and objects as entry points to broader ideas and spatial themes. In such cases, a scene must be constructed, and a story must be told to convey the immaterial content (Kassem, 2017). Scenography becomes crucial here, compensating for the lack of physical exhibits by emphasizing spatial performance, often using scenographic tools. Gottfried Korff redefines scenography as “the presentation of a topic without original objects… if there are no objects, then a space, an image, an atmosphere must be created. (Reinhardt & Teufel, 2009, p. 39). Thus, to address the exhibition space itself must perform, narrate, or communicate the exhibition's content or theme. The spaces become scenes and atmospheres rich with metaphors and information. Spatial performances are created employing various spatial strategies and tools to convey the immaterial aspects of the exhibition (Kassem, 2017).

Exhibition designer Uwe Brückner encapsulates his design philosophy with the expression "form follows content": "Translating contents in an exciting way… evoking spatial images that arise from theatrical concepts, leading the visitor along a constant line to the center of a specific story: that is the dimension of scenography… linking spatial design and the information it contains. Design and content become one… a dialog between form and content and the unbiased application of the design elements—space, graphics, light, and media…” (Brückner, 2008, pp. 75-78). From this philosophy, Brückner developed a new generation of spatial potentials that dramatize space and develop concepts from its content, making the space perform. He identified different spatial design strategies and approaches for making a space talk including:

First, the Physical-Substantive Space; where the space is effective when the architecture of an exhibition not only serves as a functional shell but is generated from its contents. Tools include dimensions, materials, lighting, and acoustic potentials. Second, the Narrative-Verbal Space; where the space conveys information through text, graphics, and sound, becoming a narrative medium where a story unfolds. The experience becomes tangible and activated, engaging the recipient through movement, listening, seeing, and acting. (Brückner, 2008, pp. 75-78). Atelier Brückner provides examples that vividly illustrate these strategies for spatial performativity. The following cases of exhibitions metaphorize and embody the "form follows content" philosophy and the various tools used to "make spaces perform" but more importantly "make the surfaces speak."

4.0 EXAMPLES AND CASE STUDIES

4.1. Exhibition of Garden Art, Castle of Dyck (2003)

In the permanent Garden Art exhibition at Castle Dyck (2003), the display emphasizes the origins and evolution of the English landscape garden, Dyck's Garden, Prince Joseph's plant collection, and the ideas of landscape architects. It also showcases examples of landscape gardens in painting, literature, and music through three-dimensional settings (Brückner, 2011).

One exhibition room was devoted to the prince's book on garden art, where the designer literally applied the concept of "form follows content." Copies of all the book's pages were used as wall coverings, turning the room's walls into reading material and making the content a spatial element (Figure 1). Here, the content served as a gateway to a world of ideas for the spatial design, reflecting the distinction between the "aura strategist" and the "scenography strategist" (Kassem, 2017). However, the designer also retained an aspect of the "aura strategy" by placing the original book at the center of the room, displayed traditionally in a glass case. This placement highlighted its aura and created a ritualistic atmosphere around it, making it the room's focal point. This room was part of a series of staged spaces (Brückner, 2011).

Figure 1. Exhibiting the book of gardening, Exhibition of Garden Art, at Castle of Dyck, Permanent exhibition, 2003 by Atelier Bruckner. Source: Vetter, H. (n.d.).

4.2. Living Frontiers of the Swiss Cantons at the Expo 02, Arteplage Biel-Bienne, Switzerland

Atelier Brückner designed a pavilion that exemplifies how to present an immaterial exhibit. The exhibition theme was "individual and collective experiences of limits, bans, taboos, and borders," with no physical objects on display. The pavilion's architecture, titled "Living Frontiers," served as the medium for communication, conveying the content to the audience. "The Swiss Border Cantons collectively explored borders and limits from social, psychological, cultural, and ethnic perspectives. Topics like personal boundary-crossing experiences, individual encounters with limits, and the collective societal impacts of issues ranging from domestic violence to human reproductive cloning are not easily presented through conventional means. The interpretive display at the heart of the pavilion, along with the revolving audio cabinets, offered insights into these complex experiences of limits. In exhibitions where the exhibit is immaterial, the space itself becomes the material exhibit, acting as the sculpture or artistic installation in performance. On the ground floor, an immersive (low-tech) effect was created with unexpected encounters with messages. This was achieved through a forest of rods and a monochromatic space with special lighting. The first floor provided a high-tech visual collective immersive experience, including a walk-in film with 360-degree projections of individually experienced stories and a choir of collective border violations (Figure 2). This experience featured interpretive video screenings and private audio experiences. Visitors became part of this moving film, either identifying with the individual stories or, upon crossing the border, becoming part of the collective" (Brückner, 2011). This pavilion can be described as performance-oriented architecture, where every spatial and architectural element was infused with performative and communicative potential. The surfaces, atmospheres, lighting, and beams all contributed to the spatial performance and to communicating the content.

Figure 2. The exhibition pavilion Living frontiers of the Swiss Cantons at the Expo 02, Arteplage Biel-Bienne, Switzerland. Source: Studer, P. (n.d.).

4.3. Illustrative exhibitions

The selected examples effectively demonstrate the diverse strategies used to create performance spaces and the various ways in which surfaces and spaces can be rendered performative. These projects highlight how architecture and design can transcend static forms, engaging users in immersive, dynamic experiences that communicate deeper narratives and sensory experiences.

The exhibition "Je est un autre," curated by CH GXM Architects (Yves Milani and Alexandra Gubeli), was showcased at Straihof Literatur Ausstellungen in Zurich from December to February 2005. This installation exemplified how color and light can transform an exhibition space into a multi-sensory experience. Each room within the exhibition was meticulously designed with distinct color palettes, allowing visitors to immerse themselves in different atmospheres as they moved through the space (Figure 3). The use of color was not merely decorative; it was a deliberate tool to evoke specific emotional responses and alter the perception of space. By manipulating light and color, the architects created environments that were deeply immersive, encouraging visitors to engage with the exhibition on a sensory level. This approach highlights the performative potential of color and light in architectural design, where surfaces become active participants in shaping the visitor's experience, rather than passive backdrops (Figure 4).

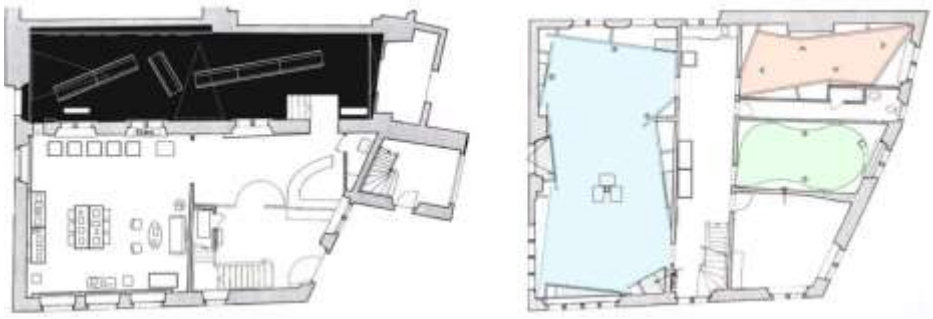

Figure 3. The floor plans of exhibition "*Je est un autre*" showing the curated rooms with different color moods. Source: GXM Architekten GMBH. (n.d.).

Figure 4. The exhibition "*Je est un autre*" showing the content-color-mood relationships. Source: GXM Architekten GMBH. (n.d.).

Raumlabor Rheinpegel, a room installation created by Stefan Korschildgen, Andreas Schmitz, and Michael Weichler for the exhibition "Looking Back to the Future" at the Bonn Monday Visual Arts Foundation in 2008, offers a compelling exploration of kinetic and performative design. The installation aimed to evoke the fluid, ever-changing nature of the Rhine River, a historical symbol of the region. To achieve this, the designers introduced an elastically mounted ground level within an existing room in Bonner Villa Ingenohl (Figure 5a). This ground level was engineered to shift and undulate as visitors walked upon it, mimicking the soft, unstable currents of the Rhine. The physical movement of the floor altered the spatial perception of the room, making the experience of walking through the installation akin to navigating the river itself. This kinetic element served as a powerful metaphor for the Rhine's dynamic character, transforming a static room into an interactive, performative space that communicated the essence of the river through bodily experience (Figure 5b & c). The project exemplifies how architectural surfaces can be designed to be performative, using movement and sensory engagement to convey narrative and content in a profoundly experiential manner.

a b c

Figure 5. Details from the Raumlabor Rheinpegel's room installation. Source: Gliese, C. (2023).

Both of these examples illustrate the potential of performative design to create spaces that are not only visually compelling but also deeply interactive and communicative. By leveraging color, light, and kinetic elements, the designers transformed ordinary surfaces into active components of the spatial narrative, enriching the visitor's experience and offering new ways to engage with architecture and design. These projects underscore the importance of considering the performative qualities of space in contemporary design practices, where the role of architecture extends beyond shelter and aesthetics to encompass dynamic interaction, sensory engagement, and narrative communication.

4.4. Performative façade

The Institute du Monde Arabe (Arab World Institute) in Paris, designed by Jean Nouvel and completed in 1987, stands as a powerful example of performative architecture that skillfully blends modern innovation with deep cultural references, particularly to Islamic traditions. The building's facade, in particular, serves as a focal point for analyzing its performative and kinetic aspects, which not only respond dynamically to environmental conditions but also embody the rich heritage of Islamic culture.

The architectural design of the Institut du Monde Arabe is a synthesis of modern Western aesthetics and traditional Arab architectural motifs. This fusion is performative in that it transcends mere visual integration, actively engaging in a dialogue between the Arab world and the West. The facade, with its intricate patterns and advanced technology, becomes a symbol of cultural convergence, reflecting the institute's mission to bridge these two worlds. The performative nature of this integration is evident in how the building does not merely display these cultural elements but actively uses them to shape the experience of the space, both functionally and symbolically (Figure 6).

A key performative feature of the building is its south facade, which draws inspiration from the traditional Islamic architectural element known as *Mashrabiya*. Traditionally, *Mashrabiya* is a type of projecting window enclosed with a latticework of intricate geometric designs, used in Arab architecture to control light, provide privacy, and allow ventilation. Nouvel's modern interpretation of *Mashrabiya* on the facade of the Institut du Monde Arabe is not only an homage to this Islamic tradition but also a technological advancement. The facade serves a dual purpose: it regulates light and heat entering the building, ensuring a comfortable internal environment, and it also reduces energy consumption (Figure 7). This approach demonstrates how cultural references can be reimagined in contemporary contexts to address modern needs while preserving their symbolic significance.

The facade's design is highly adaptable, allowing the building to respond dynamically to changing environmental conditions. By modulating the amount of natural light that filters into the interior, the facade enhances occupant comfort and minimizes the reliance on artificial lighting and climate control systems. This adaptability is a performative characteristic that aligns with the building's broader cultural narrative, where traditional design principles are employed in service of modern sustainability goals. The kinetic facade, comprises 240 motor-controlled apertures. These apertures are inspired by the geometric patterns of traditional Arab screens, echoing the Islamic art form that emphasizes repetitive, symmetrical patterns to evoke infinity and the divine. The kinetic nature of these apertures allows them to open and close like camera lenses, responding to the intensity of sunlight throughout the day. This not only regulates light and heat but also brings a sense of life and movement to the facade, making it a dynamic, ever-changing surface that interacts with its surroundings in real-time.

During periods of intense sunlight, the apertures close to minimize glare and heat, while in softer light conditions, they open to allow more natural light into the building. This sensor-driven system ensures that the facade is constantly in flux, responding to the environment in a way that is both functional and aesthetically compelling. This interplay of light and shadow on the facade is reminiscent of the way light filters through traditional *Mashrabiya* screens, creating a sense of continuity with Islamic architectural heritage. The performative aesthetic dynamism of the kinetic facade is not merely a technical achievement but also a cultural statement. The shifting patterns and changing light conditions create a visually engaging experience that draws attention to the building's role as a cultural bridge between East and West. In this way, the building's exterior becomes a performative space that communicates its underlying cultural and symbolic messages.

The Institut's façade exemplifies how architecture can be both performative and deeply expressive of cultural identity. Jean Nouvel's innovative use of technology, combined with references to Islamic architectural traditions, results in a building that is not only functional and sustainable but also a profound statement on cultural convergence. The facade, with its kinetic, light-modulating apertures, serves as a tangible manifestation of the building's performative mission.

Figure 6. Images showing the details of Façade and the exterior of the Institut du Monde Arabe. Source: IMA., Cateloy, F. (n.d.).

Figure 7. Images showing the details within the façade and its performance mechanisms at the Institut du Monde Arabe. Source: IMA., Cateloy, F. (n.d.).

4.5. Making urban surfaces perform

Animating surfaces as a core strategy for spatial intervention can also be effectively applied on an urban scale. The primary objective is to make the space perform or to alter its performance. A recent example is the Superkilen park project by BIG (Bjarke Ingels Group) in Denmark. This park serves as a meeting place for residents of Denmark's most ethnically diverse neighborhood and as an attraction for the wider city. It is one of the six winners of the Aga Khan Award.

“It was conceived as a giant exhibition of urban best practices—a collection of global found objects from the 60 different home countries of the people living in the adjacent area. The objects range from exercise equipment from Muscle Beach in Los Angeles to palm trees from China, and neon signs from Qatar and Russia” (Frearson, A., 2012). BIG furnished the park with objects from 60 different nations to represent the nationalities of the residents, all spread across a colorful carpet of grass and rubber (Figure 8). The 750-meter-long park is divided into three main zones: a red square for sports, a green park for children, and a black zone for a food market and picnic area. “The park is split into three color-coded zones, each containing different objects. A patchwork of pink rubber blankets the ground and covers the sides of buildings in the first zone, accompanied by maple trees with matching red leaves. The second zone is conceived as an 'urban living room,' where locals play board games beneath the shelter of Japanese cherry trees and Lebanese cedar trees. Painted white lines run north to south across the ground, curving around the street furniture, which includes Belgian benches, Brazilian bar chairs, a Norwegian bike rack, and a Moroccan fountain (Figure 9). The third zone consists of grassy plains and hills, providing areas for sports, sunbathing, and picnics” (Frearson, A., 2012).

Whether it’s an artistic spatial installation, an exhibition, or a spatial intervention, the underlying logic and strategy remain consistent: making surfaces performative and transforming existing spaces through interventions on their two-dimensional components.

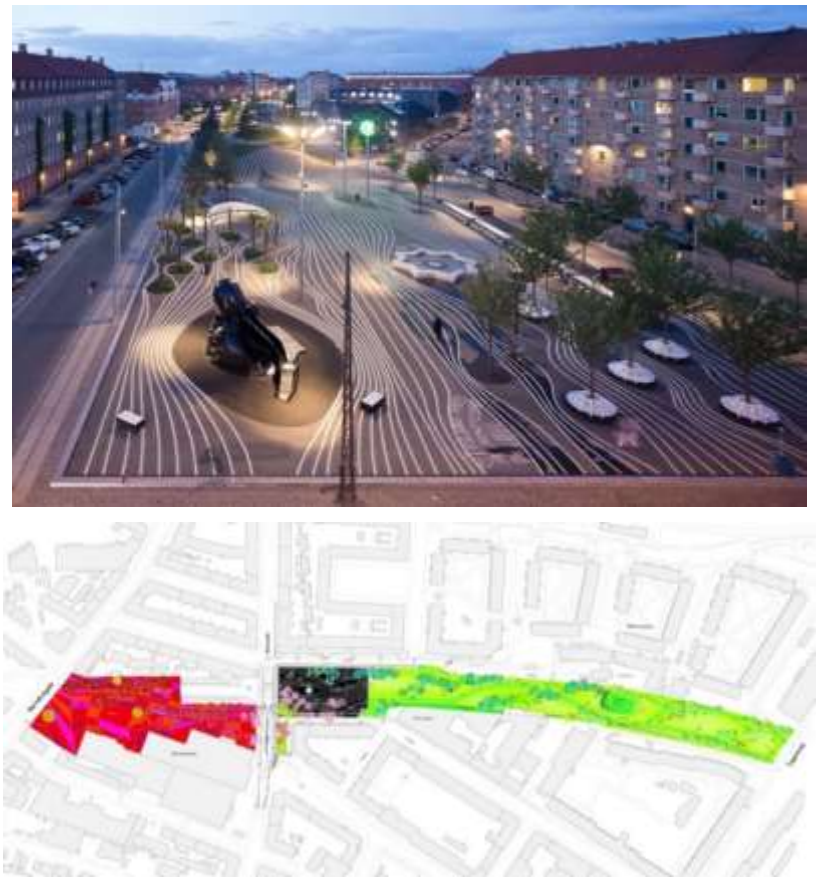

Figure 8. Images and a plan of the park project by BIG in Denmark highlighting the urban intervention that consisted on reimanging the materiality of the two-dimensional compoment. Source: Bjarke Ingels Group. (n.d.).

Figure 9. The Superkilen park project by BIG in Denmark highlighting the urban intervention that consisted on reimanging the materiality of the two-dimensional compoment. Source: Bjarke Ingels Group. (n.d.).

5.0 CONCLUSION AND DISCUSSIONS

The concepts of 'performative' and 'performance' are gaining traction not only within the realms of architectural and spatial design but also across broader design discourses. These emerging paradigms are reshaping how we understand and approach the two-dimensional components of space, encouraging a shift from traditional aesthetic and functional evaluations to more dynamic and interactive interpretations. By incorporating performative qualities into these components, designers can create spaces that transcend mere visual appeal, offering enhanced functionality, adaptability, and engagement with users. A performative understanding of architecture, interior, and urban surfaces provides a more comprehensive framework for analyzing two-dimensional elements, moving beyond the simplistic binaries of aesthetics and function. This approach recognizes surfaces as active participants in the spatial experience, capable of interacting with their environment and the people within it. Such surfaces are not static; they perform, adapt, and respond to various stimuli, creating a richer, more immersive experience for users.

The essay highlighted how transdisciplinary collaboration—bringing together biologists, material scientists, architects, and designers—can lead to the development of highly performative materials and surfaces. This collaborative approach is instrumental in pushing the boundaries of what is possible in design. For example, facades and cladding materials can be engineered to not only meet structural and environmental requirements but also to communicate and interact with their surroundings. These materials might change color with temperature fluctuations, adjust opacity based on light levels, or even release specific scents in response to environmental conditions, thereby creating multi-sensory experiences. Such innovations are not merely about enhancing functionality or aesthetics; they also embed narratives and communicative abilities within the surfaces themselves. Surfaces can become storytellers, conveying the history, culture, or environmental considerations of a space. This narrative quality adds a layer of meaning and engagement, transforming how occupants perceive and interact with their environment.

The integration of smart, open, flexible, dynamic, communicative, and responsive surfaces in design is particularly promising. These surfaces can enhance user experience by creating environments that are not only responsive to the presence and activities of individuals but also reflective of the underlying knowledge and technology that informed their creation. For instance, a smart wall that adjusts its acoustic properties based on the number of occupants in a room could simultaneously showcase advancements in material science while providing optimal sound quality for different activities.

Future research in this field could focus on the development of new materials and technologies that further expand the possibilities of performative surfaces. However, it is equally important to establish a robust theoretical and pedagogical framework within design education and research. Such a framework would guide the integration of performative concepts into design practices, ensuring that future designers are equipped to push the boundaries of what surfaces can achieve. This holistic approach could lead to the creation of environments that are not only functional and aesthetically pleasing but also sustainable, interactive, and deeply engaging, ultimately redefining the role of two-dimensional components in spatial design.

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