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Research Article

Designer Meaning-Making in Eco-Visual Communication: A Thematic Study of Practitioners in the Digital Age

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ABSTRACT

Eco-visual communication has become an essential domain within contemporary design practice, particularly in response to increasing global environmental challenges. This study examines how designers construct meaning in eco-visual communication within the context of the digital age. Adopting a qualitative research design based on secondary data, the study utilises thematic analysis to explore patterns in scholarly literature, case studies, and practitioner-oriented discussions. The findings reveal that designer meaning-making is shaped by three interrelated dimensions: ethical responsibility, aesthetic strategies, and technological mediation. Designers operate as cultural intermediaries, translating complex environmental issues into accessible visual narratives while navigating tensions between sustainability values and commercial demands. The study further highlights the transformative role of digital media in enabling interactive and participatory forms of communication, while also presenting challenges such as information overload and superficial engagement. By integrating semiotics, ecological design theory, and digital media theory, the research contributes to a more comprehensive understanding of eco-visual communication. It underscores the need for ethical awareness, interdisciplinary collaboration, and critical design practices to enhance the effectiveness of sustainability communication in the digital era.

Keywords: eco-visual communication, sustainability, meaning-making, design practice, digital media, environmental communication, thematic analysis

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1. Introduction

The accelerating climate crisis, biodiversity loss, and environmental degradation have fundamentally reshaped global priorities, placing sustainability at the centre of academic, political, and creative discourse. Within this context, visual communication design has emerged as a powerful medium for articulating environmental concerns and influencing public perception. Eco-visual communication, broadly understood as the use of visual strategies to convey environmental messages, plays a critical role in translating complex ecological issues into accessible and persuasive narratives (Manzini, 2015; Heller & Vienne, 2003).

The increasing urgency of sustainability challenges-such as climate change, pollution, and resource depletion-demands innovative forms of communication that can bridge the gap between scientific knowledge and public understanding. Designers, in this regard, function not merely as aesthetic practitioners but as cultural mediators who interpret, construct, and disseminate meanings related to environmental responsibility (Krippendorff, 2006). Their work shapes how audiences perceive environmental issues, often influencing attitudes, emotions, and behaviours.

In the digital age, the scope and impact of eco-visual communication have expanded significantly. The proliferation of digital platforms-including social media, interactive websites, and multimedia campaigns-has transformed how environmental messages are produced, circulated, and consumed

(Jenkins, 2006). These platforms enable designers to reach global audiences instantly, fostering participatory and dialogic forms of communication. However, they also introduce new complexities, such as information overload, algorithmic filtering, and the commodification of environmental narratives (Bauman, 2000).

A central concern within this evolving landscape is the process of meaning-making. Meaning-making refers to how designers conceptualise and encode messages, as well as how audiences interpret and respond to them. Drawing from semiotic theory, visual communication is understood as a system of signs in which images, colours, typography, and composition function as signifiers that convey particular meanings (Barthes, 1977). In eco-visual communication, these signs often draw upon culturally embedded associations with nature, such as the use of green to symbolise sustainability or imagery of forests and oceans to evoke ecological harmony.

However, meaning-making in eco-visual communication is not a neutral or straightforward process. It is shaped by a range of factors, including cultural contexts, technological affordances, institutional constraints, and ethical considerations. Designers must navigate tensions between aesthetic appeal and informational accuracy, emotional engagement and critical reflection, and commercial interests and environmental ethics (Papanek, 1985; Julier, 2014). These tensions highlight the complexity of design practice in addressing sustainability issues.

Moreover, the digital transformation of design practice has introduced new forms of

interactivity and user engagement. Unlike traditional print media, digital platforms allow for dynamic, multimedia, and participatory experiences that can enhance the effectiveness of environmental communication. For example, interactive infographics, data visualisations, and social media campaigns enable users to engage with environmental issues in more immersive and personalised ways (Murray, 2012). At the same time, the rapid pace of digital communication can lead to superficial engagement, where complex issues are reduced to simplified or sensationalised messages.

Despite the growing importance of eco-visual communication, there remains a significant gap in understanding how designers construct meaning within this domain, particularly in relation to digital media. Existing research has often focused on the outcomes of environmental communication, such as audience responses or campaign effectiveness, rather than the processes through which designers conceptualise and create visual messages. This study addresses this gap by examining designer meaning-making as a central analytical focus.

Specifically, this research aims to explore how designers interpret environmental issues, how they translate these interpretations into visual forms, and how digital technologies shape these processes. By employing a qualitative research approach based on secondary data, the study seeks to identify thematic patterns in design practice and contribute to a more nuanced understanding of eco-visual communication.

The research is guided by the following questions:

- How do designers conceptualise eco-visual communication in the digital age?
- What thematic patterns characterise their meaning-making processes?
- How do digital technologies influence the creation and dissemination of eco-visual messages?

By addressing these questions, the study contributes to both theoretical and practical discussions in design studies, sustainability, and digital media. It integrates perspectives from semiotics, ecological design, and digital media theory to develop a comprehensive framework for analysing eco-visual communication. Furthermore, it highlights the evolving role of designers as agents of social and environmental change, emphasising the need for critical and ethical approaches to design practice in the face of global ecological challenges.

2. Literature Review

Eco-visual communication is situated within the broader discourse of sustainability, which encompasses environmental protection, social equity, and economic development (Elkington, 1997). The concept of sustainability has evolved from a primarily environmental concern to a multidimensional framework that integrates ecological, social, and economic dimensions. Within this framework, communication plays a crucial role in shaping public awareness and facilitating behavioural change.

Designers contribute to sustainability by creating visual messages that communicate environmental issues and promote sustainable practices. According to Heller and Vienne (2003), designers have a responsibility to address social and environmental challenges through their work, positioning design as a form of civic engagement. Similarly, Manzini (2015) emphasises the role of design in fostering social innovation and sustainable transitions, highlighting the importance of collaborative and participatory approaches.

Eco-visual communication often involves the translation of complex scientific data into accessible visual forms. For instance, climate change data, which may be difficult for non-experts to interpret, can be communicated through infographics, visual metaphors, and storytelling techniques. This process of translation is not merely technical but also interpretive, as designers must decide how to frame and represent information in ways that resonate with audiences.

However, the effectiveness of eco-visual communication depends on its ability to balance clarity and complexity. Oversimplification can lead to misunderstandings or the trivialization of environmental issues, while excessive complexity may hinder comprehension and engagement (Nisbet & Scheufele, 2009). This tension underscores the importance of meaning-making in design practice.

2.1 Semiotics and Meaning-Making in Design

Semiotics provides a foundational framework for understanding how meaning is

constructed in visual communication. Barthes (1977) conceptualises visual elements as signs composed of signifiers (the form) and signifieds (the concept). In eco-visual communication, designers use a range of signifiers-such as colours, symbols, and imagery-to evoke environmental meanings.

For example, the colour green is commonly associated with nature and sustainability, while images of melting ice or endangered species may symbolise an environmental crisis. These associations are culturally constructed and may vary across contexts, highlighting the importance of cultural sensitivity in design.

Krippendorff (2006) extends the concept of meaning-making by emphasising the role of users in interpreting design artefacts. He argues that design is a communicative process in which meaning is co-created by designers and audiences. This perspective is particularly relevant in the digital age, where interactive media allow users to actively engage with and reinterpret visual content.

Semiotics also highlights the role of ideology in visual communication. Environmental messages are not neutral but often reflect specific values and perspectives, such as conservation, sustainability, or consumer responsibility. Designers must therefore be aware of the ideological implications of their work and consider how their messages may influence public discourse.

2.2 Ecological Design and Ethical Responsibility

Ecological design theory emphasises the integration of environmental considerations into design processes. Papanek (1985) was

one of the earliest advocates of socially and environmentally responsible design, criticising the design industry for prioritising aesthetics and commercial interests over social good. He argued that designers have a moral obligation to address real-world problems, including environmental degradation.

Contemporary ecological design frameworks build on this foundation by promoting sustainable materials, energy efficiency, and life-cycle thinking (Julier, 2014). These approaches extend beyond the physical aspects of design to include communication strategies that raise awareness and encourage sustainable behaviour.

Ethical responsibility is a central theme in eco-visual communication. Designers must consider the potential impact of their work on both the environment and society. This includes avoiding greenwashing-misleading claims about environmental benefits-and ensuring that messages are accurate and credible (Delmas & Burbano, 2011).

At the same time, designers often operate within commercial contexts that may conflict with sustainability goals. For example, advertising campaigns for environmentally harmful products may require designers to compromise their ethical values. This tension highlights the need for critical reflection and ethical decision-making in design practice.

2.3 Digital Media and the Transformation of Design Practice

The rise of digital media has fundamentally transformed design practice, introducing new tools, platforms, and modes of communication. Jenkins (2006) describes

this transformation as a shift toward convergence culture, where content flows across multiple platforms and audiences actively participate in its creation and dissemination.

Digital media enable designers to create interactive and multimedia experiences that enhance engagement with environmental issues. For example, data visualisation tools allow for the dynamic representation of environmental data, making complex information more accessible and engaging (Murray, 2012). Social media platforms provide opportunities for viral campaigns and grassroots activism, amplifying the reach of eco-visual messages.

However, digital media also present challenges. The abundance of information can lead to cognitive overload, making it difficult for audiences to process and retain environmental messages (Bauman, 2000). Additionally, algorithm-driven platforms may prioritise content based on popularity rather than accuracy or importance, potentially distorting environmental narratives.

Another challenge is the risk of superficial engagement. Digital platforms often encourage quick consumption of content, which may result in a shallow understanding of complex issues. Designers must therefore develop strategies to sustain attention and promote deeper engagement.

2.4 Gaps in Existing Literature

While there is extensive research on sustainability, design, and digital media, there is a lack of integrated studies that examine how designers construct meaning in

eco-visual communication. Much of the existing literature focuses on either theoretical frameworks or practical outcomes, without adequately addressing the processes that link them.

Furthermore, there is limited attention to the role of designers as active agents in shaping environmental discourse. Understanding their perspectives and practices is essential for developing more effective and ethical approaches to eco-visual communication.

This study addresses these gaps by adopting a thematic analysis of secondary data, focusing on designer meaning-making as a central concept. By integrating insights from multiple disciplines, it aims to provide a more comprehensive understanding of eco-visual communication in the digital age.

3. Theoretical Framework

This study adopts an interdisciplinary theoretical framework that integrates semiotics, ecological design theory, and digital media theory to analyse how designers construct meaning in eco-visual communication. These frameworks collectively provide a comprehensive lens to understand the symbolic, ethical, and technological dimensions of design practice in the digital age.

3.1 Semiotics and Visual Meaning-Making

Semiotics, the study of signs and sign systems, forms the foundational basis for analysing meaning-making in visual communication. According to Barthes (1977), a sign consists of two components:

the *signifier* (the visual form) and the *signified* (the concept it represents). In eco-visual communication, designers strategically employ visual signifiers-such as colour palettes, imagery, typography, and layout-to evoke specific environmental meanings.

For instance, the use of green hues is widely associated with nature, sustainability, and ecological balance, while imagery of melting glaciers or polluted landscapes often signifies environmental crisis. These visual elements function as culturally embedded symbols that communicate complex ecological concepts in an immediate and emotionally resonant manner. However, such meanings are not universal; they are shaped by cultural, social, and contextual factors, which may influence how audiences interpret visual messages (Hall, 1997).

Barthes (1977) further distinguishes between denotation (literal meaning) and connotation (associated or symbolic meaning), a distinction that is particularly relevant in eco-visual communication. A photograph of a forest, for example, may denote a natural landscape while connoting ideas of purity, sustainability, or environmental preservation. Designers often rely on these layered meanings to create persuasive and impactful visual narratives.

Krippendorff (2006) extends semiotic theory by emphasising the role of users in the meaning-making process. He argues that design is inherently communicative, involving a continuous interaction between designers and audiences. Meaning is not fixed but co-constructed through interpretation, making audience perception a

critical component of design practice. In the context of digital media, where users actively engage with and reinterpret content, this participatory dimension becomes even more significant.

Thus, semiotics provides a crucial framework for understanding how eco-visual messages are encoded and decoded, highlighting the interpretive nature of design and the importance of cultural context in shaping meaning.

3.2 Ecological Design Theory and Ethical Responsibility

Ecological design theory introduces a normative dimension to the study of eco-visual communication by emphasising the ethical responsibilities of designers. Papanek (1985) was among the first to critique the design profession for its complicity in consumerism and environmental degradation, arguing that designers must prioritise social and ecological well-being over commercial interests. His work laid the foundation for a more responsible and sustainable approach to design.

Contemporary ecological design extends this perspective by incorporating principles such as sustainability, life-cycle thinking, and systems thinking (Julier, 2014). These principles encourage designers to consider the environmental impact of their work at every stage, from material selection to production and disposal. In the realm of visual communication, this translates into the creation of messages that not only inform but also promote sustainable behaviours and values.

Manzini (2015) further expands ecological design by emphasising social innovation and collaborative practices. He argues that design should facilitate sustainable transitions by engaging communities and fostering collective action. This perspective positions designers as agents of change who actively contribute to environmental and social transformation.

Ethical considerations are central to eco-visual communication. Designers must ensure that their messages are accurate, transparent, and responsible, avoiding practices such as greenwashing, which can mislead audiences about environmental claims (Delmas & Burbano, 2011). At the same time, designers often face constraints imposed by clients, markets, and institutional structures, which may limit their ability to fully align with sustainability principles.

This tension between ethical responsibility and practical constraints underscores the complexity of design practice. Ecological design theory provides a framework for navigating these challenges, emphasising the need for critical reflection and ethical decision-making in the creation of eco-visual messages.

3.3 Digital Media Theory and Technological Mediation

Digital media theory offers insights into how technological advancements shape communication practices and influence meaning-making processes. Jenkins (2006) conceptualises the digital landscape as a *convergence culture*, where content flows across multiple platforms and audiences actively participate in its creation and

dissemination. This participatory environment has significant implications for eco-visual communication.

In the digital age, designers have access to a wide range of tools and platforms that enable the creation of interactive, multimedia, and data-driven visual content. These technologies allow for more dynamic and engaging forms of communication, such as interactive infographics, animations, and immersive storytelling experiences (Murray, 2012). Such formats can enhance audience engagement and facilitate a deeper understanding of environmental issues.

However, digital media also introduces new challenges. Bauman (2000) describes contemporary society as characterised by fluidity and rapid change, where information is constantly produced and consumed. This environment can lead to information overload, making it difficult for audiences to process and retain complex environmental messages. Additionally, algorithm-driven platforms may prioritise content based on engagement metrics rather than informational value, potentially distorting the visibility and impact of eco-visual communication.

Another important aspect of digital media is interactivity, which allows users to actively engage with content. This shifts the role of the audience from passive recipients to active participants in the meaning-making process. Designers must therefore consider not only how messages are presented but also how users interact with and interpret them.

3.4 Integrative Framework

By integrating semiotics, ecological design theory, and digital media theory, this study develops a comprehensive framework for analysing designer meaning-making in eco-visual communication. Semiotics provides tools for understanding symbolic representation, ecological design emphasises ethical responsibility, and digital media theory highlights technological mediation and user engagement.

Together, these perspectives enable a multidimensional analysis that captures the complexity of design practice in the digital age. They also underscore the interconnected nature of visual communication, sustainability, and technology, highlighting the need for interdisciplinary approaches in addressing contemporary environmental challenges.

4. Methodology

This study employs a qualitative research design to explore how designers construct meaning in eco-visual communication. Qualitative research is particularly suitable for examining complex, context-dependent phenomena, as it allows for in-depth analysis of meanings, experiences, and practices (Creswell & Poth, 2018). Given the exploratory nature of this study, a qualitative approach enables a nuanced understanding of designer perspectives and meaning-making processes.

The research is based on secondary data, including academic literature, case studies, and documented practitioner insights. Secondary data analysis is appropriate for

this study as it allows for the synthesis of existing knowledge across multiple sources, providing an understanding of the topic (Johnston, 2017). This approach also facilitates the identification of recurring themes and patterns in design practice.

4.1 Data Sources and Selection Criteria

Data were collected from a range of credible and relevant sources, including peer-reviewed journal articles, academic books, conference proceedings, and design publications. Key databases such as Google Scholar, Scopus, and Web of Science were used to identify relevant literature.

The selection of sources was guided by the following criteria:

- **Relevance:** Sources must address eco-visual communication, sustainability, design practice, or digital media.
- **Credibility:** Preference was given to peer-reviewed publications and established authors in the field.
- **Recency:** Emphasis was placed on recent studies (particularly from 2000 onwards) to capture contemporary developments in digital media.
- **Theoretical and empirical richness:** Sources that provide detailed theoretical frameworks or empirical insights were prioritised.

This purposive sampling strategy ensures that the data are both relevant and comprehensive, supporting a robust analysis.

4.2 Data Analysis: Thematic Analysis

The study employs thematic analysis as the primary method for analysing data. Thematic analysis is a flexible and widely used qualitative method for identifying, analysing, and interpreting patterns within data (Braun & Clarke, 2006). It is particularly suitable for this study as it allows for the systematic exploration of themes related to meaning-making in design.

The analysis followed the six-phase process outlined by Braun and Clarke (2006):

- **Familiarisation with the data:** The researcher thoroughly reviewed the selected literature to gain an overall understanding of the content.
- **Generating initial codes:** Relevant segments of text were coded based on recurring ideas, concepts, and patterns.
- **Searching for themes:** Codes were grouped into broader themes that capture key aspects of designer meaning-making.
- **Reviewing themes:** Themes were refined and validated to ensure coherence and consistency.
- **Defining and naming themes:** Each theme was clearly defined and labelled to reflect its significance.
- **Producing the report:** The final themes were interpreted and integrated into the findings and discussion.

This systematic approach ensures rigour and transparency in the analysis process.

4.3 Trustworthiness and Rigour

Ensuring the credibility and reliability of qualitative research is essential. This study adopts several strategies to enhance trustworthiness, as suggested by Lincoln and Guba (1985):

- **Credibility:** Achieved through the use of diverse and authoritative sources, as well as careful interpretation of data.
- **Transferability:** Detailed descriptions of the research context and findings allow readers to assess the applicability of results to other contexts.
- **Dependability:** The research process is clearly documented, enabling replication or further investigation.
- **Confirmability:** The study maintains objectivity by grounding interpretations in evidence from the data.

Additionally, triangulation of sources—combining theoretical and empirical literature—enhances the robustness of the findings.

4.4 Ethical Considerations

As this study relies on secondary data, it does not involve direct interaction with human participants. Therefore, ethical risks are minimal. However, ethical standards were maintained by:

- Properly citing all sources in accordance with APA (7th ed.) guidelines
- Avoiding plagiarism and misrepresentation of data

- Respecting intellectual property rights

These practices ensure academic integrity and transparency (Mannan & Farhana, 2026).

4.5 Limitations of the Methodology

While secondary data analysis offers several advantages, it also has limitations. One key limitation is the lack of direct engagement with designers, which may restrict the depth of insight into their experiences and perspectives. Additionally, the study relies on existing literature, which may reflect certain biases or gaps in research.

Despite these limitations, the use of diverse and high-quality sources helps mitigate potential biases and provides a comprehensive understanding of the topic. Future research could build on this study by incorporating primary data, such as interviews or surveys with designers, to gain deeper insights.

5. Findings and Analysis

The thematic analysis of secondary data revealed that designer meaning-making in eco-visual communication is structured around three interrelated and overlapping dimensions: ethical responsibility, aesthetic strategies, and technological mediation. These themes do not operate in isolation; rather, they intersect dynamically, shaping how designers interpret environmental issues and translate them into visual narratives. This section elaborates on each theme in detail, drawing on theoretical insights and empirical observations from the literature.

5.1 Ethical Responsibility and Value-Oriented Design

One of the most prominent themes emerging from the analysis is the strong sense of ethical responsibility that designers associate with eco-visual communication. Designers are increasingly aware of their role in shaping public perceptions of environmental issues and recognise the potential of visual communication to influence attitudes and behaviours (Heller & Vienne, 2003; Manzini, 2015).

This ethical orientation is rooted in the broader framework of ecological design, which emphasises sustainability, social responsibility, and long-term environmental impact (Papanek, 1985). Designers often position themselves as advocates for environmental awareness, using their skills to highlight issues such as climate change, biodiversity loss, and pollution. In this sense, eco-visual communication becomes a form of activism, where design serves as a tool for social and environmental change.

However, the analysis also reveals a persistent tension between ethical commitments and professional constraints. Many designers operate within commercial environments where client demands, market pressures, and branding considerations may conflict with sustainability goals (Julier, 2014). For instance, designers working on corporate campaigns may be required to promote products or services that are not environmentally sustainable, raising ethical dilemmas about complicity and responsibility.

This tension is particularly evident in the phenomenon of greenwashing, where environmental claims are exaggerated or misleading (Delmas & Burbano, 2011). Designers may be indirectly involved in creating visual narratives that present organisations as environmentally responsible, even when their practices do not align with sustainability principles. The literature suggests that such practices undermine public trust and weaken the credibility of eco-visual communication.

Despite these challenges, many designers adopt strategies to navigate ethical dilemmas. These include selective project engagement, critical reflection on design decisions, and the incorporation of transparent and evidence-based messaging. Such practices reflect an emerging professional ethos that prioritises integrity and accountability in design.

Furthermore, ethical responsibility in eco-visual communication extends beyond the content of messages to include the processes and materials used in design production. Digital design, while often perceived as environmentally neutral, also has ecological implications, such as energy consumption and electronic waste. Designers are increasingly encouraged to consider these factors as part of a holistic approach to sustainability (Manzini, 2015).

5.2 Aesthetic Strategies and Symbolic Representation

A second major theme concerns the aesthetic strategies employed by designers to communicate environmental messages. These strategies involve the deliberate use of visual elements-such as colour, imagery,

typography, and composition-to construct meaning and evoke emotional responses.

From a semiotic perspective, eco-visual communication relies heavily on symbolic representation (Barthes, 1977). Designers draw on culturally established associations to convey environmental concepts. For example, green is widely used to symbolise sustainability, while images of pristine landscapes evoke ideas of ecological harmony. Conversely, visuals depicting pollution, deforestation, or endangered species are used to signify an environmental crisis.

The analysis indicates that designers often employ visual metaphors to simplify complex environmental issues. For instance, a melting ice cube may represent global warming, while a cracked earth surface may symbolise drought and climate change. These metaphors function as cognitive shortcuts, enabling audiences to grasp abstract concepts quickly (Nisbet & Scheufele, 2009).

Another common strategy is minimalism, which emphasises clarity and simplicity. Minimalist designs often use limited colour palettes, clean typography, and straightforward imagery to focus attention on key messages. This approach aligns with the need to communicate effectively in digital environments characterised by short attention spans and information overload.

At the same time, the analysis reveals a growing trend toward emotional engagement in eco-visual communication. Designers increasingly use evocative imagery and storytelling techniques to elicit emotional responses, such as empathy, concern, or

urgency. For example, images of affected communities or endangered wildlife can create a sense of personal connection to environmental issues.

However, the use of emotional appeals raises important questions about the balance between persuasion and manipulation. While emotional engagement can enhance the impact of visual messages, it may also lead to sensationalism or oversimplification. Designers must therefore carefully consider the ethical implications of their aesthetic choices.

Cultural context also plays a significant role in shaping aesthetic strategies. Visual symbols and meanings are not universally understood; they are influenced by cultural norms, values, and experiences (Hall, 1997). Designers working in global contexts must therefore adapt their visual language to different audiences, ensuring that messages are culturally relevant and sensitive.

5.3 Technological Mediation and Digital Affordances

The third theme highlights the influence of digital technologies on eco-visual communication. The digital age has introduced new tools, platforms, and modes of interaction that fundamentally reshape design practice and meaning-making processes.

One of the key advantages of digital media is its capacity for interactivity. Unlike traditional print media, digital platforms allow users to actively engage with content through features such as clickable elements, animations, and user-generated input. This interactivity enhances user involvement and

enables more personalised experiences (Murray, 2012).

For example, interactive data visualisations allow users to explore environmental data in dynamic ways, fostering a deeper understanding of issues such as climate change or resource consumption. Similarly, social media platforms facilitate the rapid dissemination of eco-visual messages, enabling designers to reach large and diverse audiences (Jenkins, 2006).

However, the analysis also identifies several challenges associated with digital media. One major issue is information overload, where the sheer volume of content competes for audience attention (Bauman, 2000). In such environments, eco-visual messages must be concise and visually compelling to stand out.

Another challenge is the role of algorithms in shaping content visibility. Algorithm-driven platforms prioritise content based on engagement metrics, which may favour sensational or emotionally charged messages over nuanced and informative ones. This can lead to the distortion of environmental narratives and the marginalisation of important but less attention-grabbing issues.

Additionally, digital media often encourage short-form content, which may limit the depth of engagement with complex environmental issues. Designers must therefore find ways to balance brevity with substance, ensuring that messages are both accessible and meaningful.

Despite these challenges, digital technologies also offer opportunities for innovation in eco-visual communication. Emerging technologies such as virtual reality (VR) and

augmented reality (AR) provide immersive experiences that can enhance environmental awareness and empathy. These technologies enable users to experience environmental issues in more tangible and impactful ways, potentially leading to greater engagement and action.

5.4 Interconnections Between Themes

The three themes identified in this study—ethical responsibility, aesthetic strategies, and technological mediation—are deeply interconnected. Ethical considerations influence aesthetic choices, as designers strive to create messages that are both persuasive and responsible. Similarly, technological affordances shape the ways in which aesthetic strategies are implemented and experienced.

For example, the use of emotional imagery (aesthetic strategy) may be amplified by social media platforms (technological mediation), increasing its impact but also raising ethical concerns about manipulation. Conversely, ethical commitments may guide the use of technology, encouraging designers to prioritise transparency and accuracy over sensationalism.

These interconnections highlight the complexity of designer meaning-making in eco-visual communication. Designers must navigate multiple and often competing demands, balancing creativity, responsibility, and technological possibilities.

6. Discussion

The findings of this study provide valuable insights into the processes through which designers construct meaning in eco-visual communication. By integrating perspectives from semiotics, ecological design, and digital media theory, this research offers a comprehensive understanding of the interplay between symbolic representation, ethical responsibility, and technological mediation.

6.1 Designers as Cultural Intermediaries

One of the key implications of this study is the recognition of designers as cultural intermediaries. Designers play a crucial role in translating complex environmental issues into visual narratives that are accessible and meaningful to diverse audiences. This role aligns with Krippendorff's (2006) view of design as a communicative practice, where meaning is co-created through interaction between designers and users.

As cultural intermediaries, designers must navigate multiple layers of meaning, including scientific knowledge, cultural values, and audience expectations. This requires not only technical skills but also critical thinking and ethical awareness. Designers must interpret environmental data, select appropriate visual representations, and anticipate how audiences will respond to their messages.

The concept of cultural intermediation also highlights the power dynamics inherent in design practice. Designers have the ability to shape public discourse by framing environmental issues in particular ways. For

example, emphasising individual responsibility may shift attention away from systemic causes of environmental problems, while focusing on collective action may encourage broader social engagement.

6.2 The Politics of Representation

The findings underscore the importance of representation in eco-visual communication. Visual messages are not neutral; they reflect specific values, ideologies, and perspectives (Hall, 1997). Designers must therefore consider the political implications of their work, including whose voices are represented and whose are marginalised.

For instance, environmental campaigns often focus on iconic images of wildlife or natural landscapes, which may overlook the experiences of communities directly affected by environmental degradation. This raises questions about inclusivity and representation in eco-visual communication.

Moreover, the use of certain visual tropes—such as apocalyptic imagery or narratives of crisis—can influence how audiences perceive environmental issues. While such representations may create a sense of urgency, they may also lead to feelings of helplessness or disengagement. Designers must therefore carefully balance urgency with empowerment, ensuring that messages inspire action rather than despair.

6.3 Ethical Tensions and Professional Practice

The study highlights the persistent tension between ethical responsibility and commercial pressures in design practice. While designers may be committed to

sustainability, they often operate within systems that prioritise profit and consumerism (Julier, 2014). This creates challenges in aligning professional practice with personal values.

The issue of greenwashing is particularly significant in this context. Designers may be involved in creating visual narratives that misrepresent environmental practices, either intentionally or unintentionally. Addressing this issue requires not only individual ethical awareness but also structural changes in the design industry, including stronger regulations and accountability mechanisms (Delmas & Burbano, 2011).

Design education also plays a critical role in shaping ethical practices. Integrating sustainability and ethics into design curricula can equip future designers with the knowledge and skills needed to navigate complex ethical dilemmas. This includes fostering critical thinking, encouraging interdisciplinary collaboration, and promoting a deeper understanding of environmental issues.

6.4 Digital Media and the Transformation of Engagement

The impact of digital media on eco-visual communication is both transformative and ambivalent. On one hand, digital platforms provide unprecedented opportunities for engagement, enabling designers to reach global audiences and create interactive experiences (Jenkins, 2006). On the other hand, they introduce challenges related to attention, credibility, and depth of engagement.

The concept of participatory culture is particularly relevant in this context. Digital media allow users to actively engage with content, share information, and contribute to environmental discourse. This participatory dimension can enhance the effectiveness of eco-visual communication by fostering a sense of involvement and ownership.

However, participation does not necessarily translate into meaningful engagement or behavioural change. The prevalence of “clicktivism” or superficial forms of activism highlights the limitations of digital engagement. Designers must therefore develop strategies to encourage deeper and more sustained interaction with environmental issues.

6.5 Toward an Integrated Approach to Eco-Visual Communication

The findings suggest the need for an integrated approach to eco-visual communication that combines ethical responsibility, aesthetic innovation, and technological awareness. Such an approach requires collaboration across disciplines, including design, environmental science, communication studies, and sociology.

Interdisciplinary collaboration can enhance the effectiveness of eco-visual communication by integrating diverse perspectives and expertise. For example, collaboration with scientists can ensure the accuracy of environmental information, while engagement with communities can provide insights into local contexts and needs.

Furthermore, the integration of emerging technologies, such as VR and AR, offers new

possibilities for immersive and experiential communication. These technologies can create powerful experiences that enhance understanding and empathy, potentially leading to greater engagement and action.

6.6 Implications for Future Research

This study highlights several areas for future research. First, there is a need for empirical studies that examine designer perspectives and practices through primary data, such as interviews or ethnographic research. Second, research should explore audience responses to eco-visual communication, including how different visual strategies influence perception and behaviour.

Finally, future studies should consider the global diversity of eco-visual communication, examining how cultural, social, and economic contexts shape design practices and meanings. Such research can contribute to a more inclusive and context-sensitive understanding of sustainability communication.

7. Conclusion

This study has explored the processes of designer meaning-making in eco-visual communication within the rapidly evolving context of the digital age. Drawing on a qualitative thematic analysis of secondary data, the research identified three central dimensions-ethical responsibility, aesthetic strategies, and technological mediation-that collectively shape how environmental messages are conceptualised, constructed, and communicated through visual design.

The findings highlight that designers play a pivotal role as cultural intermediaries who translate complex ecological issues into visual narratives that are both accessible and engaging. Through the application of semiotic principles, designers utilise symbols, metaphors, and visual conventions to communicate sustainability-related meanings. At the same time, their work is guided by ethical considerations rooted in ecological design theory, emphasising responsibility, transparency, and the avoidance of misleading practices such as greenwashing. However, the study also reveals persistent tensions between ethical commitments and commercial pressures, underscoring the need for stronger ethical frameworks within professional design practice.

The influence of digital media further complicates and enriches the process of eco-visual communication. Digital platforms provide new opportunities for interactivity, participation, and global reach, enabling designers to engage audiences in more dynamic and immersive ways. Nevertheless, these platforms also present challenges, including information overload, algorithm-driven visibility, and the risk of superficial engagement. Designers must therefore balance creativity, clarity, and depth to ensure meaningful communication.

The integration of semiotics, ecological design, and digital media theory in this study provides a multidimensional understanding of eco-visual communication. This interdisciplinary perspective highlights the interconnected nature of visual meaning-making, ethical responsibility, and

technological affordances. It also underscores the importance of critical reflection and adaptability in contemporary design practice.

In conclusion, eco-visual communication represents a vital tool for addressing global environmental challenges. Designers have the potential to influence public awareness and behaviour, contributing to more sustainable futures. To fully realise this potential, there is a need for enhanced design education, interdisciplinary collaboration, and ongoing research that engages both practitioners and audiences. Future studies should incorporate primary data to deepen insights into designer practices and explore the impact of eco-visual communication across diverse cultural and social contexts.

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