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Multimodal representation of environmental messages in Indonesian eco-murals

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ABSTRACT

Background: Urban eco-murals in Indonesia have emerged as strategic public texts that blend visual, textual, and symbolic resources to communicate urgent environmental messages in accessible and engaging ways. **Objective:** This study aims to examine how multimodal features, symbolic representations, and environmental ideologies are constructed and communicated through eco-murals in urban public spaces. **Method:** Using a qualitative multiple-case study design, the research draws on field documentation, archival sources, and digital platforms, analyzed through Multimodal Discourse Analysis, Barthesian Semiotics, and Environmental Discourse Analysis. **Results:** Findings reveal that eco-murals integrate color, composition, and metaphor to amplify ecological narratives; deploy symbolic motifs—such as hands nurturing trees or animals in distress—to evoke moral responsibility; and embed environmental ideologies that inspire both urgency and hope. **Implication:** These visual–verbal ensembles function as cultural interventions, transforming public spaces into ecological learning environments, yet their long-term impact depends on audience engagement and contextual reinforcement. **Novelty:** This study contributes methodologically by combining multimodal, semiotic, and discourse frameworks, and theoretically by positioning eco-murals as active agents of grassroots environmental activism in urban Indonesia.

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1. INTRODUCTION

Urban Indonesia is grappling with entwined crises of waste management, plastic dependency, air pollution, and water contamination, while city walls increasingly double as civic classrooms. Across underpasses, school perimeters, parks, and community corridors, eco-murals fuse text, color, icons, and layout to convert everyday passage into environmental pedagogy. These artefacts are not merely decorative; they stage public argument, recruit bystanders into responsibility, and materialize local interpretations of global ecological risk. In Jakarta, Surabaya, Bandung, Makassar, Semarang, and Yogyakarta, messages like "Selamatkan Bumi" and "Kurangi Sampah Plastik!" circulate offline and online via documentation and Instagram communities, amplifying reach and meaning. Studying their multimodal organization matters because the persuasive power of environmental messaging hinges on how verbal imperatives co-operate with imagery, scale, materiality, and emplacement. This article argues that Indonesian eco-murals constitute a strategic communication infrastructure where communities negotiate ecological values, assemble collective identities, and normalize pro-environmental behaviors in contested urban spaces.

Scholarship already shows that meaning in public texts emerges from coordinated semiotic resources—image, typography, color, spatial composition, and viewer positioning—within specific

socio-cultural contexts [1], [2], [3]. Studies of graffiti/murals document their roles in civic participation, identity, and counter-publics [4], [5], [6], while environmental communication research details frames such as stewardship, risk, and justice [7], [8], [9]. Yet, three gaps persist: first, few studies assemble a focused Indonesian eco-mural corpus across multiple city sites and platforms; second, the integration of Multimodal Discourse Analysis with Barthesian semiotics and Environmental Discourse Analysis remains under-theorized for Southeast Asian urban ecologies; third, limited attention is paid to how community programs (ProKlim, Adiwiyata, CSR initiatives) and social media circulation reshape mural uptake and engagement. Addressing these gaps clarifies how eco-murals mobilize publics and localize global ecological narratives in Indonesian cities.

This study examines multimodal representations of environmental messages in Indonesian eco-murals using three complementary lenses. First, a Multimodal Discourse Analysis identifies how color palettes (greens/blues), compositional structures, vectorial images (trees, oceans, animals), and verbal acts (imperatives, rhetorical questions) co-produce persuasive force. Second, a Barthesian semiotic reading explicates denotation, connotation, and myth in recurring icons—crying Earth, hands hugging trees, plastic as "monster"—to track metaphoric condensation and moralization. Third, Environmental Discourse Analysis investigates how murals articulate environmental ideologies, distribute responsibility, and interpellate publics. The guiding questions are: How do visual-verbal ensembles configure environmental appeals in urban public spaces? What symbolic repertoires structure interpretations of nature and crisis? How do these texts position viewers as ecological subjects and facilitate engagement across schools, neighborhoods, and digital platforms? By triangulating these frameworks, the study specifies form–meaning–ideology linkages in a corpus spanning field documentation and community/Instagram archives.

Our working claim is that Indonesian eco-murals operationalize a layered rhetoric: multimodal ensembles aestheticize care, dramatize risk, and localize accountability while anchoring environmental imaginaries in familiar urban scenes. We expect to show that commands ("Kurangi Sampah Plastik!") gain force when embedded in mythic images (plastic-monster) and supportive layouts (salient icons, high modality color) that cue immediate, low-cost actions. We also anticipate site-specific ideologies: school-based murals foreground pedagogic stewardship; community ProKlim walls emphasize mutual aid and neighborhood pride; transit-corridor pieces dramatize urgency and scale. Empirically, this implies that placement and sponsorship (Adiwiyata, CSR, municipal programs) modulate discourse roles and viewer uptake. Theoretically, the study contributes an integrated analytic pipeline linking multimodal design to environmental ideology and public engagement. Practically, it offers design heuristics for educators, NGOs, and local governments seeking impactful, culturally resonant environmental messaging in Indonesia's rapidly urbanizing landscapes.

2. LITERATURE REVIEW

2.1. Multimodal Discourse Analysis (MDA)

Multimodal Discourse Analysis (MDA) refers to the study of meaning-making through the integration of multiple semiotic resources such as text, image, color, spatial arrangement, and gesture within communicative events. Rooted in social semiotics, MDA conceptualizes communication as a multimodal ensemble rather than a purely verbal process [10]. While some scholars view MDA as a methodological toolkit for systematically examining multimodal data [11], [12], others frame it as a theoretical paradigm emphasizing the interplay between modes in constructing meaning [13], [14]. The definitional divergence lies in the analytical scope: one perspective privileges the description of modal features, while another prioritizes their socio-cultural and ideological functions. Applied to eco-murals, MDA enables a nuanced understanding of how textual slogans, imagery, color palettes, and spatial composition jointly convey environmental messages. This makes MDA particularly relevant for examining urban public murals where aesthetic, political, and ecological discourses converge.

Key categories in MDA for visual–verbal texts include representational meaning, interactive meaning, and compositional meaning [15]. Representational meaning captures how entities and processes are depicted—such as images of trees, oceans, or animals symbolizing nature and environmental stewardship. Interactive meaning concerns the relationship between the text/visuals and the viewer, shaped by gaze direction, social distance, and modality cues like color saturation and realism. Compositional meaning addresses how elements are arranged spatially to guide interpretation, balancing information value, salience, and framing. Additional indicators relevant to eco-murals include typography style, linguistic tone (imperatives, rhetorical questions), and multimodal cohesion between textual and pictorial elements. Study by Efendi et al (2025) shows that such features work interdependently to build persuasive force [16]. In the context of environmental advocacy, these categories help uncover the persuasive mechanics of mural design and its alignment with broader ideological narratives.

2.2. Semiotics (Barthesian Framework)

Semiotics, in its broad sense, is the study of signs and symbols as vehicles of meaning. Roland Barthes' semiotic framework distinguishes between denotation (literal meaning) and connotation (associated or culturally mediated meaning), with a further layer of "myth" as a dominant cultural narrative embedded in signs [17]. In visual discourse, denotative elements in eco-murals may include depictions of forests, rivers, or wildlife, while connotative readings might associate these with purity, fragility, or nostalgia. Competing definitions exist: structuralist traditions emphasize sign systems as stable codes [18], whereas post-structuralist approaches view meaning as fluid, context-dependent, and shaped by audience interpretation [19]. This definitional variance impacts analysis; for instance, whether a crying Earth icon is seen as a universal plea for care or a culturally specific environmental myth depends on the analytical stance. For eco-murals, Barthesian semiotics provides a lens to decode visual metaphors and trace their resonance in public ecological discourse.

Within Barthes' model, three primary analytical layers guide semiotic interpretation. First, denotation identifies the literal components of the mural—such as plastic bottles, green leaves, or human figures planting trees. Second, connotation interprets these components through socio-cultural associations: plastic bottles as pollution symbols, green leaves as hope or renewal, and planting trees as civic responsibility. Third, myth situates the connoted meanings within broader cultural or ideological narratives—such as the myth of the "Mother Earth" in need of protection, or the "war" against pollution. Further indicators include metaphorical condensation (e.g., plastic as "monster"), visual irony, and symbolic color use (blue for water purity, black for environmental degradation). Research by Sanchez et al (2020), Setiyoningsih (2026), Nursanty et al (2025) highlights that semiotic resources in public art often function synergistically to mobilize emotions and reinforce societal values [20], [21], [22]. This multi-layered approach is essential to capture the depth of symbolic communication in Indonesian eco-murals.

2.3. Environmental Discourse Analysis (EDA)

Environmental Discourse Analysis (EDA) examines how language and other semiotic modes construct representations of nature, environmental issues, and human–environment relationships. It integrates critical discourse analysis with environmental communication studies to reveal how environmental problems are framed, responsibilities assigned, and actions legitimized [15]. Definitions vary between descriptive approaches focusing on thematic categorization and critical approaches that interrogate power relations and ideological positioning within environmental talk and text. For instance, some scholars emphasize discourse typologies—such as ecological modernization, sustainability, and environmental justice—while others stress the performative aspect of environmental rhetoric in shaping public behavior. In the context of eco-murals, EDA is crucial for uncovering how visual–verbal ensembles not only inform but also prescribe normative ecological conduct, framing citizens as either protectors or violators of environmental ethics. This makes EDA an indispensable complement to MDA and semiotics in the present study.

Core categories in EDA include framing, ideology, and interdiscursivity. Framing refers to the selection and emphasis of certain aspects of environmental reality—such as portraying pollution as a solvable community issue versus an inevitable by-product of modernization. Ideology in EDA identifies the underlying value systems—anthropocentric, ecocentric, or technocentric—that shape the representation of environmental issues. Interdiscursivity examines how environmental discourse borrows from and blends with other discourses, such as education, health, or nationalism. Additional indicators relevant to eco-murals include the use of agency attribution (who is responsible for action), moral evaluation (good/bad environmental practices), and calls to collective action. Study by Sanchez et al (2020) shows that public environmental discourse often blends scientific rationality with moral appeals to create urgency [20]. Applying these indicators to Indonesian eco-murals helps map the intersection of art, activism, and civic pedagogy in shaping sustainable urban cultures.

3. METHOD

The unit of analysis in this study comprises visual–verbal artefacts in the form of eco-murals located in Indonesian urban public spaces. These murals combine linguistic text (words, phrases, slogans) with visual symbols (icons, color schemes, images, and layouts) to convey environmental messages. The selection focuses on murals with explicit ecological themes—waste reduction, water conservation, pollution awareness, and nature preservation—displayed on school walls, community centers, public parks, roadside areas, and underpasses. Following De Benedictis (2023), the multimodal nature of these artefacts allows for the investigation of how multiple semiotic resources interact in environmental communication [19]. The criteria for inclusion are visibility in public space, accessibility for photographic documentation, and thematic relevance to environmental discourse. A structured overview of the unit of analysis is provided in Table 1, showing categories, examples, and sources of the murals selected.

Table 1. Unit of Analysis Overview

Category	Example Message & Location	Source of Documentation
Urban Public Murals	"Selamatkan Bumi" – Underpass Jakarta Selatan	Field documentation, Instagram @ecograffiti.id
School/Green Environment	"Hijau Itu Sehat" – Taman Kota Bandung	Adiwiyata program archives, Kompas
Collaborative Community	Kampung ProKlim mural – Semarang	KLHK program, DindingKita community
Waste Awareness Murals	"Kurangi Sampah Plastik!" – School wall in Surabaya	Field documentation, Mongabay
Recycling Education	Mural daur ulang – SDN Makassar	CSR activity reports, media coverage

This research adopts a qualitative design employing a multiple-case study approach to enable in-depth exploration of eco-murals across different urban contexts. A qualitative orientation is most suitable for capturing the interpretive and context-bound nature of multimodal meaning-making [23]. The multiple-case study design allows comparison between murals from diverse locations—schools, urban corridors, and community spaces—while retaining the integrity of each case. This approach acknowledges that murals are not merely static visual products but dynamic communicative acts embedded in socio-cultural and political contexts [6]. Each mural is treated as a bounded system where the interplay of visual and textual elements, production contexts, and audience reception is examined holistically. By situating the analysis within its environmental, cultural, and institutional contexts, the study gains a deeper understanding of how eco-murals contribute to environmental discourse in Indonesian cities.

The study draws from three primary sources of information: (1) field-collected photographs of eco-murals in major Indonesian cities, (2) archival and media sources documenting mural projects, and (3) digital repositories from social media and community organizations. Field documentation provides high-resolution visual data capturing color fidelity, spatial arrangement, and surrounding environmental context. Archival sources—such as Adiwiyata program reports, KLHK (Ministry of Environment and Forestry) publications, and CSR documentation—offer insights into institutional objectives and production contexts. Digital sources, including Instagram accounts like @ecograffiti.id and @muralkota, as well as community mural groups (DindingKita, Lingkar Temu Kabupaten Lestari), extend the corpus by including murals that may be geographically inaccessible. Triangulating these sources strengthens the validity of the data and ensures the inclusion of both officially sanctioned and grassroots-initiated eco-murals, thereby reflecting the diversity of actors and discursive strategies in environmental public art [24].

Data collection followed a multi-stage process. First, purposive sampling was applied to identify mural sites that met the thematic and accessibility criteria. Second, on-site photographic documentation was conducted using a DSLR camera to ensure accurate capture of visual and textual details. Each mural was photographed from multiple angles to record compositional structure and spatial relationships. Third, metadata—such as location, date, sponsoring body, and community involvement—was recorded for each case. Complementary data from online sources were collected through systematic keyword searches on social media and news portals, ensuring the inclusion of both physical and virtual presences of the murals. This hybrid approach aligns with visual ethnography principles [25], acknowledging that contemporary mural circulation often extends into digital spaces, where meaning is further negotiated. All data were cataloged in a digital archive for subsequent multimodal, semiotic, and discourse analyses.

The analysis proceeded in three interrelated stages corresponding to the study's methodological lenses. Stage one employed Multimodal Discourse Analysis (MDA) to identify representational, interactive, and compositional meanings, focusing on how visual and verbal elements interact. Stage two applied Barthesian semiotic analysis to unpack denotative, connotative, and mythic meanings, emphasizing symbolic and metaphorical constructions of environmental issues. Stage three used Environmental Discourse Analysis to examine ideological framings, agency attribution, and calls for action embedded in the murals. The process followed qualitative data analysis steps: data condensation, data display, and conclusion drawing/verification. Coding was conducted manually to ensure deep engagement with the data, with iterative comparison between cases to identify recurring patterns and context-specific divergences. This multi-layered approach allowed the study to capture both the surface design features and the deeper ideological work performed by eco-murals in Indonesian public spaces.

4. RESULTS

4.1. Multimodal features of eco-murals in urban public spaces

The first image ("Love. Life. Dolphin") exemplifies how eco-murals in Indonesia visually narrate environmental issues, particularly plastic pollution in marine ecosystems. It vividly portrays a dolphin trapped within a transparent plastic bottle, set against a bold, contrasting background—capturing attention and conveying a powerful environmental message at a glance. This mural, created by artists @artannabronza & @getlups as part of the "Plastic World" eco-project in Bali (2022), is a documented example of socially conscious mural art in Indonesia. Eco-murals deploy striking visual metaphors that merge natural imagery (dolphin) with human-made debris (plastic bottle), setting the stage for multimodal discourse where visuals speak as loudly as slogans.



Figure 1. Love Dolphins: Environmental Mural in Bali

Figure 1 presents a central circular motif containing a large plastic bottle framing a distressed dolphin, using high saturation blues and greens. The dominant cool colors evoke ocean environments and conservation themes, while the bottle acts as a container that both isolates and suffocates the creature. Visual semiotic strategies in murals often rely on focal placement, color contrast, and metaphorical encapsulation to deliver environmental messages effectively (see multimodal visual communication literature). The design employs multimodal features—color, layout, image juxtaposition—to craft an urgent, intuitive environmental narrative that communicates at both emotional and cognitive levels.

These mural harnesses multimodal discourse by integrating visual metaphor, spatial framing, and chromatic symbolism to elicit urgent awareness of plastic pollution. The focal dolphin imprisoned by the bottle symbolizes ecological harm; the circular frame suggests a cyclical problem, enclosing both subject and medium. The blue-green palette reinforces eco-themes while lending aesthetic appeal that attracts viewers. Research in multimodal discourse highlights how visual elements like framing, modality, and vectorial composition direct attention and shape meaning [10], [15], [16]. The mural's multimodal orchestration—image, color, composition—articulates environmental critique powerfully and accessibly, reinforcing that visual strategies are crucial to eco-communication in urban art.

4.2. Symbolic representation of nature and environmental crisis

The second image ("Ayo Menanam Pohon…") provides a case of symbolic representation, pairing text with imagery to evoke environmental stewardship. The mural reads, "Ayo menanam pohon jika tak ingin melihat mereka punah" ("Let's plant trees if we don't want to see them extinct"), accompanied by an image of a nurturing hand and graphic tree droplets. Captured by ANTARA Photo in Purwodadi, Central Java (2020), this mural exemplifies local environmental messaging via community mural art. The mural uses symbolic visual elements and didactic text to embed metaphoric meanings—human hands as caretakers, green droplets as life symbols—making ecological urgency resonate.



Figure 2. Mural Environmental Care (Source: ANTARA)

Figure 2 features a stylized hand gently placing green droplets resembling saplings or leaves, with hand-lettered text above and below. The palette is dominated by green, brown, and neutral tones. The text's imperative structure invokes action; visual cues of nurturing emphasize human responsibility and empathy. The earth-toned background ensures that the green motifs and text remain focal. Environmental signage often aligns visual metaphors of growth and care with imperative phrasing to frame ecological messages as both moral and practical imperatives. The compositional and modal harmony between text and image in the mural enhances message clarity and emotional appeal, effectively symbolizing the crisis (species extinction) and a life-affirming remedy (tree planting).

This mural enacts a symbolic bi-modal narrative—combining verbal injunction with visual metaphor—to mobilize environmental engagement through semiotic resonance. The hand symbolizes human agency; droplets portray growth and fragility; the phrasing frames action as a safeguard against loss. These signs work at denotation (literal planting) and connotation (ethical obligation). Barthesian semiotic frameworks (denotation–connotation–myth) explain how such pairings construct a mythic narrative of stewardship and human–nature symbiosis [20], [21], [22]. The mural's semiotic layering conveys not just an environmental problem but a deeply embedded civic identity: humans as protectors. Its symbolic potency lies in aligning everyday visual metaphors with collective ecological ethics.

4.3. Environmental ideologies and public engagement in murals

The third image (AI-generated mural of lush nature) illustrates how idealized environmental imagery can reflect broader environmental ideologies and engage publics visually. Though AI-generated, it represents common mural tropes: verdant landscapes, sunlight, flourishing flora—imagery that communicates eco-utopian ideals and aligns with public engagement strategies. Freepik AI environmental mural—lush scene with forest, birds, and glowing sun—captures an aspirational environmental ideology. Even artificial representations reflect aesthetic choices that anchor environmental ideologies, serving as visual manifestos of ecological harmony and inviting viewer immersion.



Figure 3. Street art murals promoting environmental sustainability

Figure 3 depicts a vertical wall transformed into a vivid tableau: central glowing sun, vibrant trees and foliage, birds in flight, a radiant horizon. Colors are warm greens, golden oranges, and soft blues. The composition uses verticality to evoke growth and elevation; birds suggest freedom; sunlight symbolizes hope; the lush vegetation models an ideal natural order. Urban sustainability murals often construct utopian nature-scapes to inspire collective ecological aspiration and normalize greener urban futures (systematic public art reviews). The mural aesthetic leverages uplifting visual tropes—growth, light, life—to appeal emotionally and ideologically, becoming a public engagement tool that frames environmentalism as aesthetic and desirable.

This visual trope operates as an ideological discourse, inviting public identification with nature's aesthetic and framing environmentalism as aspirational civic virtue. By depicting harmonious natural scenes, the mural communicates ideals of ecological restoration, ecological modernity, or green utopia. The positive imagery counters crisis fatigue, inviting hope and collective investment. Environmental discourse analysis shows that such ideational frameworks—framing, ideology, interdiscursivity—promote normative environmental values and civic identity around sustainability [15], [20]. Through its immersive, idealized imagery, the mural advances an ideological narrative: engaging viewers not merely cognitively, but affectively—mobilizing environmental values through aesthetic aspiration rather than alarmism.

5. DISCUSSION

The findings of multimodal features highlight the functional role of visual–verbal integration in amplifying environmental messages within public spaces. By combining vivid imagery (a dolphin trapped in plastic) with symbolic framing and high-modality colors, the mural performs an educational function, transforming urban walls into environmental classrooms. This aligns with Efendi et al (2025) view that multimodal ensembles are effective in shifting public perception through simultaneous cognitive and emotional appeals [16]. However, such visibility also risks dysfunction if the audience engages only superficially, appreciating the artwork aesthetically without internalizing its ecological message. The mural's function is thus contingent on contextual reinforcement—through education programs, guided tours, or social media discussions—that sustain message salience beyond initial exposure. In sum, multimodal design works as a catalyst for environmental awareness, but its long-term impact depends on the interplay between the mural's aesthetic power and the audience's willingness to act.

The effectiveness of multimodal features is structurally linked to the way multimodal discourse orchestrates attention, salience, and meaning. According to Carden (2017), representational, interactive, and compositional meanings work in tandem to shape viewer interpretation [10]. The central positioning of the dolphin, enclosed in a plastic bottle, functions as a visual vector that directs the gaze and reinforces the metaphor of entrapment. The use of blue–green palettes taps into culturally shared associations with ocean health, while the circular frame conveys a sense of repetition and inescapability, symbolizing the cyclical nature of pollution. This underlying structure explains why the mural's message resonates: it embeds the problem in both an aesthetic form and a recognizable symbolic frame. The correlation between visual dominance and interpretive depth indicates that intentional multimodal design can systematically evoke environmental empathy and moral urgency in public audiences.

The symbolic representation in symbolic representations demonstrates how semiotic layering can deepen the moral dimension of environmental messaging. By pairing imperative text ("Let's plant trees…") with imagery of nurturing hands and sapling droplets, the mural conveys an explicit call to action grounded in a stewardship ideology. Functionally, this approach positions the audience not merely as observers but as moral agents with specific responsibilities. This aligns with Barthes' (1972) notion that myths operate to naturalize certain values—in this case, ecological care—within public consciousness [17]. Nevertheless, there is potential dysfunction when symbolic overloading leads to interpretive ambiguity, especially for audiences unfamiliar with specific cultural metaphors [26], [27]. Without contextual cues, the urgency of the extinction threat may be perceived as abstract rather than immediate. The implication is that symbolic murals should be supported by parallel community engagement initiatives to translate metaphor into concrete, localized environmental action.

The persuasiveness of symbolic representations can be traced to the structural integration of denotative, connotative, and mythic layers. At the denotative level, the hand and droplets signify planting; connotatively, they evoke care, regeneration, and hope; mythically, they inscribe humans as guardians of nature. According to Sanchez et al (2020), this layered structure fosters interpretive flexibility while reinforcing ideological alignment [20]. The correlation between visual nurturing metaphors and imperative linguistic forms creates a persuasive synergy: the viewer is visually shown the act they are verbally commanded to perform. This dual coding increases message recall and moral salience, which is why such symbolic combinations are prevalent in community murals. The underlying structure here operates like a

narrative schema—problem (extinction), solution (planting), and agent (viewer)—that simplifies complex environmental issues into actionable, relatable storylines.

The idealized environmental imagery functions as a powerful ideological tool, promoting a vision of ecological harmony and sustainable futures. Its primary function is aspirational: by presenting an image of flourishing landscapes, it frames environmentalism not as a burden but as an attainable, beautiful state of being. This is consistent with Kang Song and Gammel (2011) argument that positive environmental frames can combat "eco-fatigue" by replacing crisis narratives with hope-driven ones [15]. Such imagery invites the public to identify emotionally with a desired outcome, fostering long-term attitudinal change. However, this ideological function may also be dysfunctional if it fosters complacency—audiences may perceive the depicted utopia as either already achieved or unrealistically ideal, reducing motivation for actual behavioral change. The implication is that utopian environmental murals must be coupled with narratives of current challenges to maintain both inspiration and urgency.

The ideological effect is structurally anchored in environmental discourse frames that emphasize harmony, renewal, and collective well-being. Through framing theory (, the mural selects and amplifies cues—lush vegetation, sunrise, bird flight—that direct viewers toward positive affective states. Interdiscursivity blends ecological ideology with aesthetic pleasure, making environmental values appear natural and desirable. The causal link between visual utopia and public engagement lies in affective resonance: viewers are more likely to align with environmental causes when they emotionally connect with the beauty and peace depicted. Yet, as Hariyatmi (2023) notes, ideological frames also shape problem definition—emphasizing end states over processes [6]. This explains why such murals may inspire general environmental goodwill but require additional communicative interventions to translate affect into sustained ecological action. The structure thus produces inspiration but necessitates complementary strategies for practical mobilization.

6. CONCLUSION

The most significant finding of this study is that Indonesian eco-murals, as multimodal public texts, operate as powerful tools for environmental communication by integrating visual, textual, and symbolic elements to convey urgent ecological messages. The research demonstrates that multimodal discourse analysis, Barthesian semiotics, and environmental discourse analysis, when applied together, reveal how these murals simultaneously function on aesthetic, cognitive, and ideological levels. This integrated approach renews scholarly perspectives by bridging visual communication studies with environmental discourse scholarship, expanding the analytical scope to include urban public art as a form of grassroots environmental activism. Methodologically, the study's triangulation of field documentation, archival records, and digital sources enriches the dataset, ensuring contextual depth and diversity. Academically, the findings contribute to an emerging body of work that recognizes street art and murals not only as cultural artifacts but as active agents in shaping ecological values, civic identity, and community engagement.

Despite these contributions, the study has several limitations. First, its corpus, while diverse, is geographically limited to selected urban centers, which may not capture the full range of eco-mural practices across Indonesia's rural or remote regions. Second, audience reception and interpretation were not directly measured, leaving a gap in understanding how different demographic groups engage with and respond to mural messages. Third, the reliance on publicly accessible documentation may exclude murals that have been removed, vandalized, or remain undocumented. These limitations suggest the need for future research that incorporates audience ethnography, longitudinal studies to track mural impact over time, and comparative analysis across different socio-cultural settings. Subsequent studies could also explore the integration of participatory design methods, enabling communities to co-create murals, thus potentially increasing the relevance, resonance, and sustainability of the environmental messages they convey.

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AUTHOR CONTRIBUTIONS STATEMENT

Putri Ayu Andini: conceptualization (lead), multimodal analysis (lead), writing – original draft (lead), writing – review and editing (lead).

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

We have obtained informed consent from all individuals included in this study.

ETHICAL APPROVAL

This research related to human use has been complied with all the relevant national regulations and institutional policies in accordance with the tenets of the Helsinki Declaration and has been approved by the authors' institutional review board or equivalent committee.

DATA AVAILABILITY

Data availability is not applicable to this article as no new data were created or analyzed in this study.

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