Journal of Visual Art and Design Studies:
LES-GUET'S

Volume 2 Number 2, October 2026
e-ISSN 3109-5569
DOI: https://doi.org/10.25078/lg.v2i2.7674
https://ojs.uhnsugriwa.ac.id/index.php/lg

VISUAL ORGANIZATION IN BALINESE *KAKUL-KAKULAN* ORNAMENT: GESTALT INTERPRETATION AND CONCEPTUAL IMPLICATIONS FOR INTERACTIVE MEDIA DESIGN

By:

Ni Putu Anggi Pramesti[1], Fariza Wahyu Arizal[2]
[1]Prodi Desain Komunikasi Visual Universitas Hindu Negeri I Gusti Bagus Sugriwa Denpasar,
[2]Program Studi Desain Komunikasi Visual, Universitas Negeri Malang

e-mail:
anggipramesti110@gmail.com

Received: 9 November 2026, Revision: 19 November 2026, Publishing: 20 November 2026

Abstract

Traditional Balinese ornamentation offers visual forms that may inform contemporary design, although their relevance to interactive media requires careful interpretation. This study examines the formal organization of a single researcher-produced drawing of the Balinese *Kakul-kakulan* ornament and explores its conceptual implications for interactive media design. Qualitative visual analysis was conducted to identify curved contours, spatial relationships, repeated ornamental units, and tonal variations. The Gestalt principles of good continuation and proximity were applied as interpretive categories, while fractal-like characteristics were examined critically in relation to repetition and morphological resemblance. The analysis identified four horizontally arranged spiral-like units, locally continuous curved contours, recurring tonal bands, supplementary decorative elements, and distinguishable inter-unit boundaries. These characteristics provide a basis for interpreting formal continuity and spatial adjacency but do not establish actual perceptual grouping or eye movements. The repeated units demonstrate morphological resemblance without verified multiscale self-similarity or mathematical fractality. Three potential design translations are proposed: modular ornamental framing for user interfaces, contour-based motion graphic transitions, and loading animations derived from repeated units. These applications remain conceptual because no digital prototype or user testing was undertaken. The study contributes a theoretically informed approach to interpreting one traditional ornamental representation while identifying directions for further design investigation.

Keywords: *Kakul-Kakulan*; Balinese Ornamentation; Gestalt Principles; Visual Organization; Interactive Media Design.

INTRODUCTION

Visual organization is a fundamental consideration in interactive media design because the spatial arrangement of graphic elements influences how information is presented and interpreted (Johnson, 2020; Ware, 2019). Relationships among shapes, contours, distances, and structural configurations contribute to the visual organization of interface compositions. Gestalt psychology provides an established theoretical foundation for examining such relationships

Les-Guet's : Journal of Visual Art And Design Studies © 2025 by UHN I Gusti Bagus Sugriwa Denpasar is licensed under CC BY-NC-SA 4.0

Volume 2 Number 2, October 2026
e-ISSN 3109-5569
DOI: https://doi.org/10.25078/lg.v2i2.7674
https://ojs.uhnsugriwa.ac.id/index.php/lg

through principles of perceptual grouping and figure-ground organization (Wagemans et al., 2012). In the context of interface design, Ma (2025) investigated how variations in graphic size, spatial distance, and structural arrangement affect perceived visual hierarchy under controlled experimental conditions. These studies demonstrate the relevance of visual relationships to perceptual research and interface design. However, their theoretical and empirical findings must be distinguished from the examination of ornamental forms whose perceptual effects have not been experimentally evaluated. This distinction creates an opportunity to investigate how established concepts of visual organization may be applied as interpretive frameworks for traditional visual compositions.

Traditional Balinese ornamentation provides a relevant context for examining the organization of graphic forms within culturally situated artistic practices. Balinese ornaments incorporate stylized natural and decorative elements and are commonly classified into categories such as *keketusan*, *pepatran*, and *kekarangan*. Suparta et al. (2023) examined the forms and functions of Balinese ornaments in relation to artistic traditions, architectural applications, and cultural practices. Their research establishes the importance of understanding ornamental characteristics within their artistic and cultural contexts. A more specific example is provided by Radiawan et al. (2022), who investigated the application of *Kakul-kakulan*, a motif associated with the *keketusan* category, to *endek* woven fabric through airbrush techniques for evening dress design. This study illustrates the adaptation of a traditional ornamental motif into another design medium. Nevertheless, an investigation of ornamental forms and their creative application differs from an interpretation of their internal visual relationships through principles of perceptual organization.

The *Kakul-kakulan* motif offers a specific subject for such an interpretation because its recognizable configuration involves curved and spiral-like forms. These visual characteristics can be examined through relationships among individual contours, recurring ornamental units, and the spatial arrangement of neighboring elements. However, identifying these relationships requires attention to the particular visual material being analyzed. In the present research, the object consists of a single manually reproduced representation of *Kakul-kakulan* created by the researcher with reference to conventional ornamental forms encountered in Balinese architecture and ornament literature. The original architectural examples and publications used during its production cannot be retrospectively identified. Consequently, the analysis concerns the visible organization of this researcher-produced representation rather than the full range of historical, regional, or stylistic variations of the motif.

The Gestalt principles of good continuation and proximity provide two complementary perspectives for interpreting the relationships among ornamental elements. Good continuation concerns perceptual organization associated with the alignment and continuation of visual contours, whereas proximity concerns grouping relationships associated with spatial closeness (Wagemans et al., 2012). Applied to ornamental analysis, these concepts offer categories for examining curved configurations and relationships among neighboring forms. Nevertheless, formal continuity and spatial adjacency should not be equated with demonstrated perceptual behavior. The presence of a continuous curved contour does not establish that viewers follow a corresponding eye-movement trajectory, just as the proximity of repeated motifs does not independently demonstrate how viewers group them. Accordingly, Gestalt principles are employed in this study to interpret observable formal relationships rather than to verify mechanisms of visual attention or navigational performance.

Les-Guet's : Journal of Visual Art And Design Studies © 2025 by UHN I Gusti Bagus Sugriwa Denpasar is licensed under CC BY-NC-SA 4.0

Volume 2 Number 2, October 2026
e-ISSN 3109-5569
DOI: https://doi.org/10.25078/lg.v2i2.7674
https://ojs.uhnsugriwa.ac.id/index.php/lg

A further analytical consideration concerns the distinction between ornamental repetition and fractal organization. Fractal patterns are associated with structural relationships that recur across different spatial scales, although the nature and degree of self-similarity may vary. Robles et al. (2021) examined aesthetic and psychological responses to designed fractal patterns with identifiable structural characteristics. Similarly, Taylor et al. (2024) discussed fractal fluency in relation to the processing of fractal stimuli across sensory modalities. These studies provide relevant theoretical context for examining how repetitive visual structures differ from patterns exhibiting multiscale organization. However, the recurrence of similar ornamental units or the increasing extent of curved bands within a spiral does not independently demonstrate mathematical self-similarity. In the present study, *fractal-like* is therefore treated as a qualified analytical analogy whose applicability must be critically assessed against the available visual evidence. The research does not assume that the selected *Kakul-kakulan* representation possesses a mathematically established fractal structure.

A comparison of the relevant literature identifies a specific and bounded analytical gap. Previous studies have addressed the classification, functions, and contemporary adaptation of Balinese ornamentation (Radiawan et al., 2022; Suparta et al., 2023). More recently, studies in this journal have examined a single redrawn Keketusan Batun Timun motif as a basis for geometric transformation (Dewi & Caesariana, 2026) and a researcher-produced Ganggong ornament through biophilic interpretation and visual metaphor (Widianugraha et al., 2026). These studies demonstrate that qualitative, case-based interpretations of Balinese ornamental forms and proposals for contemporary design are not novel in themselves. Gestalt research provides established accounts of perceptual organization (Ma, 2025; Wagemans et al., 2012), while fractal studies examine patterns with multiscale structural relationships and associated perceptual responses (Robles et al., 2021; Taylor et al., 2024). The narrower contribution of the present study is to apply good continuation and proximity to the specific contour relationships and spatial boundaries of one Kakul-kakulan representation, critically distinguish ornamental repetition from unverified fractal self-similarity, and formulate three explicitly untested propositions for interface-related graphic translation. This study does not claim to be the first qualitative visual analysis of Balinese ornamentation or the first to propose its contemporary adaptation.

To address this gap, the study asks how the formal characteristics of a researcher-produced *Kakul-kakulan* representation can be interpreted through the Gestalt principles of good continuation and proximity, critically examined in relation to fractal-like pattern organization, and considered as potential references for interactive media design. The research aims to identify the principal visual elements and compositional relationships of the selected drawing, interpret their organization through Gestalt concepts, distinguish observable spiral repetition and morphological resemblance from mathematically defined fractal characteristics, and formulate potential directions for translating these visual relationships into contemporary digital graphic compositions. The proposed contribution lies in combining these analytical perspectives within a transparent, evidence-based interpretation of one traditional ornamental representation. Rather than establishing *Kakul-kakulan* as a functioning visual navigation system, the study explores how selected ornamental characteristics may inform conceptual approaches to interface framing, motion graphic transitions, and loading animations. The resulting propositions remain interpretive and require further design development and empirical evaluation before claims concerning interactive functionality or user experience can be established.

Les-Guet's : Journal of Visual Art And Design Studies © 2025 by UHN I Gusti Bagus Sugriwa Denpasar is licensed under CC BY-NC-SA 4.0

Journal of Visual Art and Design Studies:
LES-GUET'S
Volume 2 Number 2, October 2026
e-ISSN 3109-5569
DOI: https://doi.org/10.25078/lg.v2i2.7674
https://ojs.uhnsugriwa.ac.id/index.php/lg

METHODOLOGY

This study employed qualitative visual analysis to examine the formal organization of a researcher-produced representation of the Balinese *Kakul-kakulan* ornament. The approach focused on the identification and interpretation of visible graphic characteristics rather than the experimental measurement of perceptual responses. Visual analysis provides a methodological basis for examining the composition and relationships of elements within visual materials while recognizing the interpretive character of such examinations (Rose, 2023). The present study combined formal observation with the Gestalt principles of good continuation and proximity and a critical consideration of fractal-like pattern organization. These theoretical perspectives were used to examine observable relationships within the selected drawing and formulate potential implications for interactive media design. They were not employed to establish actual viewer behavior or functional performance. The examination of compositional relationships in the drawing is also informed by established formal approaches to visual organization in art (Arnheim, 1974).

The visual material consisted of one manually reproduced drawing of *Kakul-kakulan* created by the researcher with reference to traditional ornamental forms encountered in Balinese architectural decoration and ornament literature. According to the researcher's account, the drawing was reproduced without deliberate simplification or alteration of the referenced ornamental form. However, the specific architectural examples and publications used during the drawing process could not be retrospectively identified. The correspondence between the drawing and any particular original ornament therefore could not be independently verified. Accordingly, the material was treated as a researcher-produced visual representation rather than authenticated documentation of a specific architectural artifact. The drawing constituted the only visual case examined and was not selected from a systematically documented collection of ornamental variants. No claim was made that it represented the full morphological diversity of *Kakul-kakulan* ornamentation.

The complete ornamental composition constituted the primary unit of analysis, while identifiable graphic elements and their spatial relationships served as units of observation. For analytical identification, the four principal spiral-like units were designated S1, S2, S3, and S4 from left to right. This numbering was intended exclusively to identify their positions within the composition and did not imply a sequence of visual attention. The observation categories included curved contours, recurring spiral-like configurations, relative spatial intervals, inter-unit boundaries, tonal bands, and supplementary ornamental details. The original drawing is presented in Figure 1, while the annotated locations of its constituent features are presented in Figure 3 within the Results and Discussion section.



Figure 1. Original researcher-produced drawing of the Balinese *Kakul-kakulan* ornament used as the single visual object of analysis. (Source: Researcher-produced drawing).

Les-Guet's : Journal of Visual Art And Design Studies © 2025 by UHN I Gusti Bagus Sugriwa Denpasar is licensed under CC BY-NC-SA 4.0

Journal of Visual Art and Design Studies:
LES-GUET'S
Volume 2 Number 2, October 2026
e-ISSN 3109-5569
DOI: https://doi.org/10.25078/lg.v2i2.7674
https://ojs.uhnsugriwa.ac.id/index.php/lg

The analytical procedure comprised four related stages, summarized in Figure 2 and operationalized in Table 1. The first stage involved the descriptive identification of visible formal characteristics and their locations within the composition. The second stage considered the correspondence between selected visual relationships and the Gestalt principles of good continuation and proximity. Good continuation was examined in relation to the local alignment and apparent continuity of curved contours, while proximity was considered in relation to the spatial adjacency of neighboring units. Contrasting boundaries and intervening decorative elements were also considered to avoid assuming that spatial closeness necessarily produced perceptual grouping. These interpretations were informed by Gestalt research on visual organization (Wagemans et al., 2012), but they did not constitute experimental evidence of perceptual integration or eye movement.

The third stage examined repetition and morphological resemblance among the principal spiral-like units. The assessment considered recurring configurations, relative differences in form and size, and the organization of curved bands within individual units. Particular attention was given to distinguishing repetition among comparably sized ornamental forms from structural self-similarity across multiple spatial scales. Concepts drawn from fractal research provided a theoretical basis for this distinction (Robles et al., 2021). However, no fractal dimension, scaling ratio, or mathematical model was calculated. The term *fractal-like* was therefore treated as a qualified interpretive analogy rather than a predetermined structural classification.

The fourth stage considered possible translations of the identified visual characteristics into graphic elements relevant to interactive media design. This stage involved associating observable properties with potential compositional treatments, such as ornamental framing, contour-based graphic transitions, and repeated visual elements. Each proposed translation was considered in relation to the specific feature from which it was derived and was designated as a conceptual possibility rather than a demonstrated application. No interactive prototype was developed or evaluated. The sequence of analytical stages represented an interpretive procedure and did not imply a causal relationship between ornamental form, perceptual response, and interactive performance.

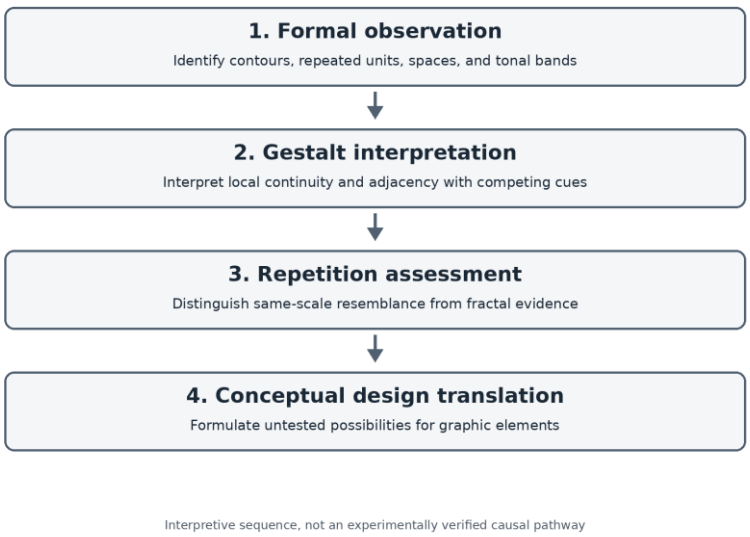

Figure 2. Four-stage procedure for qualitative visual analysis of the selected Kakul-kakulan representation. The arrows indicate the analytical sequence rather than empirically validated causal relationships. (Source: Authors' methodological framework).

Les-Guet's : Journal of Visual Art And Design Studies © 2025 by UHN I Gusti Bagus Sugriwa Denpasar is licensed under CC BY-NC-SA 4.0

Journal of Visual Art and Design Studies:
LES-GUET'S
Volume 2 Number 2, October 2026
e-ISSN 3109-5569
DOI: https://doi.org/10.25078/lg.v2i2.7674
https://ojs.uhnsugriwa.ac.id/index.php/lg

Table 1. Operational Framework for Qualitative Visual Analysis

Analytical stage	Observable indicators	Analytical procedure	Boundary of interpretation
Formal visual observation	Curved contours, repeated units, spatial intervals, tonal bands, and supplementary forms	Identify and describe visible elements and their positions within the drawing	Description is limited to the selected representation
Gestalt-based interpretation	Local contour continuity, spatial adjacency, intervening forms, and contrasting boundaries	Examine formal correspondence with good continuation and proximity while considering alternative organizational cues	No claim of measured perceptual grouping, visual attention, or eye movement
Repetition and fractal-like assessment	Recurring spiral-like units, morphological resemblance, relative size variation, and curved band organization	Compare repeated forms and distinguish same-scale repetition from possible multiscale self-similarity	No mathematical fractal classification or verified scaling relationships
Conceptual design translation	Formal characteristics identified during preceding stages	Relate documented visual features to potential graphic treatments for interactive media	No implemented interface or demonstrated usability and navigation outcomes

The analysis was documented during manuscript revision through the original drawing, an annotated visual copy, and a structured observation record. The annotations identified the locations of selected features, while the observation record distinguished directly visible characteristics from theoretical interpretations and potential design implications. Descriptive codes and labels were used to facilitate the identification of particular visual elements rather than to represent frequency measurements or an independently validated coding system. This documentation was prepared to make the analytical reasoning inspectable and should not be interpreted as a contemporaneous record of the original drawing process. The study did not employ independent coders, inter-rater reliability assessment, or formal methodological triangulation.

The methodological scope was restricted to one researcher-produced ornamental representation whose original architectural and bibliographic references could not be independently reconstructed. Consequently, the findings cannot establish the characteristics of all *Kakul-kakulan* variants. The absence of experimental perception studies, computational fractal measurements, and interactive prototype evaluation also limits the conclusions that can be drawn concerning perceptual behavior, mathematical fractality, and navigational effectiveness. The results are therefore understood as a context-specific interpretation of visual organization and a basis for formulating conceptual design propositions requiring further investigation.

Les-Guet's : Journal of Visual Art And Design Studies © 2025 by UHN I Gusti Bagus Sugriwa Denpasar is licensed under CC BY-NC-SA 4.0

Journal of Visual Art and Design Studies:
LES-GUET'S
Volume 2 Number 2, October 2026
e-ISSN 3109-5569
DOI: https://doi.org/10.25078/lg.v2i2.7674
https://ojs.uhnsugriwa.ac.id/index.php/lg

RESULTS AND DISCUSSION

Formal Visual Structure of the *Kakul-kakulan* Ornament

The formal visual analysis of the researcher-produced *Kakul-kakulan* drawing identified four principal spiral-like units arranged horizontally within a rectangular ornamental composition. As shown in Figure 3, these units are designated S1, S2, S3, and S4 from left to right. Each unit contains an identifiable inner curl (C1–C4) surrounded by curved contours and successive tonal bands. The four units exhibit broadly comparable configurations and proportions, although minor variations are visible in their contours and tonal treatment. Their recurrence establishes repetition as a prominent characteristic of the examined composition. These observations describe the specific drawing analyzed in this study rather than the formal properties of all traditional *Kakul-kakulan* variants.

Table 2. Descriptive Visual Characteristics of the Analyzed Kakul-kakulan Representation

Visual characteristic	Evidence in Figure 3	Descriptive observation
Principal ornamental units	S1–S4	Four broadly similar spiral-like units arranged horizontally
Inner spiral configurations	C1–C4	Each principal unit contains an identifiable inward curl
Curved contours	CT; S1–S4	Curvilinear contours are visible within individual units
Spatial arrangement	S1–S4; IB1–IB3	Neighboring units are arranged sequentially but remain distinguishable through intervening dark regions
Supplementary ornamental forms	SM and corresponding junctions	Leaf-like forms occur at upper and lower junctions between principal units
Tonal organization	TB; S1–S4	Related light, gray, and dark bands recur within the principal units

The internal organization of each spiral-like unit is characterized by curved contours extending around an inner curl toward the outer region of the motif. The contour segment indicated by CT in Figure 3 provides an example of this local curvilinear configuration. Successive curved bands occupy different spatial extents within each unit, creating a layered arrangement of forms. The contours are predominantly rounded rather than angular, while the apparent breadth of the tonal bands varies across the spiral configuration. These characteristics establish an identifiable relationship between the inner and outer regions of each unit. However, the observed differences in contour extent do not establish a particular mathematical spiral equation or a measured process of geometric growth.

At the compositional level, the four principal units are positioned in a horizontal sequence and occupy approximately comparable visual areas. Their recurring configurations and relative alignment establish a repeated ornamental arrangement. Nevertheless, the individual spiral-like units remain distinguishable. As indicated by IB1, IB2, and IB3 in Figure 3, dark intervening regions occur between adjacent units, forming visible boundaries within the composition. These regions separate the principal spiral contours rather than extending them into a single uninterrupted line across the four units. The horizontal arrangement can

Les-Guet's : Journal of Visual Art And Design Studies © 2025 by UHN I Gusti Bagus Sugriwa Denpasar is licensed under CC BY-NC-SA 4.0

Journal of Visual Art and Design Studies:
LES-GUET'S
Volume 2 Number 2, October 2026
e-ISSN 3109-5569
DOI: https://doi.org/10.25078/lg.v2i2.7674
https://ojs.uhnsugriwa.ac.id/index.php/lg

therefore be described as repetition of neighboring forms, while continuity of curved contours is most directly observable within individual units.

Supplementary leaf-like ornamental elements are positioned at the upper and lower junctions between the principal units. One example is identified as SM in Figure 3. These secondary elements occupy areas between the larger spiral-like forms and recur within the overall composition. Their relatively smaller dimensions, pointed contours, and contrasting tonal treatment distinguish them from the rounded configurations of the principal units. The relationship between the two types of elements creates a composition containing dominant recurring spiral-like forms and subsidiary decorative details. However, the supplementary elements do not provide continuous contour connections between the individual spiral units.

Tonal organization constitutes another identifiable characteristic of the drawing. Each principal unit contains successive light, gray, and dark bands arranged around its inner curl. The tonal bands indicated by TB in Figure 3 illustrate this layered treatment. Similar arrangements recur across S1–S4, although the transitions and widths of individual bands are not identical. The combination of recurring curved forms and related tonal treatments produces observable consistency across the composition, while the darker areas between units maintain the visibility of their individual boundaries.

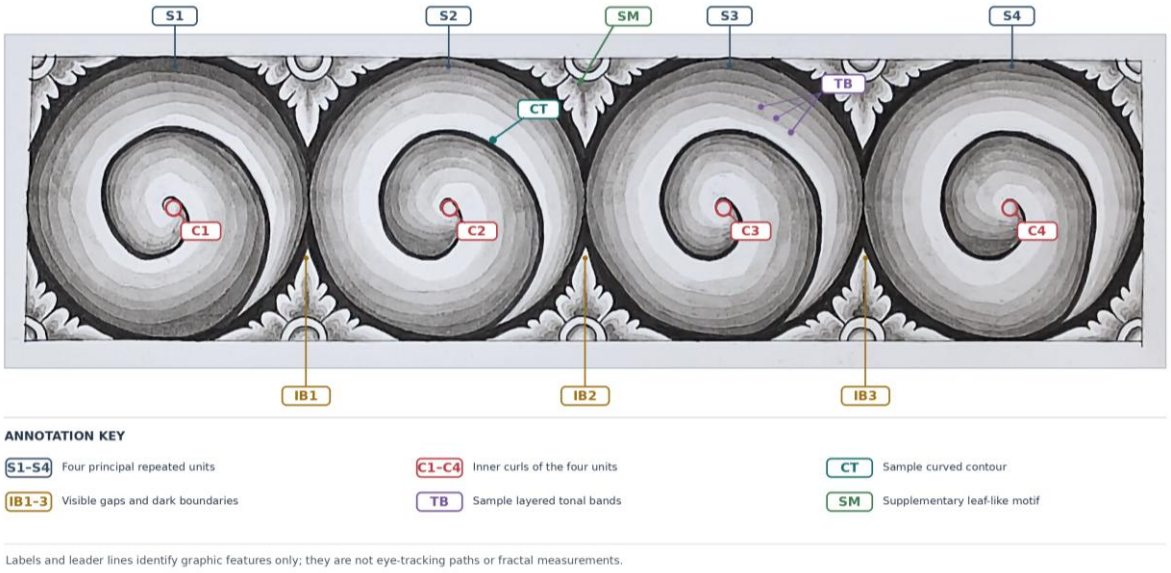

Figure 3. Annotated visual features in the original *Kakul-kakulan* drawing. S1–S4 mark principal units; C1–C4 mark inner curls; CT, a sample contour; TB, tonal bands; IB1–IB3, boundaries; and SM, a supplementary motif. Labels are descriptive, not measured gaze trajectories.

Based on these observations, the formal organization of the examined *Kakul-kakulan* representation can be characterized by four principal features: horizontally repeated spiral-like units, locally continuous curved contours, supplementary ornamental elements at the junctions between units, and recurring tonal bands. The drawing exhibits both similarity among its principal units and differentiation through intervening boundaries and secondary decorative forms. These findings establish a descriptive basis for the subsequent Gestalt interpretation and assessment of repetitive pattern characteristics. They do not, by themselves, demonstrate perceptual grouping, directional eye movements, attentional guidance, or navigational effectiveness.

Les-Guet's : Journal of Visual Art And Design Studies © 2025 by UHN I Gusti Bagus Sugriwa Denpasar is licensed under CC BY-NC-SA 4.0

Volume 2 Number 2, October 2026
e-ISSN 3109-5569
DOI: https://doi.org/10.25078/lg.v2i2.7674
https://ojs.uhnsugriwa.ac.id/index.php/lg

Gestalt Interpretation: Good Continuation and Proximity

The formal characteristics identified in the preceding analysis provide a basis for interpreting the selected *Kakul-kakulan* representation through the Gestalt principles of good continuation and proximity. As illustrated in Figure 3, the four principal spiral-like units (S1–S4) contain curved contours arranged around their respective inner curls (C1–C4). The contour segment identified as CT provides a localized example of the smooth curvature and apparent continuity observable within an individual unit. These characteristics are relevant to good continuation, which concerns the perceptual organization of visual elements according to compatible contour alignment and continuation (Wagemans et al., 2012). However, a continuous drawn contour is an observable geometric characteristic, whereas its perceptual organization through Gestalt principles constitutes a theoretical interpretation. The present analysis therefore identifies formal correspondence with good continuation without claiming that viewers necessarily follow the contours through particular eye-movement trajectories.

The relationship between neighboring spiral-like units requires a distinction between local contour continuity and repetition across the composition. Although S1–S4 are arranged horizontally and exhibit broadly similar configurations, their principal contours do not form a single uninterrupted line extending across the entire ornamental field. The dark intervening regions identified as IB1–IB3, together with supplementary leaf-like elements positioned at the junctions, distinguish the individual units. Good continuation is therefore most directly applicable to the curvilinear relationships within each principal unit, rather than to an assumed continuous pathway connecting all four spirals. The horizontal arrangement establishes a compositional sequence of repeated forms, but this sequence cannot be equated with an observed order of visual attention or a verified navigational pathway.

The principle of proximity provides a complementary perspective on the spatial relationships among the principal units. The adjacent pairs S1–S2, S2–S3, and S3–S4 occupy neighboring positions within the same horizontal composition, with their intervals visible at IB1, IB2, and IB3. These relationships provide a formal basis for considering spatial closeness as a possible grouping cue. Nevertheless, the analysis did not include quantitative spacing measurements or perceptual judgments. The repeated units also exhibit morphological resemblance, while contrasting boundaries and supplementary decorative forms maintain visible distinctions between them. Consequently, proximity cannot be considered independently of other organizational characteristics. This interpretation is consistent with Gestalt research indicating that perceptual grouping involves interactions among multiple visual cues (Wagemans et al., 2012), although the relative influence of these cues in the present drawing remains untested.

The significance of these formal relationships for visual communication design can be considered alongside empirical research on interface organization. Ma (2025) examined the effects of graphical size, spatial distance, and structural arrangement on perceived visual hierarchy using controlled experimental compositions. The study provides evidence that spatial configuration can influence hierarchical judgments under specified conditions. However, those findings cannot be directly transferred to the present *Kakul-kakulan* representation. Unlike Ma's experimental investigation, the current study did not manipulate visual variables, compare alternative compositions, or collect perceptual responses. The relevance of the cited research is therefore limited to establishing a theoretical and empirical context for examining visual relationships rather than validating a hierarchy or navigational effect within the ornament.

Les-Guet's : Journal of Visual Art And Design Studies © 2025 by UHN I Gusti Bagus Sugriwa Denpasar is licensed under CC BY-NC-SA 4.0

Volume 2 Number 2, October 2026
e-ISSN 3109-5569
DOI: https://doi.org/10.25078/lg.v2i2.7674
https://ojs.uhnsugriwa.ac.id/index.php/lg

Taken together, the Gestalt-based interpretation identifies two distinct formal relationships within the examined representation: local contour continuity within individual spiral-like units and spatial adjacency among repeated units whose boundaries remain identifiable. These relationships provide a theoretically informed understanding of the ornament's visual organization while preserving the distinction between observable graphic properties and inferred perceptual processes. The findings support the use of good continuation and proximity as complementary interpretive categories for analyzing the selected ornamental composition. They do not establish actual perceptual grouping, attentional guidance, or visual navigation. Their possible relevance to interactive media design consequently remains a conceptual proposition to be considered in the subsequent discussion of design translation.

Spiral Repetition, Morphological Resemblance, and the Limits of Fractal-Like Interpretation

The examination of recurring patterns in the selected *Kakul-kakulan* representation identifies spiral repetition and morphological resemblance as its most directly observable characteristics. As illustrated in Figure 3, four principal spiral-like units (S1–S4) are arranged horizontally, each containing curved contours organized around an inner curl (C1–C4). The units exhibit broadly comparable configurations, proportions, and tonal arrangements, although their individual contours and shading are not identical. This recurrence establishes a recognizable repetition of ornamental forms across the composition. The relationship among the units can therefore be described in terms of morphological resemblance and compositional rhythm rather than exact geometric replication.

A second observable characteristic concerns the internal organization of the curved and tonal bands within each spiral-like unit. The bands indicated by TB in Figure 3 occupy different spatial extents as they follow the curved configuration around an inner curl. This arrangement produces a layered composition in which inner and outer regions can be distinguished. However, the variation in the extent of these bands does not demonstrate that complete spiral-like structures are reproduced at progressively different scales. The four principal units also appear broadly comparable in overall dimensions, without an identifiable hierarchy of smaller and larger replicas of the complete motif. Consequently, the observed arrangement supports an interpretation of internal layering and repetitive morphology, but not a conclusion that the ornament exhibits hierarchical fractal growth or mathematically established self-similarity.

This distinction is particularly relevant when the composition is considered in relation to fractal research. Fractal patterns involve structural relationships that recur across spatial scales, potentially exhibiting exact or statistical forms of self-similarity. Robles et al. (2021) investigated aesthetic and psychological responses to designed fractal configurations whose structural complexity was characterized through fractal properties. Similarly, Taylor et al. (2024) discussed fractal fluency in relation to the processing of fractal stimuli with recurring structures across different size scales. These studies provide a theoretical basis for distinguishing multiscale fractal organization from the repetition of ornamental units at approximately similar scales. Nevertheless, their perceptual findings cannot be transferred directly to the present *Kakul-kakulan* representation, because its geometric scaling properties have not been established and no perceptual responses were measured.

Within these evidential limits, *fractal-like* is retained only as a qualified conceptual analogy rather than a confirmed structural classification. The analogy draws attention to the recurrence and resemblance of curved ornamental forms, but these characteristics are not

Les-Guet's : Journal of Visual Art And Design Studies © 2025 by UHN I Gusti Bagus Sugriwa Denpasar is licensed under CC BY-NC-SA 4.0

Volume 2 Number 2, October 2026
e-ISSN 3109-5569
DOI: https://doi.org/10.25078/lg.v2i2.7674
https://ojs.uhnsugriwa.ac.id/index.php/lg

sufficient to establish fractality. The analysis did not identify verifiable multiscale replication, calculate scaling relationships, or estimate a fractal dimension. The absence of such evidence does not establish that the motif is mathematically non-fractal; rather, it prevents either a positive or negative mathematical classification from being supported by the present method. Likewise, no conclusions can be drawn regarding fractal fluency, perceptual preference, psychological comfort, or other viewer responses associated with fractal stimuli in experimental research.

The findings therefore support a more restricted characterization of the examined *Kakul-kakulan* composition as an arrangement of recurring spiral-like forms, broadly similar ornamental units, and layered curvilinear and tonal structures. These characteristics provide a sufficient formal basis for discussing repetition, morphological resemblance, and compositional rhythm without attributing unverified fractal properties. The value of the fractal-related perspective in this study lies primarily in clarifying the distinction between observable ornamental repetition and mathematically defined multiscale organization. This distinction maintains the interpretive scope of the research and provides a more precise basis for considering the potential translation of selected formal characteristics into interactive media design.

Kakul-kakulan as a Conceptual Reference for Visual Navigation

The preceding analyses provide a basis for considering the selected *Kakul-kakulan* representation as a conceptual reference for visual organization in interactive media design. The observable characteristics identified in Figure 3 include locally continuous curved contours within individual spiral-like units, repeated morphological configurations, spatial adjacency, and distinguishable boundaries between neighboring units. These characteristics establish identifiable relationships among elements in the examined composition. However, their presence does not demonstrate that the ornament functions as a visual navigation system. In the present study, visual navigation is therefore considered a potential context for future design exploration rather than an empirically established function of the ornamental structure.

The conceptual interpretation builds upon the distinction between formal characteristics and perceptual organization. The Gestalt principle of good continuation offers a theoretical perspective for considering the local continuity of curved contours, while proximity provides a complementary perspective on the spatial relationships among neighboring units (Wagemans et al., 2012). These interpretations are qualified by the presence of dark inter-unit boundaries, supplementary ornamental elements, and morphological resemblance among the repeated forms. Although such characteristics can be examined through Gestalt theory, they do not establish a particular sequence of eye movements, a stable attentional pathway, or consistent perceptual grouping among viewers. The ornamental composition is therefore interpreted through theoretical relationships rather than treated as evidence of observed perceptual behavior.

Les-Guet's : Journal of Visual Art And Design Studies © 2025 by UHN I Gusti Bagus Sugriwa Denpasar is licensed under CC BY-NC-SA 4.0

Journal of Visual Art and Design Studies:
LES-GUET'S
Volume 2 Number 2, October 2026
e-ISSN 3109-5569
DOI: https://doi.org/10.25078/lg.v2i2.7674
https://ojs.uhnsugriwa.ac.id/index.php/lg

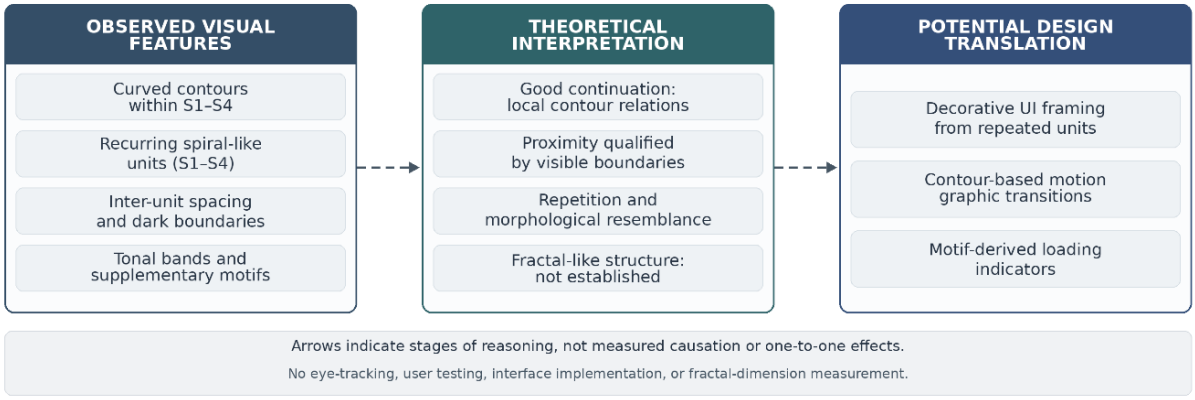

Figure 4. Conceptual interpretation and potential design translation of the analyzed *Kakul-kakulan* representation.

The framework distinguishes directly observable visual features, theory-informed interpretations, and potential applications in interactive media design. Dashed arrows indicate successive stages of interpretive reasoning and design proposition rather than empirically verified causal relationships or perceptual effects. (Source: Authors' conceptual synthesis based on qualitative visual analysis).

Figure 4 synthesizes the analytical reasoning through three distinct levels: observed visual features, theoretical interpretation, and potential design translation. The first level consists of directly identifiable characteristics of the researcher-produced drawing, including curved contours, recurring spiral-like units, spatial intervals, and tonal organization. The second level considers these characteristics through Gestalt-informed interpretations of local continuity and proximity, together with the descriptive relationships of repetition and morphological resemblance. The proposed fractal-like interpretation is explicitly qualified because multiscale self-similarity has not been established. The third level identifies possible directions for exploring these visual relationships within digital compositions, including ornamental interface framing, contour-based motion graphic transitions, and motif-derived loading indicators. The relationships represented in the framework constitute successive stages of interpretation and conceptual proposition rather than a demonstrated causal sequence.

This distinction is particularly important in discussing visual navigation. Although visual continuity, repetition, and spatial differentiation may provide references for organizing graphic elements, their translation into an interactive environment would require additional decisions concerning information structure, functional controls, system feedback, and user interaction. The proposed applications are not inherent functions of the ornament, nor can their effectiveness be inferred from its formal properties alone. No interactive prototype, usability evaluation, or experimental investigation of visual attention was conducted in this study. Consequently, the framework does not establish that the selected ornamental characteristics improve navigation efficiency, comprehension, or user experience.

The contribution of the proposed framework lies in articulating a traceable relationship between the visual evidence of one traditional ornamental representation, its interpretation through established concepts of visual organization, and possible directions for contemporary design exploration. Rather than redefining *Kakul-kakulan* as an existing navigation mechanism, the study offers an interpretive approach through which selected formal characteristics may inform future interactive media design investigations. This contribution is specific to the analyzed representation and does not establish new perceptual mechanisms or

Les-Guet's : Journal of Visual Art And Design Studies © 2025 by UHN I Gusti Bagus Sugriwa Denpasar is licensed under CC BY-NC-SA 4.0

Volume 2 Number 2, October 2026
e-ISSN 3109-5569
DOI: https://doi.org/10.25078/lg.v2i2.7674
https://ojs.uhnsugriwa.ac.id/index.php/lg

generalizable properties of *Kakul-kakulan* ornamentation. The proposed design directions are developed more specifically in the following section, where each potential application is related to an identifiable ornamental characteristic and its requirements for further investigation.

Conceptual Implications for Interactive Media Design

The visual characteristics identified in the selected *Kakul-kakulan* representation provide a basis for considering specific directions for their potential translation into interactive media design. The analysis established the presence of locally continuous curved contours, repeated spiral-like units, distinguishable inter-unit boundaries, and recurring tonal relationships. These characteristics constitute formal properties of the examined drawing rather than pre-existing interface functions. Their relevance to digital design therefore depends on how selected visual features could be transformed into graphic elements appropriate to particular interaction contexts. Three conceptual applications are proposed on this basis: ornamental framing in user interfaces, contour-based motion graphic transitions, and loading animations derived from repeated ornamental units. Each proposal is formulated through a specific relationship between the observed visual evidence and a possible graphic transformation rather than through an assumed navigational or perceptual effect.

The first proposed application concerns the adaptation of repeated spiral-like units into ornamental framing elements within user interfaces. As illustrated in Figure 3, the four principal units (S1–S4) exhibit broadly similar configurations and occupy a horizontal arrangement, while the dark intervening areas (IB1–IB3) distinguish adjacent units. A possible transformation would involve reconstructing the recurring forms as modular digital ornaments that could be arranged along a header, screen edge, or decorative section boundary. The relationship between repeated units and their intervening spaces would provide the formal reference for determining module arrangement and separation. In this application, the motif would serve a decorative and compositional purpose rather than functioning as a navigation control or defining the information hierarchy. Its suitability would need to be examined in relation to content readability, visual density, responsive layouts, and the distinguishability of functional interface elements. This distinction between ornamental treatment and recognizable interface functions is consistent with interaction design guidance on discoverability, feedback, and interaction context (Norman, 2013; Rogers et al., 2023).

The second application concerns the potential translation of continuous curved contours into motion graphic transitions. The local curvature identified by CT in Figure 3 provides a morphological reference from which a graphic path could be reconstructed. In a future design exploration, a selected contour could be converted into a vector-based graphic element and used for progressive revelation, masking, or transformation between visual states. The proposed relationship is therefore based on the geometry of the original contour rather than on an assumption that viewers naturally follow a spiral trajectory. The direction, timing, duration, and visual behavior of such transitions would be determined during subsequent design development. Their effectiveness in communicating changes between interface states remains untested. Moreover, unnecessary motion would need to be limited or made adjustable in consideration of accessibility guidance concerning motion triggered by user interaction (World Wide Web Consortium, 2023).

The third proposed application involves adapting the recurrence of the four principal spiral-like units into an animated loading indicator. Unlike the contour-based transition, this proposal draws on the repeated arrangement of S1–S4 as comparable visual modules. A

Les-Guet's : Journal of Visual Art And Design Studies © 2025 by UHN I Gusti Bagus Sugriwa Denpasar is licensed under CC BY-NC-SA 4.0

Journal of Visual Art and Design Studies:
LES-GUET'S
Volume 2 Number 2, October 2026
e-ISSN 3109-5569
DOI: https://doi.org/10.25078/lg.v2i2.7674
https://ojs.uhnsugriwa.ac.id/index.php/lg

potential transformation would involve sequential changes in the visibility, opacity, or emphasis of individual modules during an active loading process. The sequence would be an animation design decision derived from the ornamental repetition, not an observed direction of attention within the original image. Importantly, animated repetition alone would not establish that an interface communicates its operating status effectively. Harley (2018) emphasized the importance of communicating system status through appropriate feedback. Therefore, a future motif-derived loading indicator would need to be associated with an actual system state and accompanied by understandable status information. A numerical completion value should be presented only when supported by measurable progress. Its design would also require examination of clarity, motion sensitivity, and alternatives for users who prefer reduced motion.

The three conceptual applications are distinguished by their respective transformation principles. Ornamental framing is derived from the spatial recurrence of the principal units and their boundaries; motion graphic transitions are derived from local contour geometry; and loading indicators are derived from the repeated arrangement of comparable graphic forms. Table 3 summarizes these relationships, distinguishing the visual evidence, proposed transformation, potential application, and aspects requiring further evaluation. The table does not present completed design outcomes, since none of these applications was implemented or experimentally tested in the present study.

Table 3. Potential Design Translations Derived from the Visual Analysis of Kakul-kakulan

Observed visual evidence	Proposed transformation rule	Potential design application	Design constraints and verification needs
Four recurring spiral-like units (S1–S4) and distinguishable boundaries (IB1–IB3)	Reconstruct repeated units as modular decorative forms while retaining recognizable spatial separation	Ornamental framing for interface headers, screen edges, or section boundaries	Assess readability, visual density, responsive adaptation, and differentiation from functional controls
Locally continuous curved contours, illustrated by CT	Reconstruct a selected curved contour as a vector path for progressive revelation, masking, or graphic transformation	Motion graphic transitions between visual states	Evaluate visual clarity, timing, motion sensitivity, and the relevance of the transition to its interface context
Repeated spiral-like configurations across S1–S4	Adapt the recurring units into sequential variations in visibility, opacity, or graphic emphasis	Animated loading or activity indicator	Verify recognition of system status, avoid misleading progress information, and consider reduced-motion alternatives

The possible adaptation of *Kakul-kakulan* also requires consideration of its cultural context. Radiawan et al. (2022) examined the application of the motif to *endek* woven fabric through airbrush techniques for evening dress design, demonstrating an example of its transformation into another visual medium. However, the translation of traditional

Les-Guet's : Journal of Visual Art And Design Studies © 2025 by UHN I Gusti Bagus Sugriwa Denpasar is licensed under CC BY-NC-SA 4.0

Volume 2 Number 2, October 2026
e-ISSN 3109-5569
DOI: https://doi.org/10.25078/lg.v2i2.7674
https://ojs.uhnsugriwa.ac.id/index.php/lg

ornamentation into digital interface components involves different requirements concerning graphical composition, functional clarity, and cultural representation. The present study does not establish whether the proposed adaptations would preserve the cultural meanings associated with particular uses of *Kakul-kakulan*. Furthermore, the architectural and bibliographic exemplars used in producing the researcher's drawing could not be independently identified. Future applications would therefore require comparison with documented ornamental examples and consideration of their cultural context rather than assuming that visual resemblance alone establishes cultural fidelity.

The practical implications of the study consequently lie in identifying three traceable conceptual design possibilities rather than demonstrating implemented solutions. Further investigation could involve developing graphic alternatives based on the proposed transformation rules and comparing their performance with conventional interface treatments. Such work would require consideration of user needs, interaction contexts, and iterative evaluation, consistent with human-centred design principles (International Organization for Standardization, 2019). Particular attention could be given to readability, interpretation of transitions, recognition of loading states, accessibility, and cultural appropriateness. Until these investigations are undertaken, the proposed applications remain preliminary design propositions. Their relevance arises from the identifiable formal characteristics of the analyzed ornamental representation, not from demonstrated improvements in visual navigation or user experience.

CONCLUSION

This study examined the formal visual organization of a single researcher-produced representation of the Balinese *Kakul-kakulan* ornament through qualitative visual analysis. The findings identified four horizontally arranged spiral-like units, locally continuous curved contours, recurring tonal bands, supplementary ornamental elements, and distinguishable inter-unit boundaries. These characteristics establish repetition, morphological resemblance, and spatial differentiation as observable features of the selected composition. Although the curved bands vary in their spatial extent, the analysis did not demonstrate multiscale self-similarity or mathematically established fractal properties. The ornamental structure is therefore more appropriately characterized through spiral repetition and compositional relationships than through claims of verified fractal organization.

The theoretical contribution of the study lies in proposing an interdisciplinary interpretation that relates traditional ornamental form to established principles of visual organization. The Gestalt principles of good continuation and proximity provide complementary perspectives for examining local contour relationships and the spatial arrangement of repeated units. However, these relationships were interpreted from formal visual evidence rather than verified through perceptual experiments. Accordingly, the study does not establish actual eye movements, attentional guidance, or perceptual grouping among viewers. Its conceptual contribution consists of a framework that distinguishes observable ornamental characteristics, theory-informed interpretations, and potential directions for design translation, rather than demonstrating that *Kakul-kakulan* functions as an existing visual navigation system.

The practical implications are expressed through three preliminary design propositions: modular ornamental framing for user interfaces, contour-based motion graphic transitions, and loading animations derived from repeated spiral-like units. Each proposition is linked to an identifiable formal characteristic of the examined drawing and a possible transformation into a digital graphic element. These applications have not been implemented or evaluated and

Les-Guet's : Journal of Visual Art And Design Studies © 2025 by UHN I Gusti Bagus Sugriwa Denpasar is licensed under CC BY-NC-SA 4.0

Volume 2 Number 2, October 2026
e-ISSN 3109-5569
DOI: https://doi.org/10.25078/lg.v2i2.7674
https://ojs.uhnsugriwa.ac.id/index.php/lg

therefore cannot be considered validated design solutions. Their potential relevance to interactive media depends on further investigation of functional clarity, usability, accessibility, and cultural appropriateness.

The study is limited by its examination of a single manually reproduced drawing whose original architectural and bibliographic references could not be independently identified. Its findings cannot be generalized to all variations of *Kakul-kakulan* ornamentation. Furthermore, the absence of user studies, interactive prototypes, and mathematical fractal measurements prevents conclusions about navigational effectiveness, perceptual performance, or fractal classification. Future research should examine documented ornamental examples, compare morphological variations, develop digital prototypes based on the proposed transformation principles, and evaluate their performance in appropriate interaction contexts. Within these limitations, the study contributes a traceable visual interpretation of one traditional ornamental representation and identifies conceptual directions for investigating culturally situated graphic forms in interactive media design.

REFERENCES

Arnheim, R. (1974). Art and visual perception: A psychology of the creative eye (Rev. and expanded ed.). University of California Press. https://books.google.com/books/about/Art_and_Visual_Perception.html?id=V2lhMORfIUAC

Dewi, I. G. A. A. P., & Caesariana, I. P. S. (2026). Visual structure analysis of Balinese Keketusan Batun Timun as a basis for geometric transformation in contemporary visual communication design. Journal of Visual Art and Design Studies: Les-Guet's, 2(2), 169–187. https://doi.org/10.25078/lg.v2i2.7675

Harley, A. (2018, June 3). Visibility of system status (usability heuristic #1). Nielsen Norman Group. https://www.nngroup.com/articles/visibility-system-status/

International Organization for Standardization. (2019). Ergonomics of human-system interaction: Part 210: Human-centred design for interactive systems (ISO Standard No. 9241-210:2019). https://www.iso.org/standard/77520.html

Johnson, J. (2020). Designing with the mind in mind: Simple guide to understanding user interface design guidelines (3rd ed.). Morgan Kaufmann. https://doi.org/10.1016/C2018-0-02561-X

Ma, J. (2025). A study on perceptual design of hierarchical graphic information in interfaces based on Gestalt principles. Applied Sciences, 15(21), 11327. https://doi.org/10.3390/app152111327

Norman, D. A. (2013). The design of everyday things (Rev. and expanded ed.). Basic Books. https://www.hachettebookgroup.com/titles/don-norman/the-design-of-everyday-things/9780465050659/

Les-Guet's : Journal of Visual Art And Design Studies © 2025 by UHN I Gusti Bagus Sugriwa Denpasar is licensed under CC BY-NC-SA 4.0

Volume 2 Number 2, October 2026
e-ISSN 3109-5569
DOI: https://doi.org/10.25078/lg.v2i2.7674
https://ojs.uhnsugriwa.ac.id/index.php/lg

Radiawan, I. M., Sudharsana, T. I. R. C., & Diantari, N. K. Y. (2022). Application of Balinese ornament (Keketusan Kakul-kakulan) in endek woven fabric with airbrush technique for evening dress. Journal of Aesthetics, Design, and Art Management, 2(1), 73–86. https://doi.org/10.58982/jadam.v2i1.188

Robles, K. E., Roberts, M., Viengkham, C., Smith, J. H., Rowland, C., Moslehi, S., Stadlober, S., Lesjak, A., Lesjak, M., Taylor, R. P., Spehar, B., & Sereno, M. E. (2021). Aesthetics and psychological effects of fractal based design. Frontiers in Psychology, 12, Article 699962. https://doi.org/10.3389/fpsyg.2021.699962

Rogers, Y., Sharp, H., & Preece, J. (2023). Interaction design: Beyond human-computer interaction (6th ed.). Wiley. https://www.wiley.com/en-us/interaction-design-beyond-human-computer-interaction-6th-edition-p-9781119901112

Rose, G. (2023). Visual methodologies: An introduction to researching with visual materials (5th ed.). SAGE Publications. https://doi.org/10.4135/9781036231576

Suparta, I. M., Karja, I. W., & Muka, K. (2023). Balinese ornaments. International Journal of Social Science and Human Research, 6(6), 3345–3353. https://doi.org/10.47191/ijsshr/v6-i6-17

Taylor, R. P., Viengkham, C., Smith, J. H., Rowland, C., Moslehi, S., Stadlober, S., Lesjak, A., Lesjak, M., & Spehar, B. (2024). Fractal fluency: Processing of fractal stimuli across sight, sound, and touch. In A. Di Ieva (Ed.), The fractal geometry of the brain (Advances in Neurobiology, Vol. 36, pp. 907–934). Springer. https://doi.org/10.1007/978-3-031-47606-8_45

Wagemans, J., Elder, J. H., Kubovy, M., Palmer, S. E., Peterson, M. A., Singh, M., & von der Heydt, R. (2012). A century of Gestalt psychology in visual perception: I. Perceptual grouping and figure-ground organization. Psychological Bulletin, 138(6), 1172–1217. https://doi.org/10.1037/a0029333

Ware, C. (2019). Information visualization: Perception for design (4th ed.). Morgan Kaufmann. https://www.sciencedirect.com/book/monograph/9780128128756/information-visualization

Widianugraha, I. D. P. V., Daniartha, A. A. G., & Firmansyah, N. W. (2026). Visualizing ecology through tradition: A biophilic interpretation of Balinese Ganggong ornament for contemporary environmental communication design. Journal of Visual Art and Design Studies: Les-Guet's, 2(2), 148–168. https://doi.org/10.25078/lg.v2i2.7673

World Wide Web Consortium. (2023). Web content accessibility guidelines (WCAG) 2.2. https://www.w3.org/TR/2023/REC-WCAG22-20231005/

Les-Guet's : Journal of Visual Art And Design Studies © 2025 by UHN I Gusti Bagus Sugriwa Denpasar is licensed under CC BY-NC-SA 4.0