

PANCER JALMA CULTURAL WISDOM: INSPIRING SIGN SYSTEM CONCEPTS DESIGN OF WATU PAYUNG IN GUNUNG SEWU UNESCO GLOBAL GEOPARK

 Diah Natarina*,  Agus Sachari,  Agung Eko Budiwaspada,
 Hafiz Aziz Ahmad

Doctoral Program in Visual Art and Design, Faculty of Arts and Design, Institut Teknologi
Bandung, Bandung, Indonesia

Abstract. Designing and implementing an appropriate sign system as is required for geosites and geoforests within UNESCO Global Geopark members. These geosites and geoforests are managed by local communities, supported by local governments, academics, entrepreneurs and media who collaborate as stakeholders under an area management board. The sign systems employed in geoparks differ substantially from those used in commercial buildings or public facilities, which tend to be visually uniform and often discordant with the natural environment. In contrast, geosites and geoforests are characterized by their geodiversity, biodiversity and cultural diversity, which not only contributes to their unique identity but also requires adherence to freedom of landscape principles. This study introduces a simplified sign system concept, grounded in established theories and refined through practical design exploration. Prototypes derived from this approach were tested through three stages of public respond. The study employed a practice-led research methodology, one of three cycles in an iterative cyclic web, alongside semiotic analysis of urban and industrial sign system compared to geopark sign system. The results on physical material sign system generate first stage of four key concepts based on initial ideas surrounding cultural diversity and community involvement as graphic and information system. The second stage other four key concept formulation focused on the geodiversity and biodiversity of the natural environment as hardware system. The integration of immaterial virtual sign systems offers a dynamic solution, accommodating the complexity of educational content and packaging it within compact, interactive digital devices. These nine concept aligns with the Javanese philosophy of *Sedulur papat kalima pancer, kiblat papat kalima pancer, jalma limpat seprapat tamat* turn to cultural wisdom and abbreviated as “*Pancer Jalma*”. Analysis of signage study in Watu Payung Hutan Turunan, using nine of *Pancer Jalma* Concept's into ten criteria, reveals a gradual reduction of these criteria from geoforest zone, transition zone to public zone. This suggests the *Pancer Jalma* Concept is an effective framework for designing geopark sign systems that are functional, reflect geopark diversity, convey historical significance and prioritize sustainable materials.

Keywords: Diversity, geopark, Pancer Jalma, sign system design, Watu Payung.

Corresponding Author: Diah Natarina, Doctoral Program in Visual Art and Design, Faculty of Arts and Design, Institut Teknologi Bandung, Bandung, Indonesia, Tel.: 0222501214,
e-mail: natarina.diah@gmail.com

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1. Introduction

Indonesia has twenty-four geoparks (Indonesian Geoparks Network, 2024), twelve of them are currently part of the UNESCO Global Geopark recognized as UGGp network. Gunung Sewu UNESCO Global Geopark, which will be referred to in the acronym GSUGGp is one of them (List of UNESCO Global Geoparks and Regional Networks, 2024). Similar to other UGGps, GSUGGp adheres to three fundamental principles:

conservation, education and community empowerment to enhance the local economic level. Related to distinctive uniqueness of geodiversity, biodiversity and cultural diversity had to be owned by the member, GSUGGp has the main theme of geodiversity, acknowledged as karst topography. As shown in Figure 1, at the western end there is a natural attraction known as Watu Payung in Turunan Geoforest, a conserved teak forest part of Gunungkidul Regency. This regency encompasses approximately 46.5% of Yogyakarta Special Region total area.



Figure 1. Map of Gunung Sewu UNESCO Global Geopark (bottom right, green shadow) showing the location of Watu Payung - Turunan Geoforest

Certain types of signage that must be met and applied into a sign system program as in territorial visibility UGGp sub- criteria. There are (1) Permanent signage at museums and info-centers entrance, (2) Geosites interpretation panel, (3) Entrance doors, (4) Road panels, (5) Directional signage, (6) Educational panels is written in the enrollment dossier application to be completed by prospective geopark administrators (Geoparks, 2018). Detailed guidelines for implementing the sign system were not identified within these sub-criteria. Observations across various members of UNESCO Global Geoparks (UGGp) geosites and geoforests within the national scope reveal no consistent methodology for sign system design. A key consideration that must be acknowledged in implementing visibility is the emphasis on freedom of landscape, as articulated Guy Martini served as former Chairperson of the UNESCO Global Geoparks Council (UNESCO Global Geoparks Council, 2024):

Sign system should avoid of creating contamination in a specific wonderful landscape by placing information panels everywhere but substitute the panels by just a sign with a site number and UGGp logo which will give information through QR Code...

The intention of this call is specific and outstanding natural landscapes should be kept away from excessive placement of information signs. This means that sign systems in general are bound by rules and contrast with the environment to function as orientation

and direction media and part of commercial buildings or other public facilities cannot be applied in geopark areas (Martini *et al.*, 2021).

Visibility issues in the UGGp sign system were evident across GSUGGp geosites and geoforests, where existing signs diverged from standard signage principles and the freedom-of-landscape directive. Effective interpretation is essential for visitors, yet local operators lacked clear guidelines for planning and implementation. A structured concept and method are therefore required to guide the selection of design approaches; modern, geodiversity, biodiversity, or cultural diversity and to ensure that signs remain visible when needed but blend into the landscape when not. This capability is limited within local farming communities, particularly in Watu Payung, where operators require assistance. Nonetheless, several western GSUGGp sites have begun applying interpretation panels that incorporate local identity.

This study was further informed by observations of sign-system effectiveness in cultural heritage sites and their role as identity sign in geopark settings. Signage at Borobudur and Prambanan Temples was used as comparative reference due to existing studies. At Borobudur, the sign system supports operational monitoring but requires updates, particularly at entry points (Prameswari *et al.*, 2022). Post-pandemic research at Prambanan reported similar needs for maintenance and improved visitor guidance (Prameswari *et al.*, 2024) with current signage prioritising functionality over local identity. In contrast, Satun Geopark in Thailand employs its sign system to express local distinctiveness and strengthen tourism identity (Nantakat & Vorachart, 2021).

Cultural diversity is a defining characteristic of Indonesia's UGGp members and informed the GSUGGp study's exploration of audiovisual material, particularly the documentary *Kraton Yogyakarta, Pancering Kauripan*. The film illustrates contributions of Sri Sultan Hamengkubuwono I in art, culture, and architecture, demonstrating the integration of Javanese, Hindu, and Islamic traditions within a unified philosophical worldview. In the Yogyakarta Special Region, this worldview is framed by *hamemayu hayuning bawana*, a principle that promotes harmony between humans and the divine, among individuals, and between humans and nature.

The Yogyakarta Palace (Kraton) embodies Javanese philosophical concepts of human origin and consciousness, *sangkan paraning dumadi*, *sedulur papat lima pancer*, and *jalma limpat seprapat tamat*. Its spatial layout reflects the *kiblat papat lima pancer* worldview, positioning the Kraton as the *pancer* (central point) surrounded by *papat* mean the four cardinal boundaries: Gandamanan Village (east), Wira Brajan (west), Pingit–Gandolayu (north), and Krapyak (south). The palace also aligns with Mount Meru symbolism, representing the macrocosm in Javanese cosmology. This integration of cultural, spiritual, and architectural principles highlights the community's worldview, emphasizing harmony between humans, nature, and the microcosm. Sultan, as a human figure, is believed to possess four symbolic siblings; umbilicus, placenta, blood, and amniotic fluid, considered spiritual companions that safeguard one's inner self. This principle reflects the *Sedulur papat limo pancer* concept, a cosmological framework that aligns human existence with the structure of the universe. Four symbolic siblings correspond to the four cardinal directions, forming a quadrilateral philosophy that underscores harmony and balance in Javanese cosmology, where the natural world, the human realm, and the king as leader are understood as parallel and interconnected (<https://www.youtube.com/watch?v=gsSsT0t7GMQ&t=137s>).

2. Method

The study began with a historical assessment of Gunungkidul district and an analysis of its administrative structures, including the roles of local tourism groups and district–subdistrict governance. A cultural review of the Yogyakarta Special Region was undertaken to position the research within regional governance, tourism development, and heritage preservation. Consultations were also conducted with GSUGGp authorities.

The sign system design process drew on Javanese philosophical principles and progressed through practical exploration using a performative Practice-led Research approach (Haseman, 2006). Meanwhile, Chart 1 presents situated within the iterative cyclic web of art and design research (Smith & Dean, 2009).

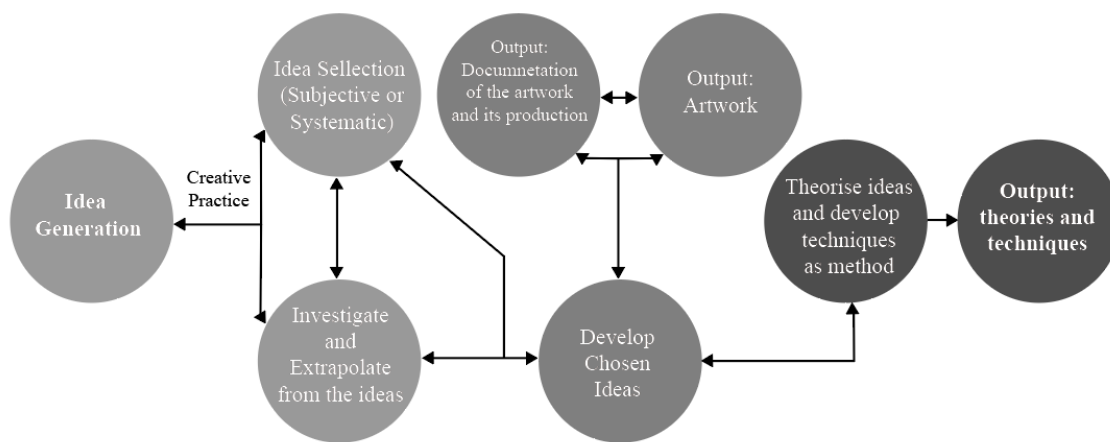


Chart 1. Practice-led Research one third of the iterative cyclic web an art and design research cycle
Source: Smith and Dean (2009)

Creative practice forms the core of this methodology, with collected data establishing the critical context framework. Chart 2 illustrates graphic components such as local typefaces and natural colour palettes drawn from the cultural diversity of the Yogyakarta Special Region, while geodiversity and biodiversity at the site, including karst formations and teak forests, inform the visual and material choices. These three diversities align with the UGGp pillars of conservation, education, and community empowerment, and with Javanese philosophical principles that guide geotourist interpretation. Although global digitalization increasingly shifts wayfinding toward virtual formats, the sign system at Watu Payung in Turunan Geoforest remains predominantly material, reflecting its limited digital exposure.

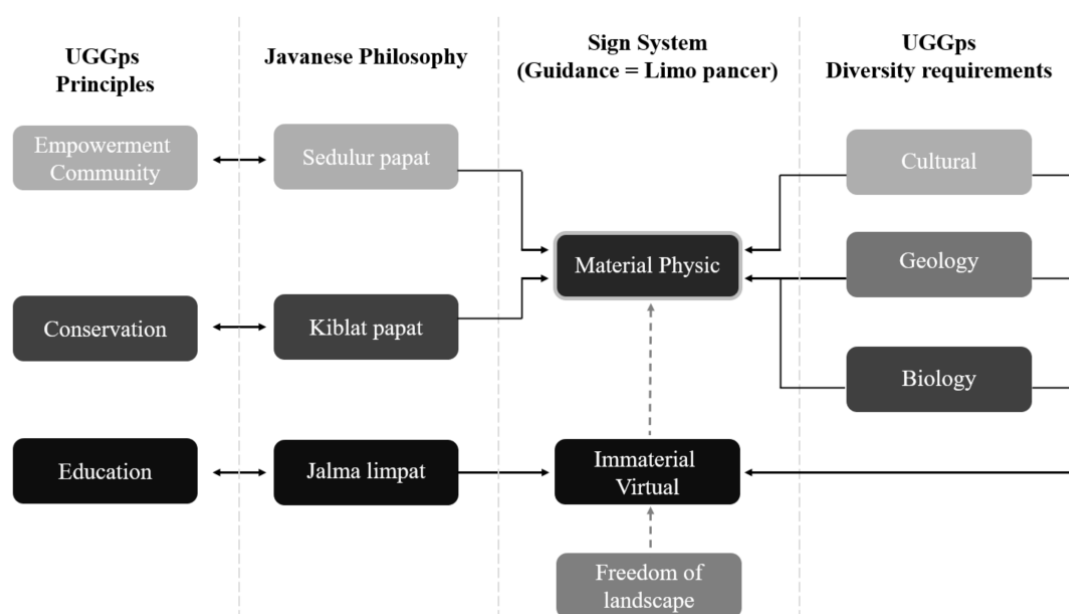


Chart 2. Creative practice that formulates a critical context

The objectivity of the proposed concept is validated through triangulation, similar to the outcome testing in qualitative research. This involves three components there are practice, professional input, and critical context as central to determining outcomes in practice-led research. Focus group discussions and questionnaires were used to gather community responses and assess the effectiveness of the design practice, and the works were later presented at an international exhibition.

3. Discussion

Global civilization is broadly viewed through two cultural spheres: the rational West and the intuitive East, including Indonesia. Eastern societies tend to approach life through intuition, relational sensitivity, and a deep agrarian connection to nature—expressed through metaphors of silence, the sky, seasons, and the earth. Communication often prioritizes non-verbal cues, as seen in traditions such as Zen Buddhism, which questions the limits of language. Javanese aesthetics emerge from this Eastern philosophical base, shaped by Islamic influences, pre-colonial traditions, and later Western interactions. They are symbolic, contemplative, and transcendental, embedding layered meanings within artistic expression. This symbolic dimension is particularly relevant to this study, as it underscores the cultural foundations informing design interpretation (Sachari, 2002).

Symbolic strategies remain essential for communicating ideas while minimizing potentially reactive public responses. In Javanese culture, *pasemon* is a mode of indirect expression through symbolism, allusion, or innuendo invites audiences to infer meaning beyond the literal. This approach is particularly effective when direct communication may provoke resistance or undesirable reactions. In this study, *pasemon* is examined as a culturally embedded strategy within the creative process, particularly in relation to socio-political and cultural dynamics. As a semiotic device, *pasemon* operates through

indirect meaning, enabling critique through symbolic allusion rather than explicit expression. Its historical use in Indonesian Reform-era artworks illustrates how indirect symbolism functioned as a mode of resistance and commentary under authoritarian constraints. Understanding this mechanism clarifies how symbolic strategies shape communicative effectiveness within artistic and cultural practices (Jurriëns, 2023). Scholarly analyses of Wayang Kayon position *pasemon* as an indirect representational strategy that allows multiple interpretations. In this view, *pasemon* operates as a conceptual device that communicates meaning through deliberate ambiguity and symbolic abstraction. Rather than merely stylizing form, it invites the viewer to infer intent through interpretive reasoning, positioning *pasemon* as a cognitive mechanism for encoding and decoding symbolic meaning beyond literal representation (Pramudita *et al.*, 2023).

Kenya Hara and Han Jiaying are influential Asian designers whose work has shaped wayfinding and environmental graphic design. Hara, a Japanese designer and Muji's art director since 2001, advances the concept of "emptiness," drawing on Japanese aesthetics to create minimal environments that encourage user engagement. His approach is exemplified in the Dashilar district project in Beijing, where he developed a visual identity and wayfinding system integrated with its urban context (Hara *et al.*, 2018). Han Jiaying, a Chinese graphic designer and founder of Han Jiaying Design & Associates, integrates traditional Chinese cultural motifs with contemporary design practice. His environmental graphic work features bold, functional signage systems for major urban developments, combining local heritage with modern principles to enhance public wayfinding. Together, his contributions illustrate how cultural continuity can be effectively synthesized with contemporary design methodologies (www.hanjiaying.com).

In contemporary urban and industrial contexts, sign-system design is typically subordinated to functional demands, emphasizing high contrast and rapid legibility. This reflects modern aesthetics, which privilege function over form and often position the two in binary opposition. However, the critical-context framework applied in formulating the Watu Payung sign-system concept demonstrates that form and function operate not as competing forces but as parallel and complementary components. This study was informed by a discussion among three women designers and employs semiotic analysis to examine how women's embodied experiences influence design practice. The findings highlight how social constructions shape visual representation and how women designers negotiate, challenge, and reconfigure dominant semiotic binaries that traditionally subordinate or objectify women in design (Agustin *et al.*, 2024).

The sign system currently installed in the GSUGGp landscape reveals a gap between its functional execution and the critical context framework, which integrates regulatory requirements, cultural philosophy, and geopark principles prior to form development. Addressing this discrepancy requires a theoretical approach that aligns contextual considerations with functional needs. While the existing system operates primarily at the denotative level, the proposed design concept introduces layered connotative meaning, enabling deeper symbolic interpretation within the geopark environment.

Barthes' two-tiered semiotic framework distinguishes denotation as the sign's primary, literal meaning and connotation as its secondary, culturally shaped meaning. This layered structure illustrates how denotative messages are extended through connotative associations that generate broader cultural myths and social values (Piliang,

2003). According to Barthes, connotation may develop into myth when culturally produced meanings become naturalized and perceived as self-evident. Myth, as a second-order semiological system, transforms first-order signs into signifiers within a broader ideological framework, reinforcing dominant social values while masking their constructed nature (Barthes, 1991)

3.1. Process & Experiment

Creative practice progressed from idea generation that establishes the critical context in practice-led research proceeds to the phase of systematic idea selection and investigate and extrapolate from ideas. The geopark sign-system design integrated the freedom-of-landscape principle, UGGp guidelines, and the site's geological, biological, and cultural diversity. Design elements were classified and aligned with Javanese philosophical principles to develop a context-specific visual language. Provincial regulation article 27 paragraph 2, requires the use of Javanese script for branding (PERGUB DIY, 2023), while universal typefaces remain for mapping. The information and hardware systems combine local cultural identity with universal accessibility, drawing on natural and geological materials in accordance with UGGp visibility requirements. Within this critical context, nine concepts derived from Javanese philosophical frameworks of *Sedulur papat kalima pancer* (Table 1), *kiblat papat kalima pancer* (Table 2), and *jalma limpat seprapat tamat* (Table 3) were synthesised into three clusters to guide idea refinement, culminating in the formulation of the *Pancer Jalma* Concept.

Table 1. *Sedulur papat kalima pancer* aligns with four concept information sign system components

Local cultural heritage elements from each geosite or geoforest are incorporated into the information signage to reflect community commitment to authenticity and cultural sustainability			Applications at Watu Payung - Turunan Geoforest
1	Geosites/geoforests brands featuring elements of the local arts and crafts traditions	Traditional script	Javanese script
		Natural colours refer to the surroundings and the vernacular of traditional local art	Lantana camara's vivid hues and natural batik dyes may complement the base palette of green, brown, and dark grey
		Local ornament	Batik from Gunungkidul
2	The titling and geosite/geoforest branding prioritise manual, spontaneous lettering, while universally legible typefaces are used for informational text and descriptive content	Information	The primary message limit for pedestrian level
		Direction	The primary message limit applies to pedestrian and medium-speed vehicle levels
		Prohibition	Refer to the regional authority that is responsible for disaster management.
3	Local art, culture and craft heritage objects as part of the signage	Artwork	Mask, bamboo basket, architectural elements
		Conventional tools for work	<i>Luku, gejak lesung</i>
4	Intangible local art, culture and craft heritage	Traditions in agricultural, architecture and landscaping methods.	<i>Joglo</i>
		Art and cultural heritage	Ancient scripts and ancestor wisdom

Table 2. *Kiblat papat kalima pancer* aligns with four concept location and hardware sign system components

Using natural, geological, and biological features as tangible elements of the geosite sign system enhances visitor connection with the environment			Applications at Watu Payung - Turunan Geoforest
1	Administrative zones	Geopark as a macro-region	Gunung Sewu UGG
		Geosites/geoforests as micro-region	Watu Payung - Turunan Geoforest at Giri Suko Village
2	UGGp visibility sign system designation and recommended consolidation of signage types positioned in close proximity within geosite landscapes	Permanent signage at museums and info-centers entrance	Entrance gate on the side of the Turunan Village Road
		Geosites interpretation panels	Located on the same side as the entrance gate
		Entrance doors	Possible to construct
		Road panels	Road panels are required at key points in the public and transition zones leading to Watu Payung
		Directional signage	Directional signage is required at several locations within Watu Payung
		Educational panels	Educational panels are required along trails and in information centers, with QR codes linking to extended information
3	Maintenance must consider terrain contours and the distance between the command post and sign placements	Coast, plains, mountains (exokarst)	Conservation forest planted with teak trees on karst hills
		Caves (endokarst)	
4	Optimizing the use of indigenous natural materials and natural lighting for sign systems in underground, open-terrain, and coastal areas	Natural lighting by day and a natural-light effect at night	Lighting assistance is required at dawn, while natural daylight is used optimally
		Predominantly uses biological and geological materials over industrial products	Hollow karst, bamboo and various woods other than teak.

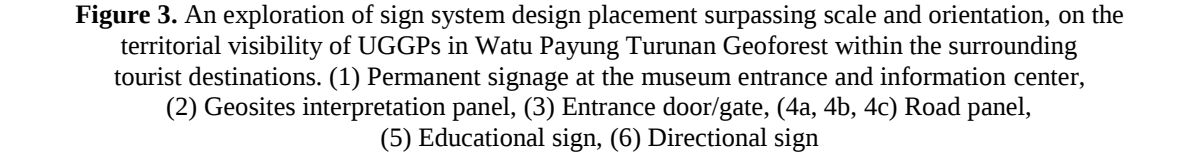
Table 3. *Jalma limpat seprapat tamat* align with concept virtual immaterial media sign systems

The community adopts virtual, immaterial sign systems in line with technological advancements. These media disseminate secondary information and help reduce visual pollution within conservation areas.		Applications at Watu Payung Turunan Geoforest
The complexity of educational material about the geodiversity, biodiversity and cultural diversity of a geosites/geoforests is packaged into a compact, concise and interactive device using digital technology.	Virtual Reality	
	Augmented Reality	
	Geo tagging	V
	Audio sensor to motion object	
	QR Code/Bar Code	V
	Face recognition	
	Interactive display	
	Websites	V
	Social media applications	V



Figure 2. The traditional Limasan house, *gejok lesung* and *luku* farming tools, karst topography of Watu Payung - Turunan Geoforest and hollow karst

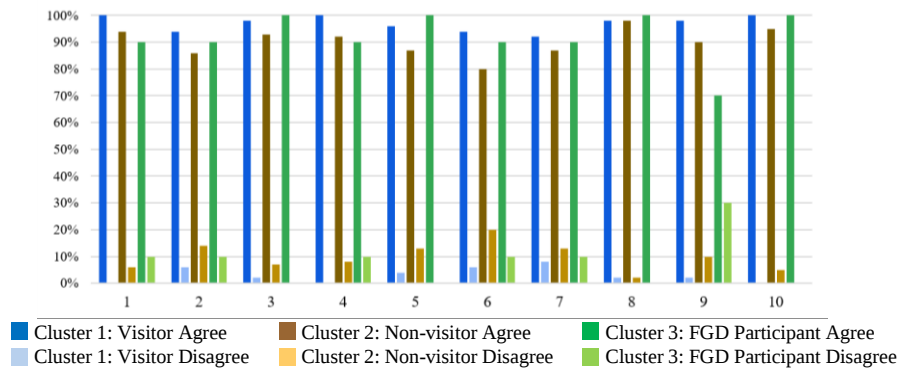
The nine concepts grounded in Javanese philosophy guide the systematic idea-selection phase, followed by the inclusion of local cultural elements—such as batik, *gejok*, *lesung*, and *luku*—to reflect cultural diversity. Biodiversity is represented through teak, jackfruit, rosewood, and bamboo, while geodiversity is expressed through hollow karst stone as illustrated in Figure 2. Although one design practice concept is adopted, an alternative approach is retained to allow iterative refinement. This phase corresponds to the phase of investigate and extrapolate from ideas. During the design practice, three conceptual approaches; modern design, geodiversity, biodiversity, and cultural diversity were explored. During sketching, opportunities to merge cultural, geological, and biological concepts emerged, generating more than seventy sketches. The final design was selected based on the critical context and natural conditions to meet UGGp visibility requirements across eight placement points and six sign types. These included (1) Permanent signage at the museum entrance (2) Geosites interpretation panels (3) Entrance gates using the concept of cultural and geodiversity, (4a) Road panel signs with some adhering to local authority rules, (4b, 4c) Road panel sign using the concept of biodiversity, (5) Educational signs using the concept of biodiversity and geodiversity, and (6) Directional signs using the concept of biodiversity. Eight design practices were presented to a focus group consisting of professionals, cultural experts, teachers, geosites managers, students, and representatives from the regional secretary and regional development planning agency of Gunungkidul. This first stage of triangulation led to a consensus among the panelists that the proposed sign system concepts aligned well with the critical context and UGGp visibility requirements. The design categorization was systematically divided into two location-based groups. The first group focuses on the road panels at public and transition zone to Watu Payung Turunan Geoforest zone (4a, 4b, 4c). The second group covers the signage within the site (1, 2, 3, 5, 6). The area's topography transitions from a sloping terrain to a steeper surface with teak forests. A prominent feature in the center is a large limestone formation resembling an umbrella situated in front of a *Joglo*, a traditional Javanese hall construction. In Javanese *Watu* refers to stone, and *Payung* refers to umbrella.



In the second triangulation stage, the permanent signage and educational panel designs were assessed through e-questionnaires involving three respondent groups: ten focus group participants, fifty visitors to Watu Payung at Geoforest Turunan, and one hundred members of the general public. This stage was critical for concept refinement. The results are presented in (Table 4) and (Table 5), while the prototype implementations are shown in Figure 5 and Figure 6.

Table 4. Respons of Permanent Sign on Museum Entrance and Information Center

No	Remarks	Cluster 1 Visitor		Cluster 2 Non-visitor		Cluster 3 FGD Participant	
		Agree	Disagree	Agree	Disagree	Agree	Disagree
1	Permanent signage allow Watu Payung easy to recognize	100%	0%	94%	6%	90%	10%
2	The location of signage placement is well placed	94%	6%	86%	14%	90%	10%
3	Permanent signage prominently indicates name of the place	98%	2%	93%	7%	100%	0%
4	Letters on permanent signage represent character of local community	100%	0%	92%	8%	90%	10%
5	Color of permanent signage blends with its surroundings	96%	4%	87%	13%	100%	0%
6	Placement of name and other elements are balanced	94%	6%	80%	20%	90%	10%
7	Permanent signage implies meaning	92%	8%	87%	13%	90%	10%
8	Placement by being raised on ground is visually legible	98%	2%	98%	2%	100%	0%
9	Signage height does not obstruct views of the surrounding area	98%	2%	90%	10%	70%	30%
10	Material of signage is suitable for the environment	100%	0%	95%	5%	100%	0%

**Figure 5.** Response of permanent sign on museum entrance and information center prototype**Table 5.** Respons of Education Panel

No.	Remarks	Cluster 1 Visitor		Cluster 2 Non-visitor		Cluster 3 FGD Participant	
		Agree	Disagree	Agree	Disagree	Agree	Disagree
1	Education panel fulfils functional requirements	96%	4%	86%	14%	100%	0%
2	Location of educational panel is appropriate	92%	8%	74%	26%	90%	10%
3	Directions, messages, and information are understandable	100%	0%	91%	9%	100%	0%
4	The font on the education panel is legible	100%	0%	90%	10%	90%	10%
5	Colours and materials of the educational panels are in accordance with the surrounding environment	100%	0%	90%	10%	100%	0%
6	Layout of the information on educational panel looks balanced	88%	12%	73%	27%	90%	10%
7	Educational panel implies meaning	98%	2%	85%	15%	100%	0%
8	For easy viewing, the placement of the above-ground educational panel is fit for purpose	94%	6%	73%	27%	90%	10%
9	Size of educational panel does not obstruct the view	96%	4%	92%	8%	80%	20%
10	Orientation map on educational panel provides clear information	96%	4%	90%	10%	100%	0%

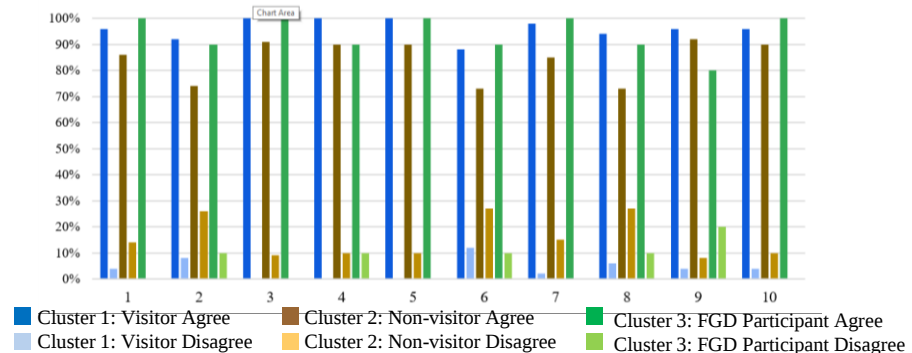
**Figure 6.** Respons of educational panel prototype



Figure 7. Scientific exhibitor part of the 5th Geotourism Festival & International Conference 2024
Mataram, Lombok, West Nusa Tenggara, on July 4-6, 2024

The third stage of public assessment was conducted at the 5th Geotourism Festival & International Conference 2024, themed “Volcano as a World-Class Sustainable Geotourism Destination.” The study was exhibited through scientific posters, prototype educational panels, and process-based video presentations as shown in Figure 7. The event included representatives from UGGp management communities in Indonesia, Malaysia, and the Philippines, local government officials, and scientists from Indonesia and Australia, with additional participation from the global geopark community online. Discussions with visitors indicated that developing a geosite sign system is perceived as less complex than expected. The findings suggest that effective sign-system development can utilise indigenous materials available within geosites and geoforests while integrating local cultural identity.

3.2. Analysis

The Signage Pyramid framework, widely applied in design practice and academic research, comprises three core systems: the graphic system, the information content system, and the hardware system. These systems collectively encompass 27 distinct contents and 110 sub-contents. A comprehensive application of this theory, however, demands a multidisciplinary understanding to discern its relevance for specific applications (Calori & Vanden-Eynden, 2015). For many geosite and geoforest operators, often from suburban backgrounds, this theory can appear daunting. Integrating nine concepts grounded in Javanese philosophy helps simplify its application. An intersection analysis revealed that 39 sub-contents in line with both frameworks, 9 sub-contents provide flexibility, while 18 sub-contents conflict with the 'freedom of landscape' principle. An additional 44 sub-contents potential for deepening integration aligned with *Pancer Jalma* Concept, enhancing the use of digital media in immaterial sign systems (Table 6).

The relationship between form and function is examined by comparing existing sign systems in GSUGGp geosites and Watu Payung–Turunan Geoforest with design practices informed by Javanese philosophical principles. This analysis aligns with semiotic theory, in which denotative meanings (D) expand into connotations (C) that shape cultural myths (M) and social values. This layered meaning-making supports both functional sign-system design and the integration of cultural symbolism within the environment (Table 7, 8 & 9). A comparative assessment evaluates the existing hardware systems against the proposed design incorporating the *Pancer Jalma* Concept.

Table 6. Intersecting Signage Pyramid theory with *Pancer Jalma* Concept

Signage Pyramid theory	Content	Sub Content		Score on intersecting with nine concepts			
		Description	Items	Inline	Against	Optional	Deepen
Information Content System	1. Types of Sign Information Content	Identification, Directional, Warning, Regulatory, Operational, Honorific, Interpretive.	7				7
	2. Hierarchy of Content	The higher up a sign is displayed, within limits, the more visually prominent.	3	3			
	3. Developing the Sign Information Content System	Before & at decision point and at destination. Consistent and concise, abbreviations used in type of sign when they are highly recognized.	5	4	1		
	4. Navigation	Destinations need to be organized on hierarchy & proximity bases.	7	3		2	2
	5. Other Factors Affecting Content	Diffable sign, outdoor and indoor sign, language used.	5		1		4
	6. Pictorial Information Content	Symbols and diagram.	2				2
	7. Signage Master Plans	Planned environment full buildout.	1	1			
Graphic System	8. Choosing a Typeface	Formal suitability, stylistic longevity, legibility, authority guidelines.	4	4			
	9. Typographic Treatment	Spacing treatment. ALL UPPERCASE (CAPITALS or CAPS), Title Case (Initial Caps), Sentence or mixed case, all lowercase.	6				6
	10. Symbols and Arrows	Symbol vocabularies and arrow.	2	1		1	
	11. Diagrams	Stylistic treatment of maps and map orientation.	2				2
	12. Color	Color that to stand out from or blend in with the sign environment, to augment the meaning of sign messages, to distinguish messages from one another and to be decorative.	4		1		3
	13. Color Selection Considerations	Color-coding, color palette sources.	2		1	1	
	14. Layout	Sizing typography for viewing distance. Proportion of symbols and arrows in relation to typography. Position of symbols and arrows in relation to typography. Spacing around and between graphic elements. Layout format proportions. Authority guidelines.	4	1			3
		Flat graphics: Full-color digital imaging, vinyl decals, screen printing, porcelain enamel, hand painting.	5	1	1	3	
		Raised Graphics: cut solid graphics, fabricated graphics, cast metal graphics, cast plastic graphics, photopolymer, raster, 3D printing.	7				7
	15. Graphic Application	Incised Graphics: sandblasted graphics, acid etched graphics, engraved or routed graphics, hand carving	4	2	1		1
Hardware System	16. Shape	Freestanding or ground-mounted, suspended or ceiling-hung, projecting or flag-mounted, flush or flat wall-mounted. Vocabulary of basic sign shapes based on geometry in front elevation and on geometry in plan.	5	5			
	17. Connotations of Form	3D aspect of signage has powerful stylistic connotations rather than communicate information in a denotative way. Some front elevation sign shapes are inherently traditional or contemporary.	2	1	1		
	18. Unity	A single sign or type of sign or creates unity of form within a sign family's hardware system.	2	1	1		
	19. Sign Mounting	Overhead and eye-level mounting zones. Architectural and site factors affecting mounting.	2	1	1		
	20. Sign Size	Overall size, depth proportion and scale	3	3			
	21. Sign Lighting	External illumination, internal illumination, non-illumination	3	2			1
	22. Sign Materials	Materials as your muse, unity of materials, materials – processes and size.	4	2	1	1	
	23. Basic Sign Materials	Metals, plastics, glass, wood, fabrics, masonry, adhesives and fasteners	7	3			4
	24. Electronic Digital Display Units	Digital signage, interactive kiosks, mobile devices	1				1
	25. Stock Sign Hardware Systems	Pros: ease of changeability and maintenance, design cost savings, manufacturing cost savings. Cons: stylistic limitations, size limitations, quality	6		6		
	26. Codes on Sign Materials	Choice of materials is limited by local regulations and building material usage rules.	1				1
	27. Sign Coatings and Finishes	Coatings: paints and clear coatings, powder coatings, porcelain enamel, patinas and oxide coatings, plastic and vinyl films. Finishes: metal finishes, plastic finishes, glass finishes, stone finishes	4	1	2	1	
Summary			110	39	18	9	44

Table 7. Comparison issue on installed sign with design practice on Road panel sign

Type of signage	Road panel sign	Review
Mulo Stone Showcase Gunungkidul		The Department of Transportation and Public Works uses blue and green for road panels in villages and cities, while the Department of Tourism uses brown for tourist spots, like Stone Park in Mulo Village. These signs are placed on round iron poles with aluminum panels and reflective stickers (D). Stone Park is located by a sub-district road leading into rural areas. There is a noticeable difference between surrounding environment and road panel signs, reflecting road's status as sub-district public road rather than rural one, marking it as part of the public zone instead of a transition zone (C).
Watu Payung Turunan Geoforest		At the crossroads of Girisuko Village, located in the transition zone, multiple road panel signs direct to the same and various destinations. Each sign exhibits distinct visual characteristics (D). Due to the lack of oversight by local authorities, the signs vary widely in style and form, contributing to visual clutter in the landscape (C). The lack of regulated design shows a disconnection from nature's harmony, which could otherwise guide and enhance the organization and appearance of road panel sign (M).
Proposed design concept		The road-name sign is constructed from industrial materials, brown-coated aluminum panels, steel poles, and a concrete foundation. Arrows and text use universal typefaces in reflective white vinyl (D). Positioned at a junction between district and village roads, the sign remains visually prominent while maintaining a degree of harmony with the natural surroundings (C). Its function is to guide drivers in making immediate directional decisions (M).

Table 8. Comparison issue on installed sign with design practice of Permanent Sign on Museum Entrance and Information Center

Type of signage	Permanent sign on museum entrance and information center	Review
Karst Museum Wonogiri - GSUGGp		The identity sign, made from red industrial material and arranged in a semicircle at human height, features a universal font. A smaller font is used for the Information Centre sign, placed above the door (D). This red sign is hard to read, indicate insufficient consideration of cultural integration and user experience in the signage design and planning (C).
Watu Payung Turunan Geoforest		The information center resembles an unused building. The name of the natural attraction is written in colorful, on a molded cement sign (D). It gives the appearance of a children's playground. The management requires assistance in designing an information center that aligns with the area's overall concept and purpose (C).
Proposed design concept		A joglo structure supports the information center sign and area map, complemented by tampah and gejak lesung. Jackfruit-wood panels are mounted on karst rocks, with the site name rendered in handwritten-style lettering and Javanese script in line with local and UGGp regulations (D). The joglo references Kraton architectural authority (C), while the inclusion of gejak lesung invites visitor interaction and recalls pre-conservation agricultural traditions (M).

Table 9. Comparison issue on installed sign with design practice on Education panel

Type of signage	Education panel	Review
Mulo Stone Showcase Gunungkidul GSUGGp		This educational panel explains the fossilized boulders that stand behind. Description in gold on light grey alabaster stone no contrast between the written message and the background color (D). This educational panel has fulfilled the requirements for ease of maintenance and material strength. It was agreed to be integrated with the environment, but visitors will be unaware of the educational panels placed on the platform. The education panel appears more as a stone block that blends in with the courtyard, more accurately called camouflage (C).
Watu Payung Turunan Geoforest		The educational panel is mounted on a single pole, made from industrial materials, standing at half-human height to avoid obstructing the surrounding landscape (D). The black text on a white base ensures excellent readability. While the panel effectively serves its educational purpose, its universal design lacks distinctiveness and fails to reflect the specific identity of the natural attraction, giving no indication that it is uniquely designed for this location (C).
Proposed design concept		The panel structure is designed to follow the karst rock formations of the teak forest terrain. The message board, made from jackfruit wood, displays maps, text, place names, Javanese script, and mandatory information printed in white on non-glare stickers for clarity (D). This use of local geodiversity and biodiversity demonstrates an intent to optimize sustainable materials while integrating the signage into its natural setting (C). The design emphasizes environmental harmony and visual camouflage, balancing form and function without relying on industrial materials that could disrupt ecological integrity (M).

Table 10. Analysis of *Pancer Jalma* Concept on Road panel sign

Installed Road panel sign Mulo Stone Showcase Gunungkidul GSUGGp	<i>Sedulur Papat</i> - Traditional script. Natural colours refer to the surroundings and the vernacular of traditional local art. Local ornament. (S1) - Information. Direction. Prohibition. (S2) - Artwork. Conventional tools for work. (S3) - Traditions in agricultural, architecture, and landscaping methods. Art and cultural heritage. (S4) <i>Kiblat Papat</i> - Geopark as a macro-region. Geosite/geoforest as micro-region. (K1) - Permanent signage at museums and info-centers entrance. Geosite interpretation panels. Entrance doors. Road panels. Directional signage. Educational panels. (K2) - Coast, plains, mountains (exokarst). Caves (endokarst). (K3) - Natural lighting during the day and the impression of natural lighting at night. The predominant utilization involves biological/ geological materials, surpassing the use of industrial product (K4) <i>Kalima Pancer</i> Physical material sign system (KP) <i>Jalma limpat seprapat tamat (J)</i> Virtual Reality. Augmented Reality. Geo tagging. Audio sensor to motion object. QR Code/Bar Code. Face recognition. Interactive display. Websites. Social media applications.	Proposed Road panel design concept
		
3	Score	3

Table 11. Analysis of *Pancer Jalma* Concept on Education Panel

Installed Education Panel Sign Watu Payung Turunan Geoforest		Proposed Education panel design concept
	Sedulur Papat - Traditional script. Natural colours refer to the surroundings and the vernacular of traditional local art. Local ornament. (S1) - Information. Direction. Prohibition. (S2) - Artwork. Conventional tools for work. (S3) - Traditions in agricultural, architecture, and landscaping methods. Art and cultural heritage. (S4) Kiblat Papat - Geopark as a macro-region. Geosite/geoforest as micro-region. (K1) - Permanent signage at museums and info-centers entrance. Geosite interpretation panels. Entrance doors. Road panels. Directional signage. Educational panels. (K2) - Coast, plains, mountains (exokarst). Caves (endokarst). (K3) - Natural lighting during the day and the impression of natural lighting at night. The predominant utilization involves biological/ geological materials, surpassing the use of industrial product (K4) Kalima Pancer Physical material sign system (KP) Jalma limpat seprapat tamat (J) Virtual Reality. Augmented Reality. Geo tagging. Audio sensor to motion object. QR Code/Bar Code. Face recognition. Interactive display. Websites. Social media applications.	
6	Score	9

A visual analysis using the *Pancer Jalma* Concept compared two prototypes from six UGGp territorial visibility types with installed signage of the same category. Both the prototype and installed road panel signs scored three of ten criteria, indicating that the concept has limited influence in public-zone contexts (Table 10). The installed educational panel scored six, while the prototype scored nine (Table 11). The higher score reflects the prototype's strong alignment with the *Sedulur papat* component, which enhances the information content system. Although the installed panel met the *Kiblat papat* location and *Kalima pancer* material criteria, the remaining components were insufficiently addressed. Consequently, the installed panel remains functional but does not fully align with UGGp territorial visibility requirements that integrate geological, biological, and cultural diversity.

Educational panels, the smaller in scale prototype, placed farther from the management office, and distributed across multiple points, would require the integration of local landscape practices, such as teak tree planting patterns, to reinforce cultural diversity within the *Sedulur papat* component. Its score of nine demonstrates strong adherence to the *Pancer Jalma* Concept and its effectiveness in enhancing territorial visibility.

4. Conclusion

In Girisuko Village within the Turunan Geoforest, the Watu Payung attraction is managed by a local farming community through a tourism awareness group. As residents of the Yogyakarta Special Region, they follow the Sultan's leadership and Kraton regulations grounded in Javanese tradition. These traditions, preserved in sacred script, guide harmonious relations with nature and foster gratitude to the Almighty, shaping a balanced way of life. Influences from Buddhist teachings, including Zen, have long permeated Eastern cultural practice, informing local perspectives on daily life, architecture, and design. This philosophical foundation supports a flexible interpretation of the freedom-of-landscape principle in shaping GSUGGp's territorial visibility.

Established professional sign-system theories often do not align with the local farming community that manages the geosites. To address this gap, a simplified design approach was developed using nine core Javanese philosophical concepts *Sedulur papat kalima pancer*, *kiblat papat kalima pancer*, and *jalma limpat sprapat tamat* as a culturally grounded framework for practice. This model offers an accessible reference that reflects both environmental and cultural contexts. *Sedulur papat* represents four dimensions of cultural diversity and community empowerment, while *kalima pancer* denotes the physical sign system. *Kiblat papat* corresponds to geodiversity, biodiversity, and conservation principles, with its *kalima pancer* guiding signage placement. *Jalma limpat* serves as an analogy for educating visitors, and *srapat tamat* represents the virtual sign system. Community-based empowerment, aligned with geopark conservation pillars, supports the balanced use of natural materials for physical signage and the careful curation of educational content for digital platforms. In this framework, the sign system operates as the pancer the central guide while visitors, as *jalma limpat*, receive contextual knowledge through virtual media. Although simplified in form, this structure enables deeper comprehension of *srapat tamat*, forming the culturally rooted "*Pancer Jalma*" design approach.

Derived from the integration of geological, biological, and cultural diversity in Watu Payung Turunan and grounded in Javanese philosophical principles of *Sedulur Papat Kalima Pancer*, *Kiblat Papat Kalima Pancer*, and *Jalma Limpat Seperapat Tamat*, the concept aligns with UNESCO Global Geopark sign-system standards while remaining consistent with established signage theory. This situates the *Pancer Jalma* Concept between corporate identity systems, which rely on high contrast and consistency, and conservation-based systems, which adapt to the landscape.

The concept extends beyond signage to support architectural and landscape planning, enabling holistic territorial visibility that reinforces cultural identity and environmental sustainability. The virtual immaterial sign system remains adaptive, allowing continuous updates within conservation areas and supporting the shift toward digital interpretation. This approach facilitates timely replacement of physical signage, encourages community-driven updates to information systems, and promotes environmentally integrated signs made from natural materials. By minimizing reliance on industrial products, the design maintains harmony with the landscape remaining unobtrusive when inactive yet visible when needed while upholding the conservation values central to UNESCO Global Geoparks.

References

- Agustin, S.A., Saidi, A.I., Damajanti, I. & Ahmad, H.A. (2024). Semiotic analysis of embodiment in the design of Indonesian women designers. *New Design Ideas*, 8(2), 433-447. <https://doi.org/10.62476/ndi82433>
- Barthes, R. (1991). *Mythologies*. Noonday Press, 83.
- Geoparks, U.G. (2018). Application dossier for UNESCO Global Geoparks. UNESCO, 9.
- Han Jiaying Design & Associates (2004). www.hanjiaying.com
- Hara, K., Kawanami, H., Saito, H., Takimi, S., Tanaka, R. & Yang, F. (2018). Dashilar VI application sign system Dashilar, Beijing, 2013 Hara Design Lab. Lotus International, January (167), 98-101.
- Haseman, B. (2006). A manifesto for performative research. *Media International Australia*, 118(1), 98-106. <https://doi.org/10.1177/1329878x0611800113>
- Indonesian Geoparks Network. (2024). List of geoparks in Indonesia: UNESCO Global Geoparks, National Geoparks, and Aspiring Geoparks. <https://www.geoparksnetwork.id/> (Accessed November 15, 2025)
- Jurriëns, E. (2023). Reconnecting with the urban vernacular through post-new order visual art. *Journal of the Humanities and Social Sciences of Southeast Asia*, 179(2), 175-215. <https://doi.org/10.1163/22134379-bja10052>
- Kraton Yogyakarta, Pancering Kauripan (2022). Paniradya Kaistimewan. <https://www.youtube.com/watch?v=gsSsT0t7GMQ&t=137s>
- List of UNESCO Global Geoparks and Regional Networks (2024). <https://www.unesco.org/en/igpp/geoparks>
- Martini, G., Zouros, N., Zhang, J., Jin, X., Komoo, I., Border, M., ... & Sá, A.A. (2021). UNESCO Global Geoparks in the world after: A multiple-goals roadmap proposal for future discussion. *Episodes*, 45(1), 29-35. <https://doi.org/10.18814/epiugs/2021/021002>
- Nantakat, B., Vorachart, V. (2021). Designing tourism identity communication in satun UNESCO Global Geopark. *Geojournal of Tourism and Geosites*, 35(2), 275-281. <https://doi.org/10.30892/GTG.35202-648>
- PERGUB DIY (2023). Peraturan Gubernur (PERGUB) Provinsi Daerah Istimewa Yogyakarta Nomor 43 Tahun 2023 tentang Peraturan Pelaksanaan Peraturan Daerah Daerah Istimewa Yogyakarta Nomor 2 Tahun 2021 tentang Pemeliharaan dan Pengembangan Bahasa, Sastra, dan Aksara Jawa. 5–24. http://repo.iain-tulungagung.ac.id/5510/5/BAB_2.pdf
- Piliang, Y.A. (2003). *Hypersemiotics: Cultural Studies' Interpretation of the Death of Meaning*. Yogyakarta: Jalasutra, 346.
- Prameswari, N.S., Cahyono, A., Subiyantoro, S. & Haryanto, E. (2022). The sign system at the Borobudur temple: Effectiveness during the Covid-19 Pandemic. *Journal of the International Society for the Study of Vernacular Settlements*, 9(3), 57-74.
- Prameswari, N. S., Cahyono, A., Subiyantoro, S., & Haryanto, E. (2022). The Sign System at the Borobudur Temple: Effectiveness during the Covid-19 Pandemic. *Sign*.
- Pramudita, P., Sarwanto, S., Soetarno, S. & Pratama, D. (2023). The landscape perception as pasemon artistic in Wayang Kayon figure. *Journal of Mudra*, 38(2), 113-119. <https://doi.org/10.31091/mudra.v38i2.2096>
- Sachari, A. (2002). *Aesthetics: Meaning, Symbols and Power*. ITB Publisher, 205. (In Indonesian).
- Smith, H., Dean, R.T. (2009). *Practise-led Research, Research-led Practise in the Creative Arts*. Edinburgh University Press, 50.
- UNESCO Global Geoparks Council. (2024). Guy Martini's tenure as Chairperson of the UNESCO Global Geoparks Council (2016–2024). UNESCO. <https://unesdoc.unesco.org/ark:/48223/pf0000392651>. (Accessed: November 15, 2025).