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SSFF MorphoMap: A hybrid method for speculative futures using projection-mapped boards

Kamal Mohd Idris[1], Puteri Mayang Bahjah Zaharin[1*], Kartini Kasmuri[1], Mujahid Nawazir[2]

**Corresponding Author*

[1] [S²]Futures Research Group, Centre of Studies for Architecture, Faculty of Built Environment, Universiti Teknologi MARA, Puncak Alam Campus, Malaysia

[2] Faculty of Engineering, Universitas Andalas, Padang, Indonesia

kamalidris@uitm.edu.my, bahjah55@gmail.com, kartini.k@uitm.edu.my, mujahidnawazir@eng.unand.ac.id

Tel: +6016-2710605

Abstract

Architectural representation has traditionally relied on static presentation boards, valued for clarity but limited in their ability to express dynamic, temporal, and speculative aspects. This study addresses these limitations by introducing SSFF MorphoMap, a hybrid method within the Strategic Speculative Futures Framework. SSFF MorphoMap repositions projection mapping from mere embellishment to a speculative storytelling tool, layering dynamic digital content onto static drawings or models. Through iterative prototyping and scenario-based testing, the approach demonstrates enhanced comprehension of complex spatial and systemic ideas, deepened narrative immersion, and supports futures-oriented thinking in design communication and education by blending traditional and digital representational strategies to facilitate speculative storytelling.

Keywords: Projection Mapping; Speculative Storytelling; Architectural Representation; Strategic Speculative Futures Framework (SSFF)

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1.0 Introduction

Architectural representation has often relied on static boards valued for clarity, legibility, and their role in conveying design intent. However, conventional drawings and models typically present architecture as fixed objects (Ishida, 2022), appearing detached from temporal, emotional, and narrative dimensions. Static boards struggle to show dynamic systems, evolving conditions, or speculative trajectories. By reducing complex relationships to snapshots, these tools miss the interconnected, shifting nature of contemporary architectural concerns. As architecture faces more uncertainty, complexity, and futures-oriented inquiry, these limitations become more evident. As Fuente Suárez (2016) argues, purely visual realism—representation that mimics only physical form fails to convey the perceptual, emotional, atmospheric, and interactive qualities of architecture. This critique highlights the need for alternative representational strategies capable of communicating not just form, but experience, narrative, and temporal change.

To address these challenges, digital media are bridging representational gaps. Projection mapping has become popular in creative and architectural contexts. Saeed Abbas (2021) explores projection mapping to turn architectural surfaces into "living canvases"—

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surfaces that move, shift, or change visually in real time. Similarly, Ishida (2022) investigates projecting curated stills and videos onto models to evoke layered narratives. This approach enables viewers to experience "multiple times and places at once."

While these studies demonstrate imaginative uses of projection mapping, there remain opportunities for further exploration. Specifically, they do not extend the technology toward critical or methodological aims. Neither study explores projection mapping as a tool for futures communication or as a method for integrating foresight methodologies with spatial storytelling. They also do not use projection mapping to communicate crisis triggers or speculative scenarios. In both cases, projection mapping is applied to 3D models instead of architectural drawings.

In response, this study introduces SSFF MorphoMap, a hybrid method developed within the Strategic Speculative Futures Framework (SSFF). This method clarifies key benefits by transforming projection mapping from a representational tool into one that enhances foresight and scenario-based communication. By layering dynamic digital content onto static architectural boards, MorphoMap not only visualizes crisis triggers, scenario-building, environmental behaviors, and temporal transitions but also enhances the ability to communicate evolving, complex ideas. By merging the certainty of traditional drawings with digital foresight, MorphoMap provides clearer narrative clarity, real-time adaptability, and deeper conceptual engagement, offering a robust medium to communicate architectural futures.

This research aims to develop and demonstrate SSFF MorphoMap as a hybrid representational method. By integrating futures thinking with projection mapping, this research seeks to facilitate clearer communication of speculative, temporal, and systemic architectural ideas. The study develops a structured workflow that combines SSFF futures methods with projection-mapping techniques, and evaluates its effectiveness in enhancing narrative clarity, temporal comprehension, and conceptual engagement. Furthermore, the research situates SSFF MorphoMap within broader discourses on hybrid representational strategies and architectural futures inquiry.

2.0 Literature Review

2.1 Architectural Representation and Communication

Architectural representation and communication shape how ideas are conceived, developed, and shared across diverse audiences (Işık, 2025). Representation encompasses drawings, models, diagrams, and digital simulations that convey design intent and experience (Díaz-Guerra et al., 2021). Beyond technical depiction, it communicates social, cultural, and experiential dimensions (Fuente Suárez, 2016) and functions as a mediating language between architects, stakeholders, and society (Jakupi & Jashari-Kajtazi, 2018).

Architectural communication is the process through which these representations transmit meaning (Susanti & Ikaputra, 2024). It is multimodal—visual, verbal, and symbolic—adapting to users' backgrounds and shared cultural codes (Ciganović & Stevanović, 2024; Díaz-Guerra et al., 2021). The sequencing of 2D and 3D visuals strengthens comprehension and spatial ability by integrating models and drawings (Carlos & López, 2025). While digital tools have accelerated production, hand drawing remains central to cognitive development, and hybrid methods—combining analog and digital approaches—support both technical proficiency and creative thinking (De Gispert Hernández et al., 2024).

Immersive technologies, including XR (VR/AR/MR) and interactive 3D modeling, further enhance engagement, spatial understanding, and information retention (Crolla et al., 2024), enabling more intuitive stakeholder involvement. In professional contexts, tools such as BIM bridge knowledge gaps among consultants, improve decision-making, and enhance interdisciplinary coordination (Jin et al., 2018). Likewise, in community-based processes, accessible representations—such as interactive drawings and mental maps—support inclusive, collaborative decision-making that reflects diverse needs and aspirations (Jakupi & Jashari-Kajtazi, 2018).

2.2 Current Development

Digital innovation, new media, and inclusivity drive rapid advances in architectural representation. Algorithmic design and advanced digital media enable complex, dynamic presentations beyond static drawings (Castelo-Branco et al., 2022). Simultaneously, immersive technologies are transforming design communication by enabling real-time, interactive experiences that encourage participatory dialogue and democratize the design process (Reyes, 2024; Shataliuek, 2025). Such capabilities foster audience-specific communication strategies using varied visual, structural, or conceptual approaches to maximize clarity and impact (Díaz-Guerra et al., 2021). Moreover, multimodal and hybrid approaches enable a richer spatial experience and promote spatio-temporal understanding by combining physical and digital media.

2.3 Response To Related Current Issues

The research builds on the discourse on Digital Twins (Horváth et al., 2023) as dynamic representations of contextual evolution across space and time. In the ecology of practices, understandings, and notions within which Digital Twins exist, we argue that the tangible quality of static representation still underpins the engagement that shapes the audience's perception. Therefore, combining static and dynamic representations, such as in projection mapping, offers a hybridity that enables simultaneous updates and simulations and functions as a performative medium (Li & Ito, 2021), thereby enhancing the audience's interpretation and understanding of contextual changes in a more holistic manner. From the perspective of future studies, such an ability is essential for shaping the structure and substance of future-oriented thinking (Zaharin & Gutiérrez, 2025).

2.4 Projection Mapping: Extent and Unique Features

Projection mapping is a powerful, context-sensitive visual tool that enables immersive, interactive, and narrative-rich communication by transforming physical surfaces into dynamic displays. Its applications span heritage communication—visualizing historical changes and cultural narratives on buildings, public art, and urban events —museum exhibitions with layered storytelling, advertising, and design collaboration, where projections enrich reviews and discussions.

By superimposing visual elements onto real spatial environments, projection mapping supports spatial and temporal storytelling (Li & Ito, 2021) and enhances spatial perception. Its strength lies in contextual integration, which highlights or reveals architectural features and narratives (Nikolakopoulou et al., 2022) and remains closely tied to the building's physical and historical identity (Nofal et al., 2018). According to Ruan (2025), media projection in architecture acts as an active cultural storyteller, shaping spatial perception and experience. Core elements such as immersive perception, interactive narrative, and spatial readability are key manifestations of this media-architectural experience. These qualities support deeper experiential learning, collaborative interpretation, and understanding of spatio-temporal conditions through interactivity and group engagement.

2.5 Significance of Projection Mapping in the Strategic Speculative Futures Framework (SSFF)

The Strategic Speculative Futures Framework (SSFF) explores multiple future scenarios and adaptive strategies in architecture by integrating systems thinking, strategic foresight, and speculative design. It emphasizes the need for structured, future-oriented thinking in exploring various scenarios (Zaharin & Gutiérrez, 2025). Projection mapping makes abstract scenarios tangible and accessible for stakeholders by visualizing alternative futures directly onto architectural models or built environments. This supports the SSFF's goal of rethinking sustainability through immersive, experiential engagement. The complexity introduced by the multifaceted process creates perceptual gaps and requires a dynamic visualization method for interpretation. Projection mapping can bridge systems thinking and design by visually synthesizing complex social, ecological, and technological systems, thereby fostering a more holistic understanding of interdependencies and trade-offs in sustainable development scenarios (Iwaniec et al., 2020).

The SSFF also advocates for participatory approaches and adaptive strategies (Zaharin & Gutiérrez, 2025). Hybrid analog-digital visualization empowers diverse participants to interact with and modify projected futures in real time. Projection mapping facilitates collaborative scenario-building, encouraging co-production and extensive iterative refinement, both key aspects of the SSFF. Moreover, interactive projection techniques (Franke et al., 2021) allow designers and stakeholders to visualize temporal changes and spatial relationships in real time, facilitating both top-down and bottom-up exploration of design alternatives.

Franke et al. (2021) also suggest that projection mapping supports pattern recognition and decision-making by making spatiotemporal data visually accessible through a visual feedback loop. This gives designers the ability to iteratively test hypotheses, adjust parameters, and observe effects in real time, thereby accelerating the exploration and optimization of architectural solutions (Han et al., 2025). As such, projection mapping can further enhance the iterative process in SSFF scenario building by enabling clustering, correlation analysis, simulation, and trend forecasting through multimodal data integration, thereby supporting more informed and responsive design iterations

3.0 Methodology

This study explores the application of the SSFF MorphoMap Integrated Projection Mapping method as a proof-of-concept, using a student design thesis project as the case study. The selected project had previously applied the Strategic Speculative Futures Framework (SSFF) to identify multiple forms of crisis and to develop speculative future scenarios ranging from probable and plausible to possible, preferable, and wild-card futures. This study focuses on examining how projection mapping can integrate these SSFF-based analyses with conventional architectural presentation boards, enabling a more dynamic and narrative-driven visualization of site crises and potential future outcomes.

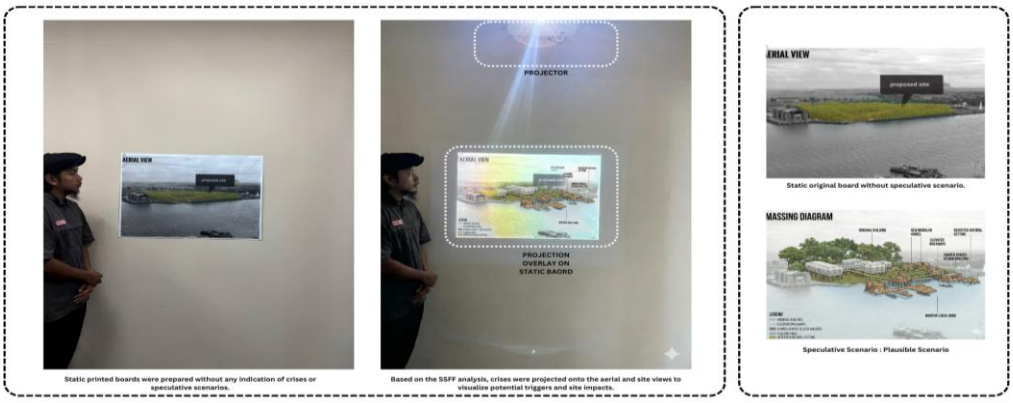

Fig. 1: The application of the SSFF MorphoMap Integrated Projection Mapping Method.
(Source:) Author

3.1 Data sources and preparation

Selected drawings from the design thesis, including an aerial view of the site, a zoomed-in site plan, and a perspective view, served as the primary representational data sources. These views were selected for their ability to communicate the project at multiple spatial scales and to support the visualization of both spatial conditions and scenario-based impacts. The drawings were prepared as static printed boards without any visual indication of crises or speculative futures, ensuring that projection mapping functioned as the primary narrative layer.

Based on the SSFF analysis, crisis conditions were projected onto the aerial and site plan views to visualise potential triggers and spatial impacts. Speculative future scenarios were projected onto the perspective view to illustrate possible architectural and spatial outcomes. Each crisis and scenario was represented using distinct graphic elements and video sequences to maintain visual clarity and differentiation.

3.2 Projection mapping procedure

Graphic and video layers were developed and integrated using Resolume software for projection mapping. Each projected element was carefully calibrated to align with corresponding areas of the printed boards, ensuring spatial accuracy and legibility. The projection setup employed a high-lumen Epson EP-FH06 projector (3,500 lumens) within a controlled lighting environment to optimise visibility and clarity. The projection session was conducted in an exhibition-like setting and documented through video recording for subsequent review and analysis.

3.3 Assessment exploratory

Given the exploratory, proof-of-concept nature of the study, the effectiveness of the projection mapping was assessed through formative observation and reflective analysis. The assessment focused on three key aspects:

1. Clarity – the degree to which projected crises and speculative scenarios were visually identifiable and distinguishable.
2. Coherence – the extent to which the projections conveyed a logical narrative linking crises and speculative scenarios to architectural responses.
3. Communicative Potential – the ability of the projection mapping to enhance understanding, engagement, and interpretive insight into the design project.

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4.0 Findings

4.1 Derivation of site crisis via SSFF systemic mapping

The site crises in this project were identified through an SSFF systemic mapping (Fig. 2), which examined the site's history and current challenges. By tracing causal loops, the analysis found the site's instability stems from three causes: coastal erosion, land subsidence, and saltwater intrusion. These threats reduce the amount of habitable land and disrupt traditional livelihoods. This evidence supports the site crisis visualization and resulting design scenarios.

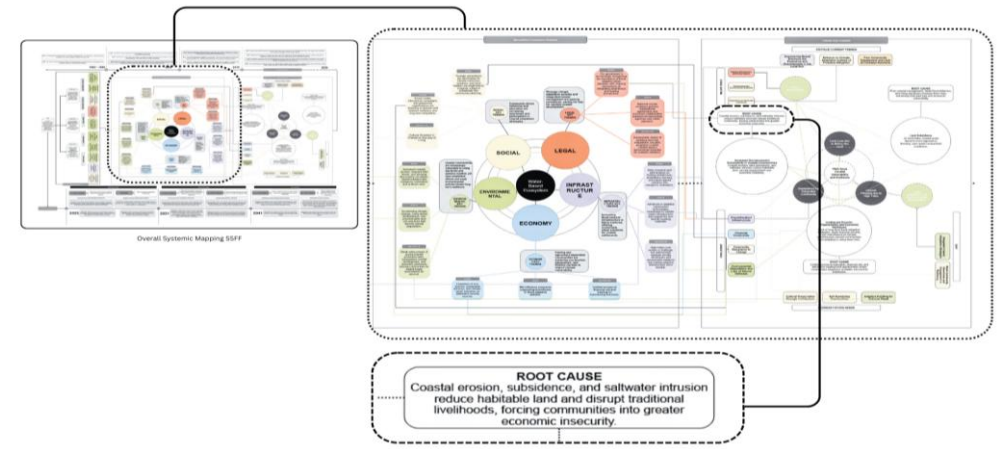

Fig. 2: The identification of root causes based on the SSFF systemic mapping
(Source:) How Can Future Perspectives Revolutionize Flood Challenges? Envisioning Self-Sustaining Communities for a Resilient Future By: Mohd Nasiruddin Mohd Mansor

4.2 Derivation of future scenario development via SSFF systemic mapping

The future scenarios in Fig. 3 were derived through SSFF systemic mapping. Instead of relying on arbitrary speculation, the process examined intersecting trends and horizon-scanning insights across six lenses—political, economic, social, technological, legal, and environmental—to identify key signals and drivers of change. Linked with past-to-present analysis,

these variables were then extrapolated into a set of future scenarios—probable, plausible, possible, preferable, and wild-card—that inform and guide the architectural intervention.

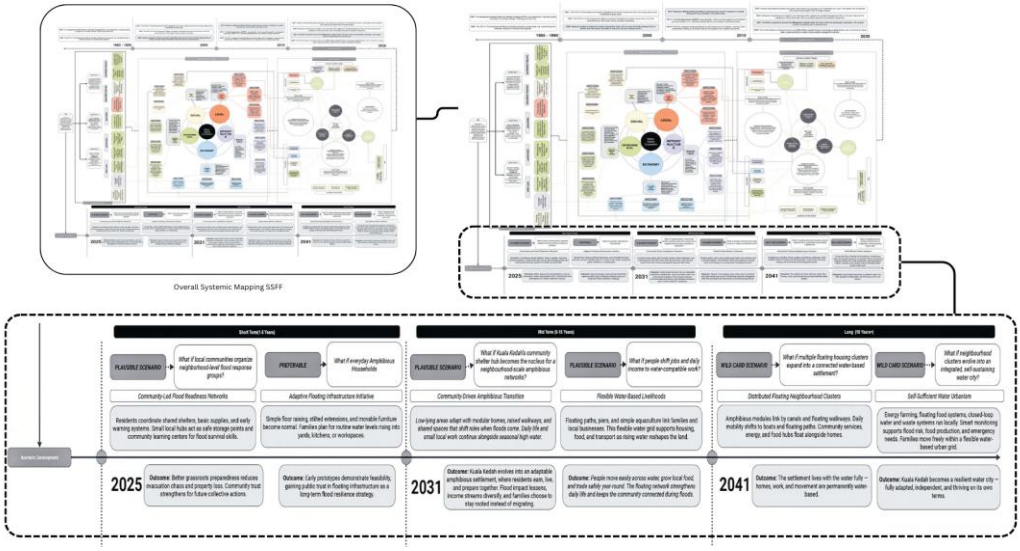

Fig. 3: Future scenario development based on the SSFF systemic mapping
(Source:) How Can Future Perspectives Revolutionize Flood Challenges?
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4.3 Analysis of Site Crisis

Figure 4 shows the site crisis analysis generated by the SSFF systemic mapping. It identifies coastal erosion, subsidence, and saltwater intrusion as root causes that reduce habitable land, disrupt livelihoods, and create economic insecurity—environmental drivers for scenario development. Using the MorphoMap projection technique made these crises clearer and addressed the study's three evaluation criteria.

- Clarity: Projection mapping translated complex environmental data into clear visual layers, showing water-level progression from minor rise to extensive flooding. This layering made the root causes and extent of land loss immediately visible.
- Coherence**:** The animation created a logical narrative by linking environmental deterioration to social impacts; as water levels rose, the decline of settlements became evident, reinforcing the idea that crises escalate.
- Communicative Potential**:** By animating the site crisis rather than depicting it statically, the method conveyed urgency with greater precision and impact, effectively communicating the severity of land loss and economic vulnerability.

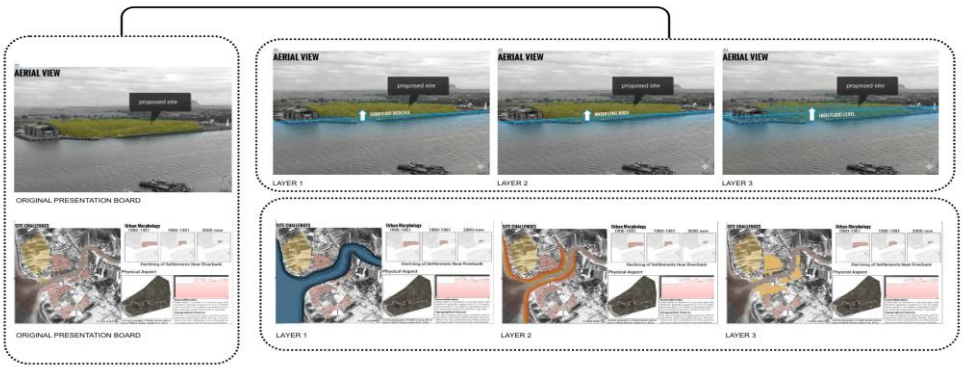

Fig.4: Site crisis
(Source:) How Can Future Perspectives Revolutionize Flood Challenges?
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4.4 Plausible scenario development analysis

Figures 5 and 6 illustrate two development options within the "plausible scenario" generated through SSFF systemic mapping. Although both depict the same scenario, they present different outcomes: Figure 5 uses graphic overlays to show proactive community responses—shared shelters, basic supplies, and early-warning systems—while Figure 6 employs video animation to demonstrate how local hubs operate as safe storage points and community learning centers for flood-survival skills. Together, they lay the groundwork for assessing MorphoMap's ability to communicate complex interventions.

- Clarity: Projection mapping provided immediate legibility of the interventions' spatial distribution in Figure 5. The massing overlay distinguished key elements—shared shelters, storage points, and the early-warning tower—while clearly outlining the coordination network and supply routes.
- Coherence: The video layer linked physical structures to social functions, showing how residents coordinate shelters and manage supplies in Figure 6. This clarified the operational flow of the hubs as community learning centers during a crisis.
- Communicative Potential: The combined projection illustrated design outcomes more effectively by simulating site activity. Moving from abstract planning to scenario-based visualization demonstrated how improved grassroots preparedness reduces evacuation chaos and property loss, while reinforcing community trust and supporting future collective action.

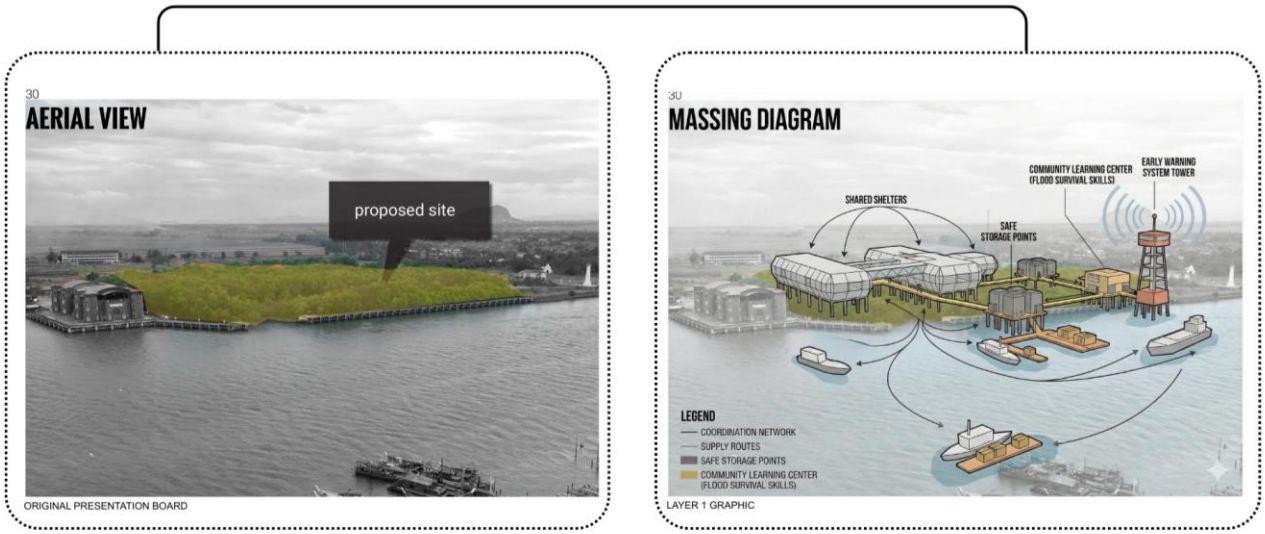

Fig.5: Plausible scenario through graphic layering
(Source:) How Can Future Perspectives Revolutionize Flood Challenges? Envisioning Self-Sustaining Communities for a Resilient Future By: Mohd Nasiruddin Mohd Mansor

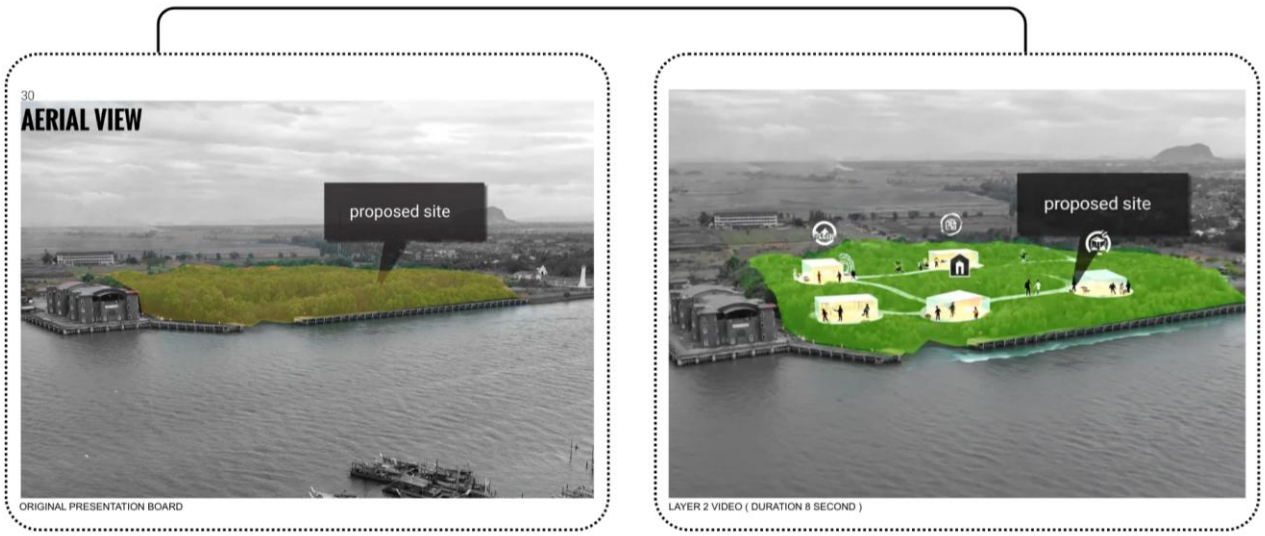

Fig.6: Plausible scenario through video visualization
(Source:) How Can Future Perspectives Revolutionize Flood Challenges? Envisioning Self-Sustaining Communities for a Resilient Future By: Mohd Nasiruddin Mohd Mansor

4.5 Probable *scenario development analysis*

Figures 7 and 8 present the "probable scenario" from the SSFF systemic mapping, outlining a mid-term adaptation strategy in which low-lying areas evolve into amphibious settlements rather than retreat. Figure 7 illustrates modular homes, raised walkways, and shared spaces that shift functions during floods, while the video in Figure 8 depicts a resilient daily life that continues alongside seasonal high water, enabling the community to remain rooted.

In translating this scenario from abstract planning into tangible understanding, the MorphoMap proved essential across three evaluation criteria:

- Clarity: The graphic overlays in Figure 7 clearly distinguished original structures from new modular homes and elevated walkways, enabling the audience to read how the built environment adapts to a re-emerging natural setting.
- Coherence: The layered projection demonstrated how shared spaces serve normal community activities but convert into flood shelters during crises, linking structural design directly to operational continuity through raised walkways and uninterrupted daily routines.
- Communicative Potential: The layered visualization in Figure 8 showed floodwater routes co-existing with everyday activity, effectively communicating the core idea of living with water. This dynamic portrayal conveyed how accumulated experience and community choice transform a high-risk area into an adaptable amphibious settlement.

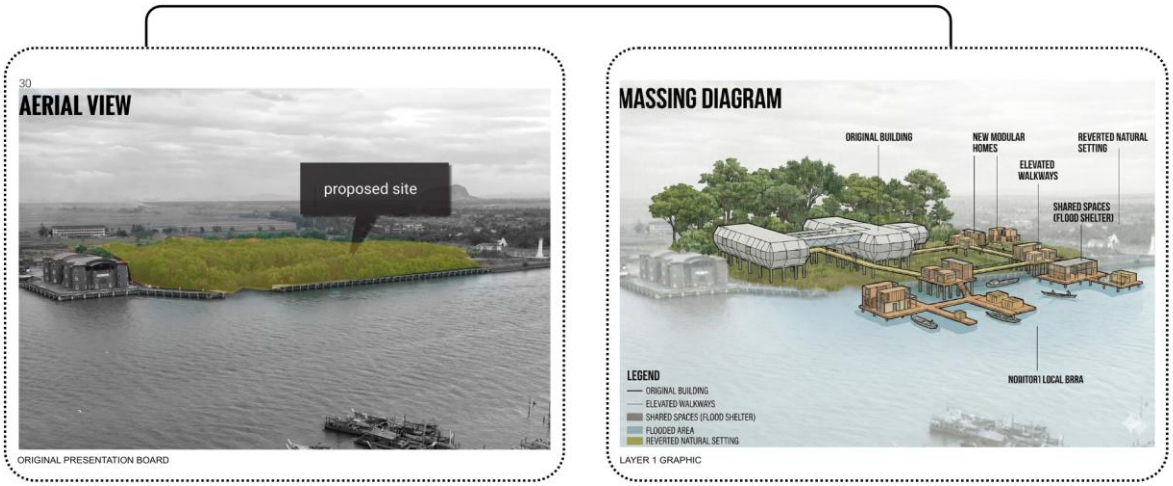

Fig.7: Probable scenario through graphic layering
(Source:) How Can Future Perspectives Revolutionize Flood Challenges?
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Fig.8: Probable scenario through video visualization
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4.6 Possible Scenario Development Analysis

Figure 9 illustrates a scenario from the SSFF mapping in which a flexible, water-based grid adapts to rising water levels. Floating paths, piers, and simple aquaculture systems connect homes and businesses, forming a resilient network for housing, food production, and transport. The visual data shows people moving across water, growing food, and trading safely throughout the year, ensuring community continuity during floods.

In this phase, the MorphoMap clarifies how the site responds to the scenario, addressing three evaluation criteria:

- Clarity**:** The graphic layering in Figure 9 clearly distinguishes floating paths, piers, housing modules, and aquaculture zones, making the water grid and its connections immediately legible.

- Coherence: The projection presents the grid as an integrated system. Layering shows how adaptability nodes and local businesses remain connected, even as rising water reshapes the landscape.
- Communicative Potential: The layers in Figure 9 depict a dynamic, flexible grid that integrates housing, food, and transport, demonstrating how the community adapts to flooding without becoming isolated.

Fig.9: Possible scenario through graphic layering
(Source:) How Can Future Perspectives Revolutionize Flood Challenges?
Envisioning Self-Sustaining Communities for a Resilient Future By: Mohd Nasiruddin Mohd Mansor.

4.7 Preferable Scenario Analysis

Fig.10: Preferable scenario through graphic layering
(Source:) How Can Future Perspectives Revolutionize Flood Challenges?
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Figures 10 and 11 visualize the "preferable scenario," where the settlement fully embraces a water-based lifestyle. Amphibious modules are linked by canals and floating walkways, shifting daily mobility from land vehicles to boats and floating paths. Community services, energy hubs, and food systems operate directly on the water, forming a fluid and resilient living environment. Figure 10 establishes the spatial organization, while Figure 11 animates the functional flow, together addressing the three core evaluation criteria:

- Clarity: The graphic layering in Figure 10 distinguishes amphibious modules, floating walkways, and canals as the primary circulation network. This separation makes the organization of floating hubs and their connections to residential units immediately clear.

- Coherence: Figure 11 enhances narrative coherence by animating the shift in mobility. The video shows boats and floating paths in action, linking the canal network to residents' daily movement and demonstrating continuous access to community services.
- Communicative Potential: The combined graphic and video layers present the scenario as a functioning, self-sufficient system. Animated energy and food hubs illustrate a thriving water-based lifestyle, transforming the proposal from a theoretical idea into a compelling and desirable future.

Fig.11: Preferable scenario through video visualization
(Source:) How Can Future Perspectives Revolutionize Flood Challenges?
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4.8 Wild Card Scenario Analysis

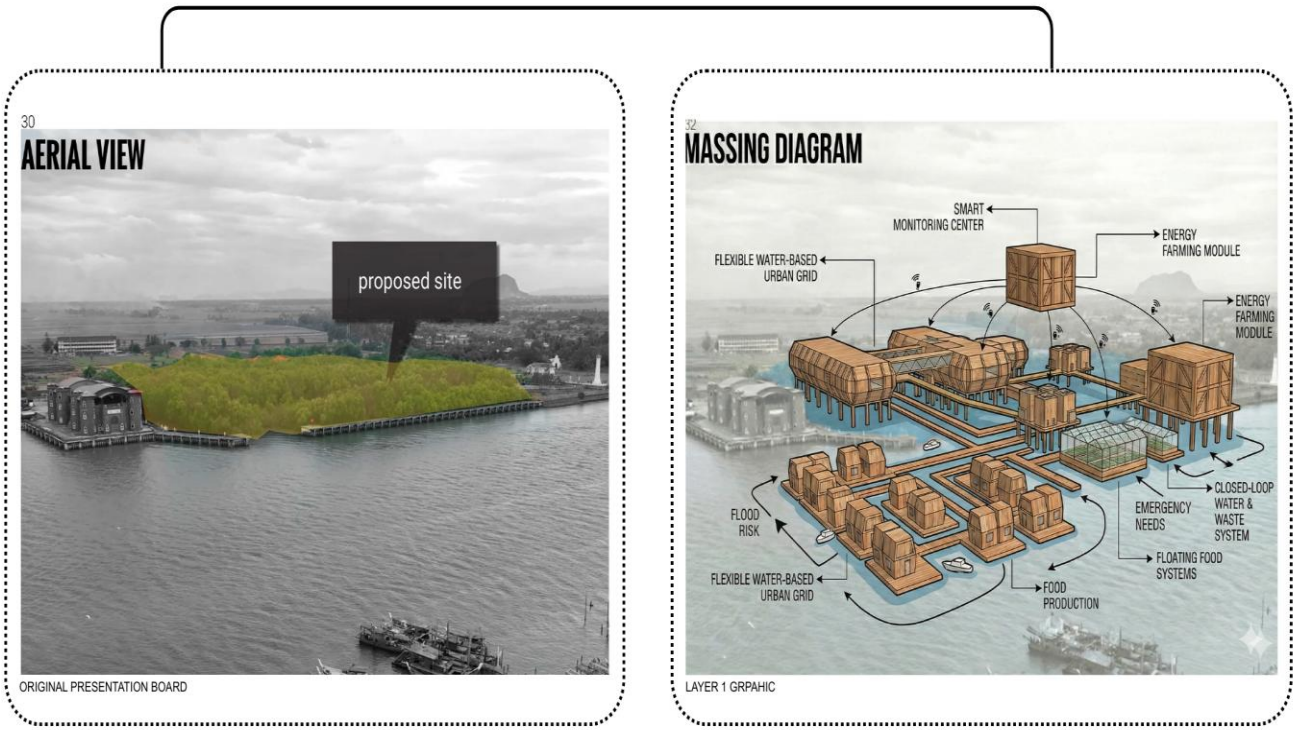

Fig.12: Wild card scenario through graphic layering
(Source:) How Can Future Perspectives Revolutionise Flood Challenges?
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Figures 12 and 13 present the "wild card scenario," depicting the site's evolution into a fully self-sufficient water urbanism. In this future

state, energy farming, floating food systems, and closed-loop water and waste cycles operate locally, supported by smart monitoring that manages flood risk, food production, and emergency needs. Families move freely within a flexible water-based urban grid. Figure 12 establishes the infrastructural grid, while Figure 13 animates the operational systems, addressing the three core evaluation criteria:

- Clarity**:** The graphic layering in Figure 12 distinguishes the components of the flexible water grid. Overlays of closed-loop systems and energy zones clearly separate technical infrastructure from residential areas, making the organization of self-sufficiency systems legible.
- Coherence: Figure 13 enhances narrative coherence by animating smart monitoring functions. The video shows how real-time data supports flood risk management and food production, connecting high-tech operations directly to daily community movement and safety.
- Communicative Potential: The combined graphic and video layers convey a fully autonomous water city. Animated floating food systems and free family movement illustrate a community that not only adapts to floods but thrives through a resilient, self-sustaining ecosystem.

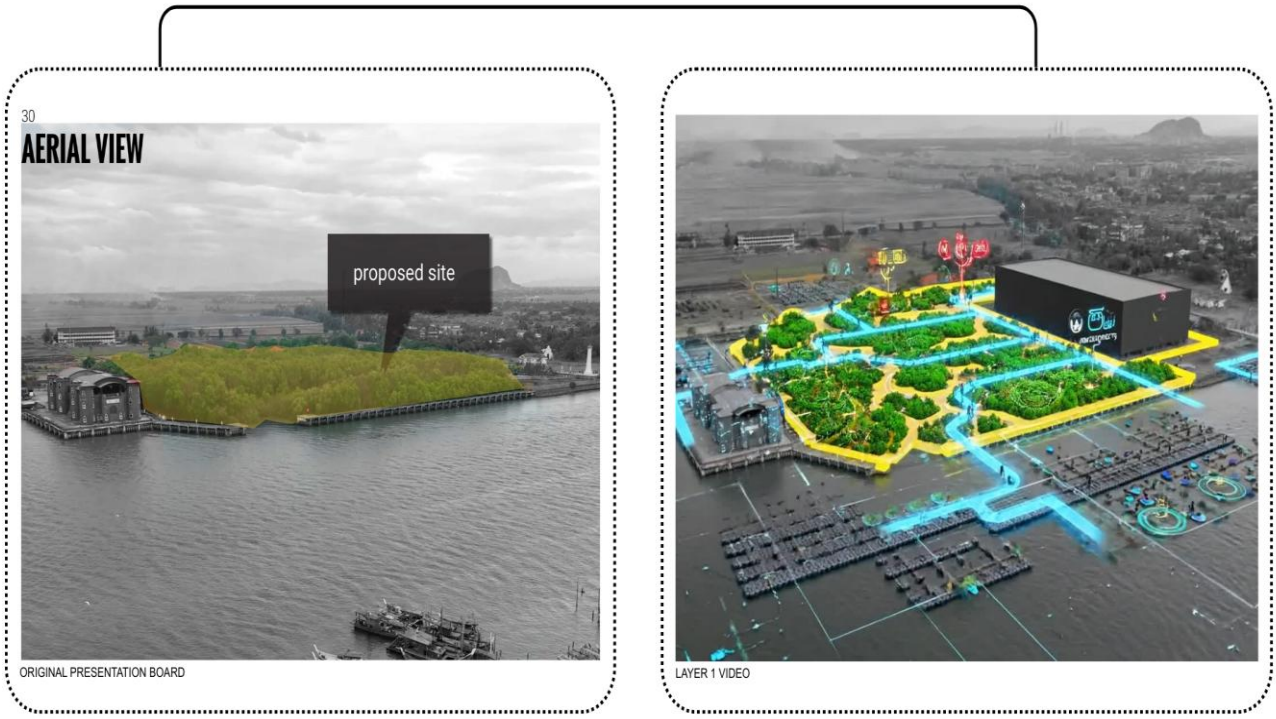

Fig.13: Wild card scenario through video visualization
(Source:) How Can Future Perspectives Revolutionise Flood Challenges?
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5.0 Discussion

The SSFF–MorphoMap proof-of-concept shows three clear benefits of dynamic projection mapping in architectural representation: First, it enhances clarity by letting viewers directly trace crisis triggers, narratives, and temporal changes, making complex systems more understandable. Second, it improves coherence by layering speculative futures and spatial sequences to unify separate elements in a structured story, deepening engagement with design intents. Third, it expands communication potential by presenting abstract, future-focused ideas in clear, visual ways, supporting understanding for audiences such as students, stakeholders, and practitioners.

These outcomes resonate with the critique of purely visual realism by Fuente Suárez (2016), emphasizing the importance of experiential, narrative, and temporal dimensions in architectural communication. Building on this, SSFF–MorphoMap exemplifies within architectural communication theory how representations transmit meaning, intent, and complex system interactions through multimodal strategies (Susanti & Ikaputra, 2024; Díaz-Guerra et al., 2021; Ciganović & Stevanović, 2024; Dymchenko et al., 2021; Jakupi & Jashari-Kajtazi, 2018). Additionally, integrating analogue boards with digital overlays aligns with research advocating hybrid methods that foster both technical proficiency and reflective, creative thinking (De Gispert Hernández et al., 2024; Carlos & López, 2025).

Extending beyond these theoretical perspectives, the method has implications for architectural pedagogy, professional practice, and futures-oriented research. In education, SSFF–MorphoMap can enhance students' ability to communicate complex design logic and anticipate emergent scenarios. In professional settings, it can visualize potential crises, environmental dynamics, and user interactions, supporting participatory design and decision-making. For research, the method offers a framework for exploring hybrid, experiential representational strategies that bridge foresight methodologies with material and spatial investigation.

6.0 Conclusion and Recommendations

This study demonstrates SSFF MorphoMap as a hybrid representational method that integrates projection mapping with the Strategic Speculative Futures Framework (SSFF) to address long-standing limitations of static architectural representation. The method enables clearer communication of complex scenarios by dynamically overlaying narrative, temporal, and systemic elements. As a result, concepts become more understandable and engaging. In the proof-of-concept application, SSFF MorphoMap illustrated how crisis triggers, scenario narratives, and temporal transitions can be layered onto static boards. This approach achieves clearer narrative coherence and deeper conceptual engagement than traditional formats.

The evaluation conducted in this study was formative and exploratory, relying on recorded observations to assess feasibility, clarity, and communicative value. Consequently, the findings are indicative rather than generalisable and are limited to demonstrating the method's feasibility and representational potential. To strengthen the method and its evidential base, future research should incorporate more systematic evaluation strategies, including user comprehension studies, expert feedback, and comparative testing against other hybrid representational tools.

Future research should specifically aim to test SSFF MorphoMap with larger participant samples, apply it across a broader range of project types, and evaluate its effectiveness within varied architectural representational settings. Additionally, research should assess its capacity to handle more complex scenario datasets, multi-layered temporal narratives, and interactive or responsive display formats. Clarifying these aims will guide implementation and applicability within futures-oriented architectural communication.

Acknowledgements

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Paper Contribution to Related Field of Study

This paper contributes to architectural representation and futures-oriented design research by introducing SSFF MorphoMap, a hybrid method that integrates projection mapping with the Strategic Speculative Futures Framework (SSFF). The method advances current representational practices by moving beyond visual realism toward a more experiential mode of communication. SSFF MorphoMap demonstrates how dynamic, digitally layered content can extend the narrative, temporal, and systemic dimensions of architectural drawings, enabling a clearer depiction of crisis triggers and scenario evolution.

References

Andalib, S., & Monsur, M. (2024). Co-Created Virtual Reality (VR) Modules in Landscape Architecture Education: A Mixed Methods Study Investigating the Pedagogical Effectiveness of VR. Education Sciences. https://doi.org/10.3390/educsci14060553.

Carlos, G., & López, A. (2025). The Systematisation of Survey Drawings: Identifying the Development of Morphological Awareness via Teaching Approaches. Buildings. https://doi.org/10.3390/buildings15050674.

Castelo-Branco, R., Caetano, I., & Leitão, A. (2022). Digital representation methods: The case of algorithmic design. Frontiers of Architectural Research. https://doi.org/10.1016/j.foar.2021.12.008.

Ciganović, A., & Stevanović, V. (2024). Theoretical modalities of architectural communicability. Arhitektura i urbanizam. https://doi.org/10.5937/a-u0-49478

Crolla, K., Song, J., Bunica, A., & Sheikh, A. (2024). Integrating Extended Reality in Architectural Design Studio Teaching and Reviews: Implementing a Participatory Action Research Framework. Buildings. https://doi.org/10.3390/buildings14061865.

De Gispert Hernández, J., Nuño, S., Cabillo, I., & Riera, A. (2024). Dibujar rápido, dibujar despacio: la dicotomía del aprendizaje de la representación arquitectónica. Jornadas sobre Innovación Docente en Arquitectura. https://doi.org/10.5821/jida.2024.13255.

Díaz-Guerra, B., Grau, J., & De La Rosa, M. (2021). Polyhedral communication in architecture. **, 5, 9. https://doi.org/10.20868/abe.2021.1.4566

Dymchenko, M., Brykova, N., & Lokonova, I. (2021). Architectural form as a subject of cultural communication. E3S Web of Conferences. https://doi.org/10.1051/e3sconf/202128102003

Franke, M., Martin, H., Koch, S., & Kurzhals, K. (2021). Visual Analysis of Spatio-temporal Phenomena with 1D Projections. Computer Graphics Forum, 40. https://doi.org/10.1111/cgf.14311

Fuente Suárez, L. A. de la. (2016). Towards experiential representation in architecture. *Journal of Architecture and Urbanism*, *40*(1), 47–58. https://doi.org/10.3846/20297955.2016.1163243

Han, X., Li, Z., Cao, H., & Hou, B. (2025). Multimodal Spatio-Temporal Data Visualization Technologies for Contemporary Urban Landscape Architecture: A Review and Prospect in the Context of Smart Cities. Land. https://doi.org/10.3390/land14051069

Horváth, A.-S., Vite, C., Holten Møller, N. L., & Neff, G. (2023). Digital twins in architecture: An ecology of practices and understandings. In A.-S. Horváth (Ed.), Digital twins in architecture and construction (pp. 3–28). Springer.

Ishida, A. (2022). *Projection mapped architectural models: Experiencing multiple times and places at once*. In K. Moore & G. Bird (Eds.), *Proceedings of the 2022 Design Communication Conference: Design Communication for Experimental Traditions* (pp. 383–389). Design Communication Association. ISBN 979-8-218-06578-2.

Işık, P. (2025). The Meanings Attributed to Representation in Architecture. Journal of Technology in Architecture Design and Planning. https://doi.org/10.26650/jtadp.25.003

Iwaniec, D., Cook, E., Davidson, M., Berbés-Blázquez, M., Georgescu, M., Krayenhoff, E., Middel, A., Sampson, D., & Grimm, N. (2020). The co-production of sustainable future scenarios. Landscape and Urban Planning. https://doi.org/10.1016/j.landurbplan.2020.103744.

Jakupi, A., & Jashari-Kajtazi, T. (2018). Architectural drawing as a medium of communication, education and interaction with the community; case study Prishtina, Kosovo. Pollack Periodica, 13, 237-246. https://doi.org/10.1556/606.2018.13.1.21

Jin, R., Yang, T., Piroozfar, P., Kang, B., Wanatowski, D., Hancock, C., & Tang, L. (2018). Project-based pedagogy in interdisciplinary building design adopting BIM. Engineering, Construction and Architectural Management. https://doi.org/10.1108/ecam-07-2017-0119.

Li, H., & Ito, H. (2021). Comparative analysis of information tendency and application features for projection mapping technologies at cultural heritage sites. Heritage Science, 9, 1-16. https://doi.org/10.1186/s40494-021-00579-0.

Nikolakopoulou, V., Printezis, P., Maniatis, V., Kontizas, D., Vosinakis, S., Chatzigrigoriou, P., & Koutsabasis, P. (2022). Conveying Intangible Cultural Heritage in Museums with Interactive Storytelling and Projection Mapping: The Case of the Mastic Villages. Heritage. https://doi.org/10.3390/heritage5020056.

Nofal, E., Stevens, R., Coomans, T., & Moere, A. (2018). Communicating the spatiotemporal transformation of architectural heritage via an in-situ projection mapping installation. Digit. Appl. Archaeol. Cult. Heritage, 11, 00083. https://doi.org/10.1016/j.daach.2018.e00083.

Reyes, A. (2024). A multimodal study of augmented reality in the architectural design studio. International Journal of Technology and Design Education. https://doi.org/10.1007/s10798-024-09895-5

Ruan, H. (2025). Narrative Screen: The Role of Media Architecture Internalization in Enhancing Architectural Narratives. World Journal of Innovation and Modern Technology, 8(2), 5-12. https://doi.org/10.53469/wjimt.2025.08(02).02.

Saeed Abbas, N. (2021). Projection Mapping Technology in Architecture from the Perspective of Optical Illusion Art. *Journal of Design Sciences and Applied Arts*, *2*(1), 160-168. doi: 10.21608/jdsaa.2021.29892.1035

Susanti, W. & I. (2024). Communicating architectural strategies (semiotics). International Journal of Architecture and Urbanism. https://doi.org/10.32734/ijau.v8i3.17343

Zaharin, P., & Gutiérrez, M. (2025). Strategic Speculative Futures Framework in Architecture and Sustainable Development. Environment-Behaviour Proceedings Journal. https://doi.org/10.21834/e-bpj.v10i32.6691