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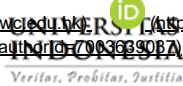


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From Concept to Community: Phased Modularity in a Participatory Public Space Design

Bramasta Putra Redyantanu

Department of Architecture, Faculty of Civil Engineering and Planning, Petra Christian University, Surabaya, Indonesia, bramasta@petra.ac.id

Aris Budhiyanto

*Department of Architecture, Faculty of Civil Engineering and Planning, Petra Christian University, Surabaya, Indonesia, arisb@petra.ac.id**See next page for additional authors*Follow this and additional works at: <https://scholarhub.ui.ac.id/ajce>Part of the [Environmental Design Commons](#), and the [Urban, Community and Regional Planning Commons](#)

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From Concept to Community: Phased Modularity in a Participatory Public Space Design

Bramasta Putra Redyantanu,^{1*} Aris Budhiyanto,¹ Agus Dwi Hariyanto¹

¹Department of Architecture, Faculty of Civil Engineering and Planning,
Petra Christian University, Surabaya, Indonesia

*Correspondence email: bramasta@petra.ac.id

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Abstract

This paper examines the idea of modularity as an extensive framework within the participatory design approach. Modularity is explored not only as a design and construction method but also as a collaboration framework that allows architecture to evolve through collaboration. In exploring the idea, this paper elaborates modularity through a community service design project at Alun-Alun Cemara Miagan, an open space in Miagan Mojoagung, Indonesia, emphasizing a participatory approach that involved local stakeholders and architects in developing a multifunctional public space. Due to the phased funding from the government, the project adopted modular strategies to enable flexible, incremental development aligned with community input. Three modular prototypes were developed: a gate responding to budget and fabrication constraints; a canopy providing adaptable shaded areas; and a building offering spatial flexibility for public functions. Through collaborative ideation in the participatory process, the hands-on engagement and iterative refinement from the community directly informed these design outcomes. This study demonstrates that modularity also supported local industries and addressed funding rhythms, demonstrating its value in both technical and social dimensions. The study also concludes that modular design can foster resilient, adaptable, and resource-efficient public spaces. It contributes to the discourse on community-based architecture and suggests future exploration of digital tools to enhance participatory modular development.

Keywords modularity; design strategy; collaboration framework; participatory design; community service

SDGs 11 (Sustainable cities and communities)

1. Introduction

This paper reflects on the design process of public squares developed through community service initiatives, employing participatory design and modular strategies to promote the sustainable development of public space. In particular, it explores how modularity not only addresses technical and economic constraints but also fosters deeper community involvement and long-term social benefits.

The complex array of forces that have made innovation in design and construction so difficult to accomplish are stubbornly resistant. By adopting design thinking,

a methodology for dealing with “wicked problems”, the intermodal modular enterprise can resolve the conflicting and competing interests in the construction sector by engaging all stakeholders in an ongoing, collaborative, and iterative process. (Wallance, 2021, p. 11)

Insofar, modularity has emerged as a key strategy in architectural design, offering flexibility, adaptability, and cost efficiency, particularly in addressing phased construction and funding constraints in village-scale public spaces. As Hogan-O’Neill (2021) notes, modular systems support incremental development while maintaining spatial cohesion. Beyond its technical advantages, modularity fosters community engagement by breaking down large-scale projects into manageable units, enabling meaningful participation, continuous feedback, and shared ownership throughout the design process. This paper examines the integration of modularity within a community service initiative at Alun-Alun Cemara Miagan, positioning it as both a sustainable construction method and a participatory framework. Drawing on Yatmo’s (2024) inclusive design principles, the study highlights how modular strategies can enhance the usability, adaptability, and social relevance of public spaces.

The use of modularity in architecture is widely acknowledged for its capacity to streamline construction while preserving design integrity. Cohen (2018) highlights the value of modular systems in addressing spatial and budgetary limitations, positioning them as essential tools in contemporary practice. Similarly, Smith (2010) emphasizes modularity’s alignment with sustainable development goals, advocating for its role in enabling gradual, resource-efficient growth. Building on these perspectives, this paper explores how modular strategies can bridge the gap between conceptual vision and practical implementation, particularly in the context of public squares, which function as critical spaces for community interaction and identity.

Adopting modularity as a design framework offers architects a more adaptable and sustainable approach to the development of public squares. Redyantanu and Sunaryo (2024) position modularity as a methodology that balances aesthetic expression with practical efficiency. This paper investigates the potential of modular architectural strategies to address phased construction challenges, particularly those arising from governmental funding constraints, while advancing goals of inclusivity, resilience, and community empowerment. Through critical analysis of case studies and theoretical frameworks, the study contributes to the evolving discourse on participatory modular design, illustrating how community engagement can shape modular interventions that are both spatially adaptable and socially responsive.

2. Modularity as a Framework for a Community Design Approach

2.1. Modularity within strategic design

Modularity has long been recognized as an effective strategy for addressing the evolving demands of the architectural and construction industries. Combes and Bellomio (1999) characterize modularity as an industrially driven approach that facilitates standardized design and production processes, enhancing efficiency and scalability. By integrating modular systems, architects and fabricators can apply pattern-based design principles—such as those outlined by Plowright (2014), to develop repeatable and adaptable structures

capable of accommodating diverse spatial and functional requirements. This pattern-oriented methodology not only ensures design flexibility but also enables innovative responses to varying user needs and project constraints.

Modularity offers material-driven adaptability and sustainability, as emphasized by Dharmawan and Alviano (2019) and Frampton (2001), who highlight the role of ‘material play’ in enabling modular designs to integrate diverse materials suited to specific environmental and economic contexts. Lehtonen (2007) further frames modular architecture as a product-based system that streamlines manufacturing and assembly, reducing waste and resource consumption. Corcuff’s (2012) reinterpretation of modularity reinforces its potential for dynamic innovation in response to contemporary architectural challenges. In parallel, modularity is recognized for its cost-efficiency and organizational flexibility, Musa et al. (2016) demonstrate its ability to lower construction costs through optimized production and reduced onsite labor, while Kurokawa (1977) and Tamari (2014) underscore its capacity to support dynamic spatial configurations that adapt to evolving needs. Collectively, these perspectives position modularity as a sustainable, flexible, and economically viable strategy for addressing the complex and shifting demands of architectural practice.

2.2. Modularity as a community-based design approach

Modularity has emerged as a compelling strategy in architectural and urban design, offering solutions across both micro and macro spatial scales. While its application is well-documented in smaller-scale contexts, such as public buildings, residential developments, and rural settlements, recent studies have further underscored its versatility. Effendi et al. (2024) highlight the adaptability of modular systems in public building design, demonstrating their responsiveness to diverse community needs. Similarly, Aldi et al. (2023, 2024) examine modularity in rural contexts, emphasizing its ability to achieve functional and aesthetic coherence within constrained resources. Indrayuni et al. (2024) extend this discourse to housing design, illustrating how modular strategies support customization and scalability in response to both individual preferences and broader societal demands.

Beyond its technical applications, modularity has also been recognized as a participatory design strategy that empowers communities to actively shape their built environments. A prominent example is Walter Segal’s self-build housing project in Lewisham, London, where modular timber-frame systems enabled residents, many without formal construction experience, to design and construct their own homes (Hilmer, 2020). This model prioritized affordability, adaptability, and user agency, allowing the architecture to evolve in response to changing needs. In a related critique, Peter Blundell Jones (1987), in his essay *Society Has Suffered Long Enough from Finished Architecture: Buildings Must Be Allowed to Grow and Change*, challenges the notion of static architectural outcomes. By comparing three participatory models, he argues that modular systems support open-ended, responsive design processes that align with the core principles of participatory architecture.

On a larger scale, modularity presents significant potential as a sustainable and participatory urban design strategy. Dennemark et al. (2017) and Wang et al. (2019) advocate for modular master plans that support phased development while promoting economic and environmental sustainability. This approach aligns with participatory design principles, as emphasized by Lukito et al. (2021), to underscore the value of community involvement in shaping

urban spaces. Similarly, Jones et al. (2013) in *Architecture and Participation* explore how modularity facilitates co-design, flexibility, and shared authorship in architectural practice. By integrating modular systems into urban planning, designers can create adaptable, stakeholder-responsive environments. In contexts such as Alun-Alun Cemara Miagan—where phased funding intersects with community aspirations—modularity functions not only as a spatial strategy but also as a social mechanism for inclusive development.

This paper examines modularity as a strategic framework for the sustainable development of public spaces, integrating insights from both architectural and urban design perspectives. It investigates how modular systems can bridge the divide between micro-scale construction practices and macro-scale urban planning, enabling coherent and scalable interventions. By incorporating participatory design methodologies, the study contributes to the discourse on creating inclusive, adaptable, and resource-efficient public environments that support long-term communal well-being.

3. Method of Study

This research employs a qualitative methodology grounded in *research-through-design* principles (Till, 2012; Verbeke, 2013), positioning the design process as both a mode of inquiry and a means of generating knowledge. It emphasizes reflective architectural practice as a pathway to deeper understanding (Groat & Wang, 2013) of sustainable public space development through modular strategies (Wallance, 2021). The study is situated within the context of Alun-Alun Cemara Miagan in Mojokerto and forms part of a community service initiative led by Petra Christian University.

The participatory process was structured into three stages: 1) collaborative ideation, 2) hands-on collaboration, and 3) iterative design refinement. In the ideation phase, offline FGDs engaged stakeholders—including youth groups, vendors, and village officials—to identify key spatial needs such as shaded areas, commercial stalls, and performance spaces. The hands-on phase included site visits and participatory mapping, material selection, and spatial prototyping through 3D simulations and sketches, fostering direct community engagement. During the refinement phase, design proposals were adjusted based on feedback from online meetings, addressing concerns related to accessibility, shading, and cultural symbolism. Notably, the triangular module—originally inspired by the *cemara* [pine] tree—was refined to better reflect local identity while preserving structural efficiency.

A total of four focus group discussions (FGDs)—two online and two offline—were conducted, each involving 8–12 participants, including youth groups, local vendors, community leaders, and village officials. Lasting 90–120 minutes, each session was guided by semi-structured questions addressing spatial needs, cultural identity, economic activity, and aspirations for the square. Transcripts and meeting notes were thematically coded to identify recurring priorities, which were then mapped onto design elements to ensure that community input directly informed the modular strategies.

By embedding participatory methods into the design process, the study ensured inclusivity and responsiveness to local needs (Nichols et al., 2024; Yatmo, 2024). FGDs facilitated collaborative ideation and iterative refinement, fostering shared ownership of the project.

Key aspirations included shaded areas for informal gatherings, flexible open spaces for cultural events, and commercial stalls for local MSMEs. These informed the modular design: the canopy addressed thermal comfort, while modular buildings supported multifunctional use. This alignment demonstrates how modularity functioned not only as a construction strategy but also as a responsive design language. Figure 1 illustrates Alun-Alun Cemara Miagan's role as Miagan Village's central activity hub and tourism focal point.



Figure 1. Context of Alun-Alun Cemara Miagan as Miagan Village's activity hub and tourism focal point



Figure 2. Collaboration agreement between the Miagan Village Government and the Petra Christian University team

The participatory process prioritized inclusivity by engaging a broad spectrum of stakeholders, including local residents of the Miagan Village, Mojokerto, Indonesia, their community leaders, and government representatives, in the design discourse. Online FGDs utilized digital platforms to accommodate participants unable to attend in person, while offline sessions facilitated hands-on collaboration and site-specific observations. Together, these methods generated rich qualitative data and actionable insights that

informed the design process. The study also offers a critical reflection on the application of modular strategies, evaluating their effectiveness in addressing practical constraints such as phased construction and limited funding. By integrating participatory methodologies with reflective design practices, this research advances the development of sustainable public spaces that are both community-driven and adaptable to evolving needs. Figure 2 illustrates the formal collaboration agreement between the Miagan Village Government and the Petra Christian University team in Surabaya.

4. Result and Discussion

The participatory design approach adopted for Alun-Alun Cemara Miagan embodies a community-centered methodology focused on fostering inclusivity and sustainability. As the central public space of Miagan Village, the square functions as a multifunctional hub for sports, gatherings, and temporary events. Given the constraints of phased government funding, modular strategies were identified as an effective solution to enable incremental development while maintaining design coherence and adaptability. The participatory process generated key community inputs—such as the need for shaded seating, flexible open areas for events, and commercial stalls to support local MSMEs—which directly informed the design of the modular canopy, central plaza, and commercial building components.

Through community service initiatives led by the Petra Christian University team, design inputs were collected through a combination of online and offline meetings, ensuring the integration of local voices in addressing spatial needs and communal aspirations. This participatory process underscored the value of inclusive engagement in shaping public spaces that reflect the community's identity, values, and lived experiences. Figure 3 illustrates the discussion and field identification activities conducted by the team in Miagan Village.



Figure 3. Team discussions and field identification in Miagan Village

The proposed design for Alun-Alun Cemara Miagan emphasizes the seamless integration of indoor and outdoor spaces, aligning with Atmodiwirjo and Yatmo's (2019) and Boettger's (2014) advocacy for spatial fluidity to enhance user interaction and experience. The modular strategy not only enables incremental development in response to phased funding but also supports local industries through the use of accessible materials and

fabrication methods, such as ironworks, uPVC roofing, and GRC panels sourced from regional workshops. As Arisya and Suryantini (2021) note, modular master plans offer an effective framework for organizing spatial functions while maintaining coherence. This approach fosters both economic sustainability and spatial adaptability, reinforcing the square's role as a dynamic, community-centered public space.

The integration of modular strategies into the master plan ensures that Alun-Alun Cemara Miagan remains adaptable to sustainability goals and crisis-related challenges. The phased implementation—developed through community consultation—comprises three stages: Phase 1 (*Lite*) includes the modular gate, basic canopy structures, and pedestrian pathways; Phase 2 introduces the commercial building and expanded canopy zones; and Phase 3 completes the village office and ceremonial plaza. This sequencing aligns with funding availability and local construction capacity. As Wallance (2021) notes, modularity offers efficient resource use and scalability in response to crises, while Picon (2021) highlights its alignment with sustainable development. By enabling local mass production, the modular approach not only reduces costs but also stimulates the regional economy and enhances long-term resilience.

While modular strategies offered a flexible framework for phased implementation, their effectiveness varied across components. The modular gate was completed early due to low material costs and reliance on local ironworks, whereas the canopy and building modules faced delays from fluctuating prices and limited regional prefabrication capacity. This exposed a gap between design intent and logistical feasibility. Although the modular approach addressed key community needs—such as shaded areas and multifunctional spaces—funding limitations in early phases deferred priorities like cultural performance areas, affecting short-term usability. These challenges underscore the tension between incremental development and holistic spatial delivery. Ultimately, the modular system demonstrated resilience in adapting to funding and community input, but its success hinged on local production capacity, material availability, and design continuity. These findings highlight the need for careful alignment between modular strategies and local economic and logistical conditions to fully realize their participatory and adaptive potential.

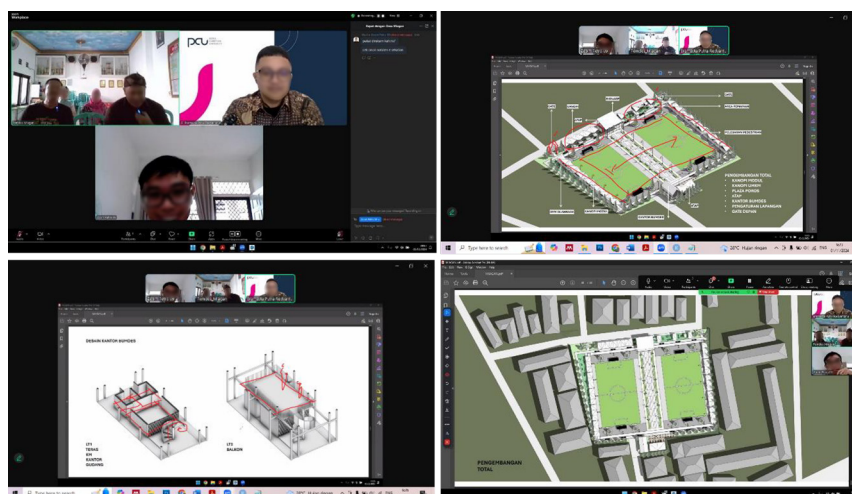


Figure 4. Collaborative design process with community input via online meetings

The findings of this study underscore the potential of modularity as a sustainable design strategy for public spaces such as Alun-Alun Cemara Miagan. The participatory methodology ensured that the design process was grounded in community needs and aspirations, while the modular master plan facilitated adaptability, environmental sustainability, and efficient phased implementation. By integrating indoor–outdoor spatial continuity with modular components, the project demonstrates both the practical viability and theoretical value of modular strategies in urban design. This approach contributes to the development of resilient, inclusive public environments capable of evolving with local contexts. Figure 4 illustrates the collaborative design process, incorporating input from the community and village representatives through a series of online meetings.

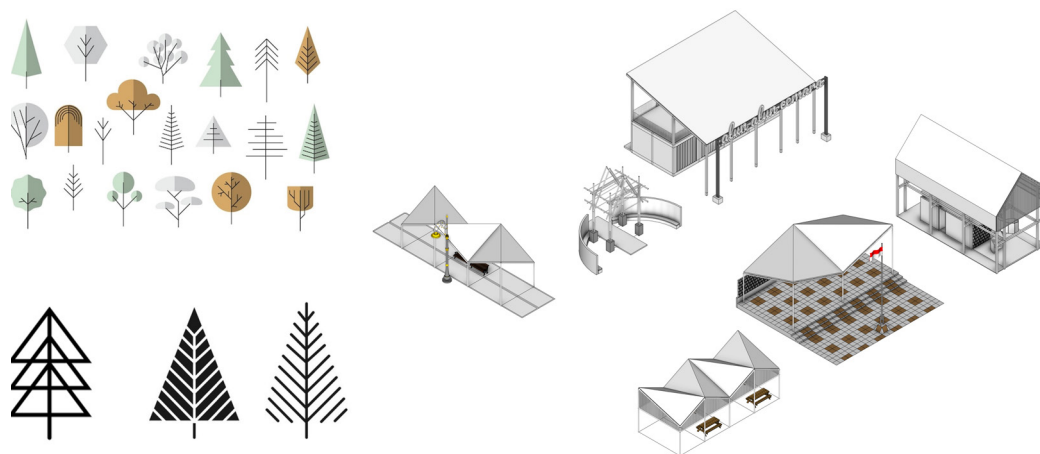


Figure 5. Transformation of modular design inspired by the pine tree identity

The design of Alun-Alun Cemara Miagan is conceptually rooted in the symbolic form of the pine tree, abstracted into triangular geometries. Renowned for their structural stability and spatial efficiency, triangles serve as the foundational module throughout the design. This modular geometry is seamlessly integrated into the master plan, enhancing both functional performance and visual coherence. The triangular modules operate as adaptable design elements, applied across multiple scales and functions to establish a consistent architectural language for the square. Figure 5 illustrates the evolution of this modular concept, translating the identity of the pine tree into a cohesive spatial framework.

A defining feature of the modular concept is its adaptability for prefabrication. By employing standardized triangular modules, a variety of architectural elements—such as seating, pavilions, and pathways—can be produced efficiently, supporting phased implementation in alignment with partial governmental funding. This incremental strategy enables sustainable development without compromising the integrity of the overall design vision. Each construction phase delivers functional outcomes while anticipating future expansion through the same modular system.

Beyond adaptability and cost efficiency, the design promotes long-term sustainability. The modular approach reduces material waste during fabrication and allows components to be reused or repurposed as needed. In doing so, the Alun-Alun Cemara Miagan master plan reflects a commitment to environmental responsibility while remaining responsive to community needs. By integrating symbolic form, modular efficiency, and sustainable

principles, the project positions Alun-Alun Cemara Miagan as a resilient and inclusive public space for the Miagan Village community.

4.1. Modularity on gate design

The gateway serves as the primary entry point to Alun-Alun Cemara Miagan, establishing a welcoming and symbolic identity for the space. Designed using iron pipes proposed by the local community and aligned with the government-approved budget, the structure reflects both local input and financial feasibility. The modular approach facilitates efficient fabrication and construction flexibility, supporting phased implementation. Through the repetition of standardized units, the gateway functions not only as an entrance, but also as a visual emblem of Miagan Village’s communal spirit and aspirations.

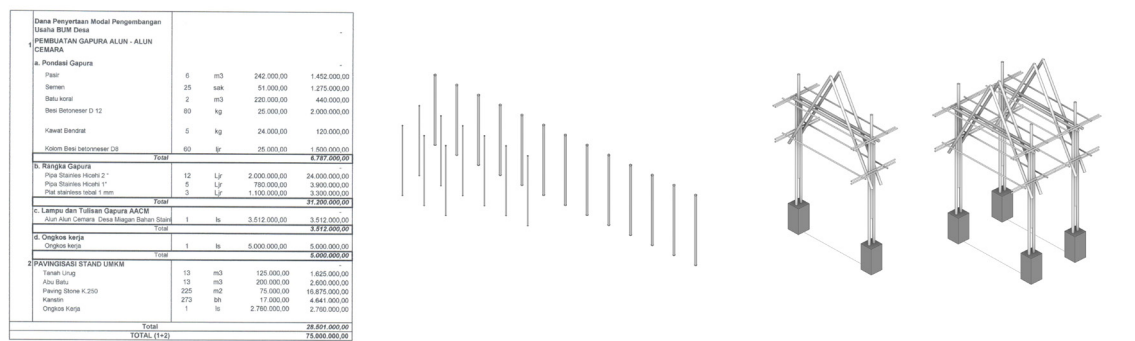


Figure 6. Design based on material availability and future repetition within budget constraints

Beyond its functional role, the modular design creates a spatial transition into the main square. The linear arrangement of modules forms a semi-enclosed corridor that blends enclosure with openness, enhancing the sense of arrival and guiding visitors into the public space. This design strategy reinforces the square’s visual and spatial identity while embodying practicality, aesthetic coherence, and cultural relevance. Figure 6 illustrates the gateway’s design, emphasizing material availability, modular repetition, and alignment with the allocated budget.

4.2. Modularity on canopy design

The modular canopy at Alun-Alun Cemara Miagan is designed to mitigate intense heat while preserving the square’s open character. By blending indoor and outdoor spatial qualities, it creates semi-enclosed zones that enhance comfort and usability without diminishing openness. Built on modular principles, the canopy supports phased construction and future expansion, aligning with the constraints of incremental funding and enabling scalable implementation.

Adapted to the site’s context, the canopy integrates with surrounding pedestrian pathways and accommodates diverse user activities. Its modular configuration allows for flexible placement and adjustment, ensuring responsiveness to evolving spatial needs. Functionally efficient and visually cohesive, the canopy contributes to the square’s identity and sustainability, fostering an inclusive and comfortable environment for public gatherings. Figure 7 illustrates the modular canopy concept, designed to provide thermal comfort while addressing outdoor spatial demands.

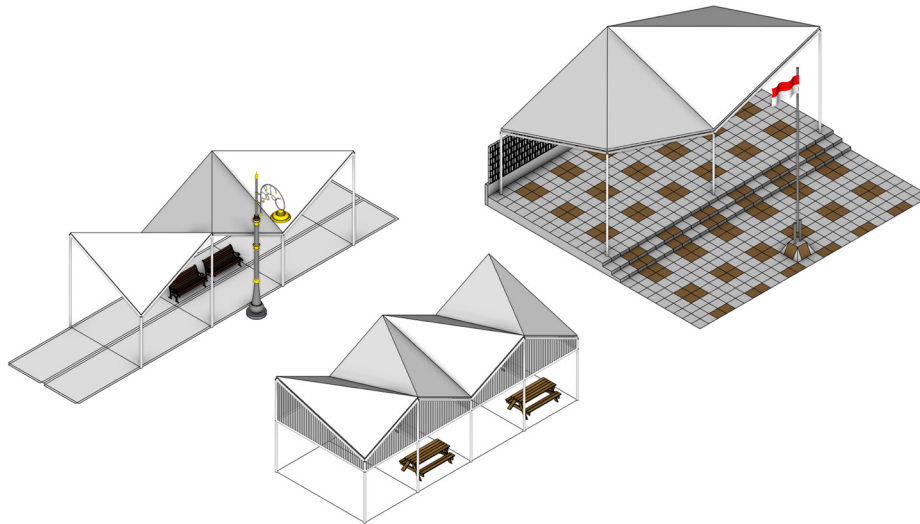


Figure 7. Modular canopy concept for outdoor thermal comfort

4.3. Modularity in building design

The proposed design for Alun-Alun Cemara Miagan features two modular buildings, each tailored to distinct community needs while adhering to phased construction principles. Building 1 functions as a commercial hub for local UMKM/MSME enterprises, with a terrace balcony on the upper level offering scenic views of the square, enhancing its role as both a marketplace and tourist attraction. Building 2 serves as the village office, incorporating administrative spaces and a flexible upper level for communal activities such as performances and rehearsals, promoting inclusivity and cultural engagement.

Both buildings utilize a modular construction system with steel structures and prefabricated components, including uPVC roofing and GRC wall panels. This approach ensures cost-efficiency, minimizes construction waste, and supports streamlined assembly. Phased implementation, beginning with the structural frame, followed by roofing and wall installation, aligns with partial funding availability while maintaining design integrity. The modular strategy enhances adaptability and sustainability, enabling the buildings to evolve with future needs and reinforcing Alun-Alun Cemara Miagan's role as a resilient, multifunctional community hub. Figure 8 illustrates the modular building design, highlighting the open upper level for flexible public use.

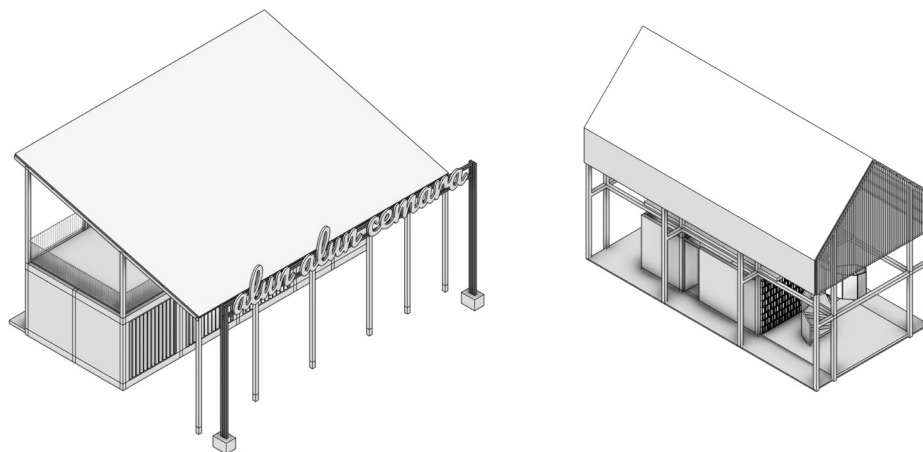


Figure 8. Modular building design with flexible open upper-level space for community use

The design of Alun-Alun Cemara Miagan integrates modularity across its layout to ensure adaptability, sustainability, and phased development. A surrounding pedestrian pathway enhances accessibility and links the modular components, establishing a cohesive spatial framework. At the northern edge, a modular gate marks the ceremonial entrance, reinforcing the square's identity. Strategically placed modular canopies along the pathways provide shading and comfort, enhancing usability while maintaining the open character of the space and contributing to a unified visual language.

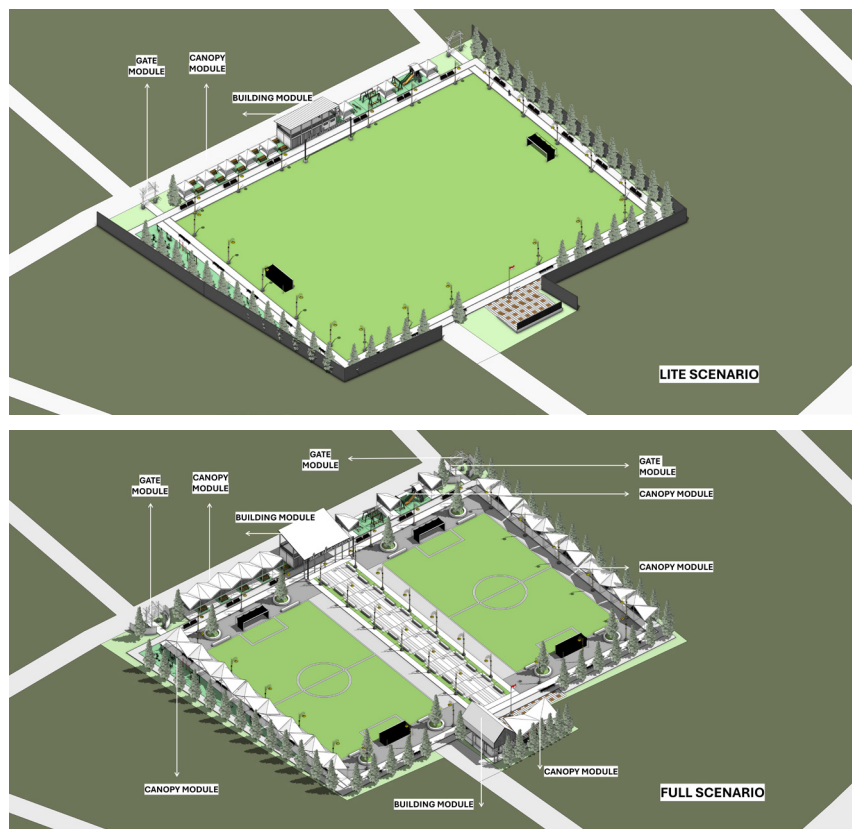


Figure 9. Simple modular application in the square (top); maximal projection of modularity in the square (bottom)

Centrally aligned modular buildings define the square's functional core. To the north, a commercial building supports local MSMEs and features a terrace balcony that activates the space for tourism and leisure. To the south, the village office accommodates administrative functions and includes a flexible upper level for communal activities such as performances and rehearsals. A central ceremonial plaza anchors the axis, reinforcing the square's role as a multifunctional public gathering space. This arrangement fosters inclusivity and reflects a thoughtful balance between spatial function, community identity, and long-term adaptability.

The implementation of Alun-Alun Cemara Miagan's modular design follows a phased approach, accommodating practical constraints such as partial funding. The initial "Lite" phase introduces core structural elements, roofing, and basic functions to ensure early usability, while subsequent phases expand and refine the modular components in line with future funding. This strategy supports economic and environmental sustainability, allowing the square to evolve with community needs. However, early-stage challenges emerged, including incomplete canopy and commercial stall installations due to funding

limitations and construction sequencing, which impacted short-term usability and public perception. Additionally, while prefabricated materials like uPVC and GRC offered cost efficiency, they presented aesthetic limitations and lacked harmony with the local vernacular. These tensions underscore the importance of aligning modular strategies with funding cycles, local craftsmanship, and cultural context. Addressing these considerations in future phases will be critical to achieving both functional performance and symbolic resonance. Figure 9 (top) illustrates the initial application of modular elements, while Figure 9 (bottom) presents the projected full-scale implementation.

The implementation of Alun-Alun Cemara Miagan is proceeding in carefully planned stages, aligned with available budget allocations to ensure steady and feasible progress. Each phase prioritizes the delivery of key modular components while addressing financial constraints and optimizing resource use. Beyond guiding construction, the design proposal functions as a strategic instrument for securing governmental funding, offering a clear and comprehensive framework that demonstrates the project's community impact and alignment with local priorities. This phased approach supports both the practical execution and the broader vision for sustainable, community-driven development in Miagan Village.

5. Conclusion: Modularity as an Inclusive and Adaptable Strategy Within the Participatory Frameworks

The design and implementation of Alun-Alun Cemara Miagan underscore the potential of modularity not only as a sustainable construction strategy but also as a participatory design framework that empowers communities to shape their public spaces. Through a structured process of collaborative ideation, hands-on engagement, and iterative refinement, community members directly influenced key spatial decisions, such as the inclusion of shaded areas, flexible gathering spaces, and commercial stalls. These inputs informed the modular components, ensuring both cultural relevance and functional responsiveness. Modularity enabled the project to navigate phased funding constraints while fostering inclusivity, adaptability, and local agency. The use of prefabricated systems and locally sourced materials further supported regional industries and minimized construction waste.

This study contributes to the discourse on community-based architecture by demonstrating how modularity can facilitate co-creation, incremental development, and long-term resilience. It offers a replicable model for rural and semi-urban contexts where participatory processes and phased implementation are critical. However, the project also reveals certain limitations: reliance on phased funding may lead to temporary underutilization of spaces, and the use of prefabricated materials can initially hinder contextual integration. These challenges highlight the need for ongoing community engagement and adaptive planning.

Future research could explore how digital tools—such as participatory mapping and real-time feedback systems—can enhance modular adaptability and deepen stakeholder involvement. Longitudinal studies may also provide insights into how modular public spaces evolve in response to shifting social, economic, and environmental conditions. Ultimately, this project affirms that modularity is not merely a technical approach, but a participatory ethos—one that enables communities to co-create meaningful, adaptable, and resilient public environments.

Author Contribution

The Alun-Alun Cemara Miagan community service project, undertaken by Petra Christian University, showcases a collaborative effort by three dedicated team members with distinct roles to ensure the project's success. Bramasta Putra Redyantanu played a pivotal role in the design process, conceptualizing and visualizing the layout and architectural elements of the public space. His expertise in architecture brought innovation and creativity to the project, while his commitment to academic and professional excellence was evident in the preparation and publication of detailed reports and materials that captured the essence and progress of the project. By combining technical proficiency and scholarly rigor, Bramasta ensured that the design not only met functional needs but also resonated with cultural and community values.

Meanwhile, Aris Budhiyanto and Agus Dwi Hariyanto brought crucial support and engagement to the project. Aris contributed by meticulously overseeing the administrative and legal aspects, ensuring compliance with regulations, and managing logistical arrangements that facilitated smooth execution. Agus served as a trusted advisor and communicator, bridging the gap between the design team and the local residents. His ability to foster trust and collaboration within the community was instrumental in aligning the project's goals with the villagers' needs and aspirations. Together, this dynamic team embodied a multidisciplinary approach, highlighting the importance of inclusivity, sustainability, and cultural sensitivity in community-oriented architectural endeavors.

Bramasta Putra Redyantanu contributed to the Alun-Alun Cemara Miagan project by conceptualizing its overall design and vision. His role also involved visualizing and refining the architectural designs to ensure they met community needs. Furthermore, he was responsible for preparing academic and professional publications to document the entire design process, serving as the author of the original draft.

Aris Budhiyanto's contributions encompassed several crucial aspects of the project. He was responsible for project administration coordinator, ensuring efficient team coordination and managing all related administrative tasks. His expertise in the legal framework was vital for handling compliance and overseeing regulatory procedures. Furthermore, Aris played a key role in communication with institutional stakeholders, reporting the project's progress and outcomes to LPPM Petra as required by the community service program.

Agus Dwi Hariyanto played a crucial role through his advising and community engagement efforts. He provided essential mentorship and strategic guidance, ensuring the project remained aligned with community objectives. Additionally, he acted as a vital liaison with local villagers, fostering collaboration and gathering valuable feedback to enhance the project's overall success.

Acknowledgment

We extend our heartfelt gratitude to the Miagan Village Government for their support and collaboration throughout the Alun-Alun Cemara Miagan community service project. Their active involvement and guidance were crucial in aligning the project with the needs and aspirations of the local community. We also thank LPPM Petra Christian University for their valuable assistance in coordinating and facilitating the program, ensuring smooth

execution and meaningful outcomes. Your dedication and cooperation were vital to the success of this initiative.

Funding

The Alun-Alun Cemara Miagan community service project received valuable funding and logistical support to ensure its success. The financial assistance covered essential elements such as local transportation and accommodations, enabling smooth coordination and mobility for the project team. Additionally, arrangements for local participant meetings with the Miagan society were made to foster engagement and collaboration, ensuring the project aligned with the community's needs and aspirations. This support was integral to the project's effective execution and meaningful impact.

Declaration of Conflicting Interests

The authors, Bramasta Putra Redyantanu, Aris Budhiyanto, and Agus Dwi Hariyanto, declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. This research was conducted as part of a community service project by Petra Christian University, and the authors' involvement is solely in their capacity as faculty members dedicated to this initiative. Funding for the project, covering aspects such as local transportation, accommodations, and meetings with the Miagan society, was provided to ensure the project's effective execution and meaningful impact. This funding was received to support the logistical and operational needs of the project, and not for the personal financial gain of the authors. All contributions from the authors were made in the spirit of academic and community service, with the primary objective of serving the needs and aspirations of the Alun-Alun Cemara Miagan community.

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Author Biography

Bramasta Putra Redyantanu is a lecturer in architecture at Petra Christian University, Surabaya, and a doctoral graduate from the Universitas Indonesia. His academic interests and research focus on design approaches, urban architecture, and the application of digital technology in architectural design processes. He advocates for the integration of design as both knowledge and practice, believing it can foster various innovations within the field of architecture. Through his research, he seeks to explore new methodologies in design as an expansion of architectural scholarship. (<https://orcid.org/0000-0003-0993-1234>)

Aris Budhiyanto is a lecturer in Architecture at Petra Christian University, Surabaya. He holds a doctoral degree from the National Taiwan University of Science and Technology. His academic interests include green buildings, smart buildings, and building science and technology, with a focus on sustainable and innovative architectural solutions. (<https://orcid.org/0000-0002-4737-6879>)

Agus Dwi Hariyanto is a faculty member of the Architecture Department at Petra Christian University, Surabaya. He holds a Bachelor of Architecture from Universitas Gadjah Mada, a Master of Building Science from the National University of Singapore, and a Doctorate in Architecture from the Institut Teknologi Bandung. He also completed the Professional Engineer Program at Petra Christian University. His research focuses include vernacular architectural tectonics, local seismic culture, building materials, sustainable construction, and thermal comfort. (<https://orcid.org/0000-0001-6772-3834>)