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Biophilic, Ethical, and Low-Carbon Design Integration in Visual Communication for Social Media Campaigns

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Abstract. *This study aims to develop an integrative model that unites biophilic aesthetics, ethical storytelling, and low-carbon design strategies into a single sustainable framework for digital communication. Using a qualitative multi-case approach, the research draws on semi-structured interviews with six expert designers and content analysis of ten social media campaigns selected for their ecological or ethical orientation. The analysis applied thematic coding and visual evaluation to identify recurring patterns and design challenges. Findings show that while nature-inspired and ethically grounded visuals are increasingly employed to foster emotional connection and inclusivity, explicit low-carbon design practices remain rare due to limited awareness and measurement tools. The study introduces a practical framework linking environmental psychology, design ethics, and digital sustainability. Its novelty lies in demonstrating that aesthetic engagement and ecological responsibility can coexist within coherent, evidence-based visual strategies for sustainable media production.*

Keywords: *Biophilic Design, Ethical Visual Communication, Law-Carbon Strategy, Sustainable Media, Social Media Campaigns*

INTRODUCTION

Over the past decade, the rise of social networking has transformed how people create, share, and interpret visual information. What once served primarily as a branding medium has become a space where designers and audiences negotiate meaning and respond to pressing global issues such as environmental degradation and social inequality (Wibowo et al., 2024). These changes mirror growing expectations that visual communication should not only persuade but also embody ecological awareness and moral responsibility. Rather than being limited to questions of style or market appeal, visual design now operates within wider ethical and cultural debates about how images influence values and behavior (Purhita & Rudjiono, 2024). In this context, design movements inspired by nature, transparency, and sustainability, specifically biophilic, ethical, and low-carbon approaches, have started to shape the creative vocabulary of contemporary visual communication (Saranya et al., 2025). Together, these emerging directions reveal a shift toward design that seeks meaning and accountability as much as visual impact.

An understanding of the ecological impacts of digital media infrastructure is becoming more apparent. According to (Widdicks et al., 2022), one global environmental report estimates that Information Technology and Communications (ITC) accounts for about 4% percent of global greenhouse gas emissions; new projections now make clear that this is a figure expected to grow

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dramatically. High-resolution images, video content, and other energy-intensive interventions associated with social media campaigns significantly contribute to this footprint. At the same time, younger audiences with environmental sentiments are demanding even greater transparency and ethical alignment with the media they consume. Biophilic visual cues have been indicated to create emotional well-being and increase trust, while ethical design becomes necessary in dealing with questions of diversity, representation, and inclusivity in digital content (Richardson & Butler, 2021) and (Tekin & Urbano Gutiérrez, 2023). Nevertheless, these practices are usually employed in isolation, and the integration of the three different dimensions into a unified framework remains largely uncharted within social media campaign contexts.

Prior studies have provided significant contributions in support of each of these design dimensions. From advertising and media, sustainability-oriented studies highlight green messaging and environmentally themed narratives as raising awareness and pushing behavior change (Campos et al., 2021; Caputo & Nabivi, 2025) and (Rathee & Milfeld, 2023). There has been significant literature on the biophilic theme in architecture and interior design, while recent studies have looked into its application towards creating psychological comfort and visual harmony in website and interface design (Tabassum & Park, 2024) and (Kujundzic et al., 2023). According to (Pietroni & Ferdani, 2021), ethical visual design has been analyzed through the lenses of brand authenticity, cultural representation, and digital human rights. The study by (Carrero et al., 2021) also states that although low-carbon design is increasingly relevant in User Interface/User Experience (UI/UX) and web development, it is still in its early stages of application to mainstream visual campaign production. Despite these advancements, the literature remains fragmented, offering few interdisciplinary models that bring these approaches together into a singular framework for visual communication strategy.

The current fragmentation within sustainable design reflects a broad theoretical and pragmatic gap. Ethical design, low-carbon design, and biophilic design are all paradigms with contributory value, but in isolation. The gap underestimates the effectiveness of sustainable practice on social media since it lacks a unifying framework. Designers don't have integrative tools to measure visual content against aesthetics, engagement, ecological awareness, and ethical impact. Therefore, visual communication sustainability is more rhetorical than real. Bridging this gap, the present study proposes an integrated model supplementing biophilic, ethical, and low-carbon design principles for social media campaigns. Employing a transdisciplinary methodology, uniting environmental psychology, design theory, visual ethics, and digital sustainability, it aims to develop practicable guidelines for designers. The research explores both

the theoretical convergence of these systems and their applied integration in content design and sustainable media production.

The main achievement of this research presents a practical framework that delivers sustainable visual communication according to modern environmental, social, and ethical audience requirements. This research distinguishes itself from current frameworks through its simultaneous focus on nature-inspired aesthetics together with value-driven storytelling and climate-conscious production. The holistic approach reinforces theory and practice by presenting a way for designers to produce effective visual content that is ethically acceptable and environmentally resource-efficient. The study seeks to position visual communication as an active catalyst for advancing global sustainability goals in addition to being primarily a medium of expression.

LITERATURE REVIEW

A. Biophilic Design in Digital Visual Communication

The concept of biophilic design first appeared in architecture and environmental psychology, yet its influence has gradually spread into digital media and visual communication. The underlying assumption is straightforward: humans are innately drawn to natural environments, and even indirect exposure to organic forms, textured surfaces, or rhythmic natural patterns can evoke psychological comfort and focus (Taylor, 2021). Within digital settings, these natural cues often serve a dual purpose. They not only enhance aesthetic richness but also help audiences feel more emotionally anchored and engaged. Several empirical studies confirm that viewing nature-inspired imagery online can improve mood stability, reduce cognitive fatigue, and support memory retention (Yildirim et al., 2024; Zhu & Yang, 2023; Jamil et al., 2021). Despite this evidence, many visual campaigns still treat biophilic motifs as decorative fragments rather than as part of a coherent environmental message.

The growing attention to biophilic design in digital culture also reflects its perceived ability to strengthen authenticity and trust between creators and audiences. Nature-oriented visuals tend to convey sincerity and calmness, qualities that are increasingly scarce in crowded and fast-moving media landscapes (Buckley, 2022; Ji & Lin, 2022; Weismayer & Pezenka, 2024). When used thoughtfully, these images can symbolize care, balance, and ecological responsibility, connecting visual expression to broader social narratives around sustainability and well-being. However, as noted by Lefosse et al. (2023) and Aldieri et al. (2023), much of the existing scholarship still isolates biophilic design from ethical and ecological dimensions. This gap

suggests a need to reposition biophilic design as more than a stylistic device, rather, as a central principle in developing responsible and context-aware visual communication frameworks.

B. Ethical Visual Communication in the Digital Age

In the digital era, the importance of creating ethical visuals has become more pronounced because the images we are presented with influence dialogue around topics, develop cultures, and shape the reputation of the firm. For example, (Doussard et al., 2024; Harris et al., 2023) and (Donia & Shaw, 2021) show that good design ethics should think about how images impact society, focusing on values like inclusivity, honesty, making content accessible to everyone, and respecting different cultures. Visual media techniques that exclude certain groups or misrepresent their identities can reinforce damaging stereotypes and increase social segregation within a media environment that prioritizes fast production through algorithms. Visual campaigns need participatory and reflexive design methods to prevent symbolic appropriation and tokenism while representing diverse experiences, as argued by scholars (Pitidis et al., 2024).

In recent years, the idea of ethical storytelling has taken on a more serious role in digital communication. It is no longer enough for a campaign to follow basic rules of representation; audiences now expect sincerity and accountability. Several scholars have pointed out that younger users, who are often more socially aware, respond better to brands that express values such as fairness, equality, and openness in a consistent way (Bonamigo et al., 2025; Silveira et al., 2024; Bertolini et al., 2023). In this sense, ethics is not only a moral concern but also a matter of credibility and long-term trust. Findings from visual ethnography show that when campaigns use inclusive imagery, people are more likely to feel emotionally connected and to view the message as genuine (Romo-Avilés et al., 2023). Even so, many design teams still chase virality and emotional impact at the cost of ethical depth. The more demanding task is to bring ethical reflection into the early creative stages so that it develops together with aesthetic and environmental considerations, rather than being added at the end to make the work appear responsible.

C. Low-Carbon Design for Sustainable Digital Communication

As the digital environments become more intricate and filled with multi-layered and visually appealing content, more and more researchers and practitioners are paying attention to the ecological consequences of such systems. (Liu et al., 2022) argue that although the digital media's rendering may seem "intangible", it is misperceived because of the colossal amount of energy needed to sustain it—energy required for powering data transmission, rendering, server upkeep, and Content Delivery Network (CDN) maintenance. Visual components such as high-

resolution imagery, animations, and autoplay videos consume disproportionately high levels of bandwidth and processing power, which in turn escalate the carbon footprint associated with online platforms (Pandiyan et al., 2024). When compounded by the frequency of content sharing and algorithmic promotion on social media, these impacts are amplified at a systemic level. Therefore, (Bibri et al., 2024) convey that digital visual communication must no longer be treated as a dematerialized or impact-free activity, but as a domain with measurable environmental consequences that demand thoughtful, design-level intervention.

Low-carbon design in digital communication refers to optimizing content formats, reducing file sizes, avoiding unnecessary animation, and adopting energy-efficient platforms or green hosting services. Scholars have recommended interventions such as adaptive image scaling, vector graphics, compressed video modes, and minimalist web architecture as viable measures to reduce emissions (Tian & Günther, 2022) and (Iqbal et al., 2023). Nevertheless, these tactics have yet to become widely applied in visual campaign planning strategy, wherein measures of performance based on exposure, richness, and recall of the audience are typically given emphasis. The research conducted by (Palanisamy et al., 2023) and (Dong et al., 2024) indicate that carbon-effective content remains regarded as secondary or incompatible with the aim of high-engagement design. This conflict reveals a broader gulf between the practice and theory of design in which environmental issues are not yet intrinsic to creative decision-making. Bridging this gulf will require a paradigm change in which visual effect and environmental stewardship are not dichotomous but convergent objectives.

D. Toward an Integrated Framework for Sustainable Visual Design

While biophilic, ethical, and low-carbon design each bring unique contributions to accountable visual communication, their collective application remains a theoretical and practical unknown. Existing frameworks, like Sustainable Interaction Design, outlined by (Eli Blevis, 2007) that offer insightful beginnings but systematically exclude the symbolic and cultural dimensions inherent in visual narrative (Besana et al., 2024). Compartmentalization of sustainability dimensions has resulted in piecemeal approaches that fail to accommodate the complexity of social media campaigns, where emotional appeal, ethical representation, and environmental responsibility need to be addressed at the same time.

The lack of integration between these dimensions limits the potential of visual campaigns to deliver integrated impact. Visual richness and carbon efficiency, narrative intensity and moral balance, are too often framed as trade-offs that have to be made by designers without a sense of how to reconcile competing demands. Furthermore, current toolkits and metrics only attempt to measure visual content in terms of isolatable outputs—like engagement or environmental

performance—when their intersection is precisely where value occurs. As (Boehnert et al., 2022) and (Bissett-Johnson & Radcliffe, 2021) suggested, irresponsible design is design that is indifferent to greater ecological and social consequences. Toward this end, there is a pressing need for a multidisciplinary and practical framework that integrates biophilic aesthetics, ethical storytelling, and low-carbon methods. Such a framework would enable designers to produce media that is emotionally resonant, socially conscious, and ecologically sensitive—up to the multilayered demands of both the world and publics.

METHODS

A. Research Design and Approach

This study applies a qualitative and exploratory design to build a single framework that links biophilic, ethical, and low-carbon principles within social-media-based visual communication. The exploratory orientation was chosen because there are still no established models that bring together these three sustainability dimensions in digital design practice. To investigate the issue in context, several case studies were conducted across different creative settings and organizations. This approach made it possible to observe how design decisions are shaped by specific environmental and ethical conditions rather than by abstract theory. By comparing a range of campaign examples, the research identifies recurring strategies and common challenges that eventually inform the development of a practical, operational framework.

B. Sampling and Data Sources

The analysis draws on two main sources of data: in-depth interviews with experts and a curated collection of visual campaign materials. Participants were selected through purposive sampling, focusing on professionals with substantial experience in sustainable visual communication—such as designers, creative directors, and campaign consultants. Effort was made to include individuals from different professional backgrounds so that the study could capture a range of viewpoints and practical insights. Alongside the interviews, a set of social-media campaign materials was gathered to serve as empirical case studies. Each selected campaign featured some combination of nature-inspired imagery, ethically framed messages, or references to environmentally conscious production. Insights from these practitioners, when read against the campaign evidence, allowed the research to balance theoretical intent with practical execution and to understand how sustainability principles are actually expressed in day-to-day design work.

C. Data Collection Methods

Two complementary methods were used to collect the data. First, semi-structured interviews were conducted with professionals involved in sustainable and digital design. The question guide was intentionally open-ended, encouraging participants to reflect on how they make creative decisions, balance ethical goals with practical limits, and respond to environmental constraints. Interviews were carried out either in person or online, depending on availability, and each conversation was recorded with consent and later transcribed in full for analysis. The second line of data collection focused on the visual material itself. A set of social-media campaigns was gathered and documented, each displaying some deliberate use of natural imagery, ethical narratives, or energy-efficient production choices. Examining these materials alongside the interviews helped the research connect what designers said about sustainability with what they actually produced in practice.

D. Analytical Strategy

The analysis followed a thematic approach that sought to uncover patterns and meanings emerging from both the interview and visual data. Instead of relying on a rigid coding template, the researchers read each transcript several times and noted expressions or concerns that frequently appeared across participants. These fragments were then compared and gradually refined into a small number of recurrent themes that reflected shared understandings of sustainable and ethical design. Over several iterations, the themes were expanded and reorganized to reveal how personal values and working contexts shaped the designers' choices.

A similar interpretive process was used for the campaign materials. Each case was reviewed using a flexible checklist that considered the presence of biophilic features, ethical storytelling elements, and low-carbon production techniques such as file compression, vector formats, or reduced animation. Patterns of similarity and contrast between campaigns were observed and discussed within the research team. In the final stage, insights from both sources were synthesized into a conceptual framework that captures the strategic intentions and the everyday practices underlying sustainable visual communication

E. Trustworthiness and Research Ethics

To keep the study dependable, the team paid attention to validity and consistency at each stage. Interview data and visual analyses were constantly cross-checked so that the interpretation would not depend on one type of evidence alone. Full case descriptions were kept, allowing other researchers to judge whether the results might hold in similar contexts. Notes from the coding process and theme development were stored and revisited several times to make sure that the reasoning remained traceable.

After the initial analysis, participants received short summaries of their interviews and were asked to confirm that their perspectives had been represented fairly. This step often clarified certain meanings and helped refine the interpretation. Ethical care was maintained throughout the project. Every participant was briefed about the aim of the study, the voluntary nature of their involvement, and the option to withdraw whenever they wished. These small but deliberate checks helped strengthen the study's overall trustworthiness and ethical grounding.

RESULTS

A. Interpretation of Testing Data

The findings draw on two main sources: interviews with six professionals who specialize in sustainable visual design and a content review of ten social media campaigns selected for their environmental or ethical focus. Each campaign was examined using a simple three-part rubric that looked at the use of biophilic ideas, ethical storytelling, and low-carbon strategies, rated on a scale from zero to three. The interviews offered a more personal view of the creative process, showing how designers balance aesthetic ambition with ecological intent and where tensions often arise. Several admitted that visual clarity and emotional impact tend to outweigh carbon-related concerns during production. Others mentioned the difficulty of keeping expressive richness while working in minimalist or resource-efficient formats. A recurring issue was the absence of clear standards for measuring ecological or moral impact. Together, these insights provided the background for interpreting the campaign data and gave context to the comparative evaluation of design outcomes.

B. Testing Result

The scores of the ten campaigns are presented in Table 1, which indicates the performance of each campaign against the three sustainability criteria. The Total Sustainability Score is the collective total of all three categories, with a score ranging from 0 to a possible 9. Notably, Campaign 5 (C5) had the highest total score of 8, which shows that it utilized all three principles most effectively, albeit this campaign had only incomplete adoption of low-carbon practices. On the other hand, Campaigns 3, 8, and 10 were given merely 4, indicating fragmented implementation where one or a few dimensions of sustainability were largely neglected. These disparities point to the fact that while designers are becoming increasingly responsive to the need for ethical and biophilic considerations, operationalization of environmental strategies continues to be uneven and underestimated.

Table 1. Sustainability Element Scores for Each Campaign

Campaign ID	Biophilic Design (0-3)	Ethical Narrative (0-3)	Low-Carbon Strategy (0-3)	Total Score (0-9)

C1	3	2	1	6
C2	2	3	2	7
C3	1	1	2	4
C4	2	2	1	5
C5	3	3	2	8
C6	2	2	2	6
C7	1	3	3	7
C8	2	1	1	4
C9	3	2	2	7
C10	1	2	1	4

Table 1 shows that the most consistently applied across campaigns is biophilic design, with 4 campaigns scoring 3 under this category. Ethical stories also reveal a consistent presence, especially in Campaigns C2, C5, and C7. Low-carbon strategies are still only moderate, with only one campaign (C7) scoring 3 in this category. This table highlights an important imbalance: most campaigns succeed in visual and ethical resonance but struggle to reduce the environmental footprint of their digital content. The disparities reinforce the relevance of a unified framework to help designers manage and balance these three dimensions.

The testing results of the ten campaigns reveal significant variations in the application of sustainability principles, namely biophilic design, ethical narrative, and low-carbon strategies. Campaign 5 (C5) achieved the highest total score of 8 out of 9, demonstrating a more comprehensive integration of these principles, despite a partial adoption of low-carbon practices. In contrast, Campaigns 3 (C3), 8, and 10 scored only 4, indicating a fragmented approach that largely overlooks one or more sustainability dimensions, particularly ethical and biophilic elements. These differences highlight the ongoing challenge designers face in balancing environmental and ethical considerations, as exemplified in the visual comparison between the highest and lowest scoring campaigns shown in Figure 1.

Figure 1. Visual Comparison of High-Scoring (C5) and Low-Scoring (3) Campaigns

Figure 1 showcases two comparative case examples. Campaign 5 (High-Scoring): This campaign received a score of 8 out of 9. It integrates biophilic aesthetics through natural color palettes and plant motifs, ethical storytelling via inclusive narratives and authentic imagery, and moderate low-carbon strategies by using simplified vector graphics and lightweight file formats. The visual is serene, message-driven, and ecologically conscious. Campaign 3 (Low-Scoring): As the lowest-scoring campaign to this point, at 4, the campaign has no sustainable purpose. Whilst images and animations made strong impressions and allowed it to be noticed, the ethical and biophilic aspects cannot be found in the project; totally rejected by the digital energy-efficiency of excessive file size and transition animations.

C. Visualization and Pattern Analysis

The bar chart displays the average scores of biophilic, ethical, and low-carbon categories coming from all ten advertising campaigns. In Figure 2, performance for each sustainability category is depicted visually along with the tabular data. Ethical storytelling got the highest average score of 2.1, just a bit lower than biophilic at 2.0, while low-carbon design was at the back with an actual of 1.7. The picture holds a key feature of it: the visual and ethical parts have been mostly prioritized in the past at the expense of ecological efficiency, which is probably the result of a more immediate match with brand identity and customer expectations, in turn, the lower mean score of low-carbon design creates anxiety, especially in the face of raised awareness of the environmental impact of digital media.

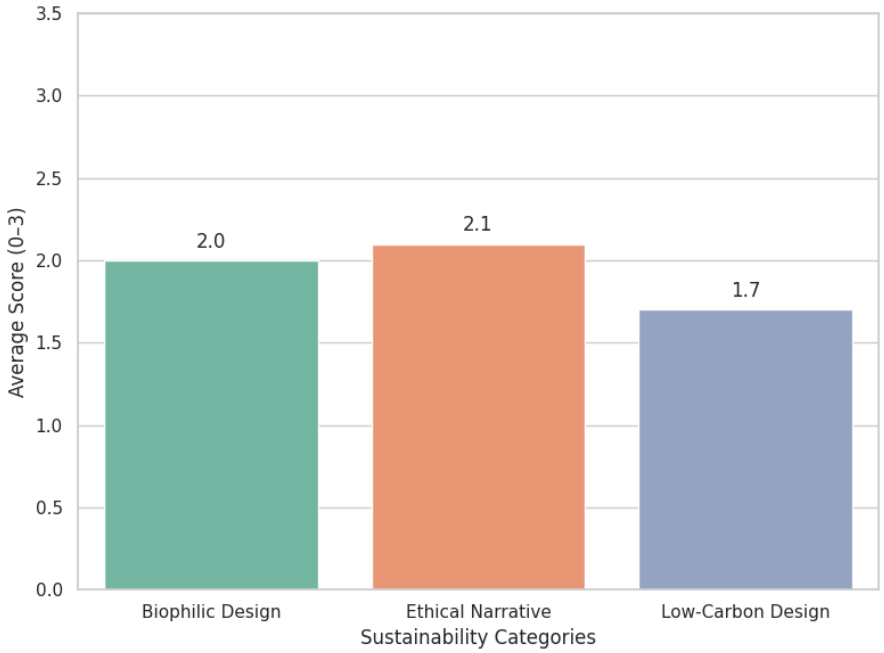

Figure 2. Average Score per Sustainability Category

Figure 2 shows ethical storytelling as the highest priority now in sustainability-driven social media campaigns. This might reflect growing public pressure for brands to become socially responsible in values. The comparatively lower biophilic design score suggests medium but not strategic use of nature-inspired design. The very poor low-carbon score shows that most creators still overlook green efficiency, usually because they lack training or tools. The finding clearly underlines the urgent need for shared, practical teaching and clear benchmarks in planet-friendly digital design.

Overall campaign performance distribution is shown in Figure 3, the number of overall scores per ten examined campaigns. The histogram shows that most of the campaigns have scores of 6 and 7, reflecting the moderate level of integration of sustainability values. One campaign has a high threshold at score 8, while three campaigns (C3, C8, and C10) have lower scores with a score of 4. The distribution shows that although there is some effort to embrace sustainable design, full integration of it remains absent. The rarity of top-scoring campaigns implies a pressing need for more formal direction and operational models.

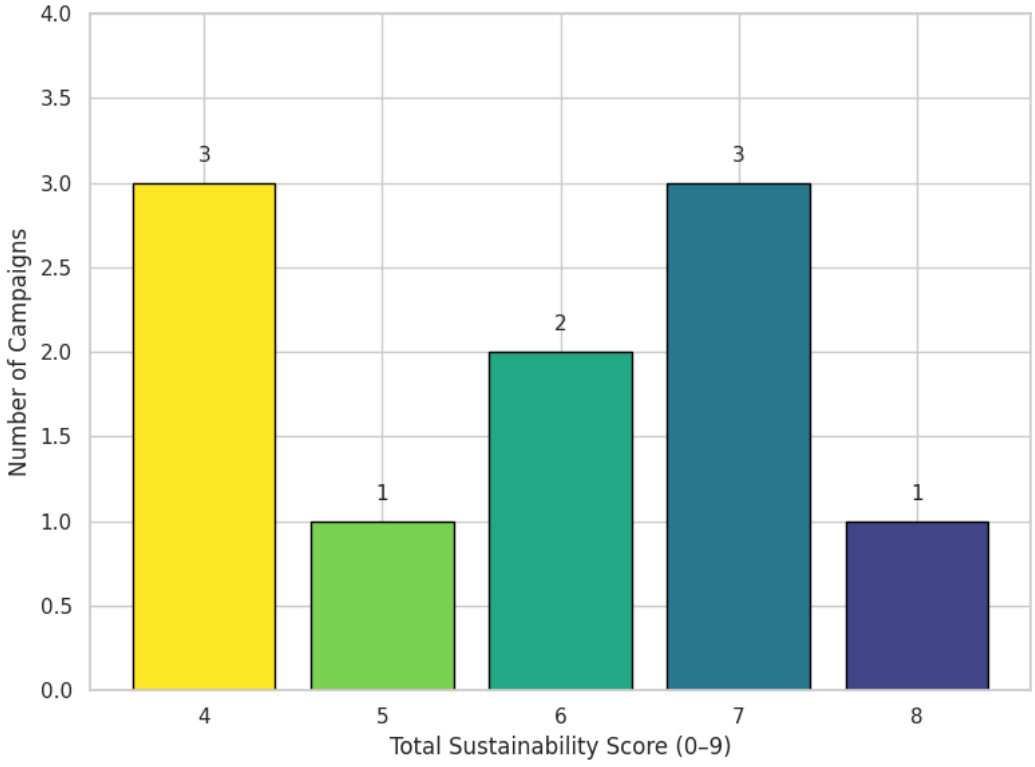

Figure 3. Distribution of Total Sustainability Score Across Camping

Figure 3 clearly shows a mid-range skew in the adoption of sustainable visual design practices. While partial integration of sustainability values is common, the absence of high-performing campaigns indicates systemic limitations in current practice. Designers may be

constrained by client expectations, limited access to sustainability tools, or institutional emphasis on visual engagement over ecological impact. The tight spread of tactics shows there are few industry touchstones that normally push firms to run fuller, more balanced green campaigns. Together, these results back the study's main point: a clear, day-to-day plan is needed if companies want to widen and deepen how they use sustainable design.

D. Evaluation of Results

Looking across the findings, it's noticeable that design agencies are beginning to talk more about sustainability, but the changes are not happening evenly. Some projects take it seriously from the start, while others mention it almost as an afterthought. Many designers use biophilic or ethical visuals because they are attractive and easy for audiences to connect with. These parts are visible. The low-carbon aspect is much less obvious. Most of the people interviewed said they rarely think about how much energy their digital work consumes. A few explained that they would consider it if there were tools that could measure or show the carbon use, but such tools are not part of their normal workflow.

The stronger campaigns were generally simpler. They used light graphics, more neutral colours, and vector-based visuals that required less data. These small choices helped reduce the digital load without hurting the overall message. Still, nobody had a clear way to calculate or prove the environmental benefit. That uncertainty makes it hard to convince teams or clients to change their habits. From what was observed, practical guidance and shared standards would probably help—something that lets creative teams compare their work in ethical, visual, and environmental terms rather than relying on instinct or preference alone

DISCUSSION

A. Restating the Study's Purpose

The research set out to deal with a common gap in sustainable digital design. Work in this area often treats biophilic, ethical, and low-carbon ideas as separate issues, and the study tried to bring them together in one framework. Through several case studies and interviews, it looked at how these principles actually meet in day-to-day design practice and how designers talk about them. The model that came out of this process draws directly on what professionals said and what was observed in real campaigns. It is meant less as a theory and more as a guide that people in the field can use to review or adjust their own work. Instead of describing sustainability in abstract terms, the study turns it into a set of practical strategies that respond to the current shift toward more accountable and responsible forms of digital media.

B. Reaffirming the Importance and Contributions

This work adds something small but needed to the ongoing conversation about sustainable design for digital media. Much of the earlier writing tends to separate the topic into pieces. Some focus only on the visual connection to nature; others stay within ethical branding or technical efforts to cut energy use. What rarely happens is bringing all those parts together in one model that can be used in daily design work. The framework developed in this study tries to do that. It offers a few practical points that designers can test or adapt when planning campaigns. It is not meant as a strict formula, but to see how narrative impact, social concern, and environmental care can be balanced at the same time. Now, when audiences and even policymakers are asking for more honesty and responsibility in media production, this kind of joined approach seems not just useful but also timely.

C. Summary of Results Against Research Objectives

The objectives set out at the start of this study were mostly met through both the field data and the conceptual work that followed. The results show that biophilic and ethical ideas are now fairly common in social media campaigns, although they are often used separately and not yet linked with low-carbon practice. Campaigns that performed better tended to simplify their visual materials, use nature-inspired imagery, and tell stories that touched on fairness or inclusion. Even so, none of the cases managed to balance all three dimensions completely. This gap highlights the everyday compromises that designers face when trying to connect aesthetics with sustainability.

What came out in the interviews supported this picture. Many participants talked about the absence of institutional guidance and the limited space in design education to discuss ecological optimization. The framework developed from the study was meant to answer exactly those issues, offering not a fixed model but a working set of ideas that can help designers move toward a more integrated and sustainable approach to visual communication.

D. Relating Findings to the Literature

The findings of this study are in line with and further extend the knowledge of previously conducted research from various fields. The minimal application of low-carbon design is a direct consequence of the environmental harm that energy-intensive content has caused, which is just an example of the papers of (Bibri et al., 2024) and our study that are identical. In addition, the issues of ethical consistency in visual storytelling are the same as those discussed here, i.e., tokenism and symbolic appropriation of (Donia & Shaw, 2021), who are the ones that raised these issues. The happy mood and engagement derived from nature-based life qualities match again with the findings of (Taylor, 2021) and (Buckley, 2022) that show the affective power of nature-

based aesthetics. Nevertheless, this research has paved a new way in the field by combining these seemingly unrelated issues and setting them in a common conceptual framework. It not only focuses on the common ground but also provides practical steps where narrative integrity, environmental responsibility, and visual effectiveness converge, thus it can be considered a draft of sustainable communication in the digital era.

E. Explanations for Unexpected or Non-Significant Findings

The particularly low integration of low-carbon strategies across campaigns, even among those with strong biophilic and ethical elements, was more pronounced than initially anticipated. This may be attributed to the dominance of industry norms that prioritize user engagement metrics, such as resolution, vibrancy, and dynamic motion, over resource efficiency. Also, the designers who are themselves technically not knowledgeable or do not have institutional support have no means to evaluate and implement carbon-efficient practices while generating content. The second, rather surprising discovery was the performative aspect of the ethical design of some brands, which was done more due to the market situation and less due to the commitment to justice or representation. These gaps are the manifestations of the creative industries' systemic failures, such as the lack of sustainability training and the limited ways for design evaluation. These results call for more powerful educational models and industry norms to equip the practitioners with the right instruments to make accurate design decisions.

F. Managerial Implications of the Study

From the results, it seems clear that the idea of checking sustainability should come much earlier in the design process. Many creative teams only think about it once the campaign is almost finished, so the opportunity to make real changes is lost. For groups producing digital work, small discussions at the start about how a design might use energy, what materials or platforms it relies on, or whether its message feels responsible, could already make a difference. Designers may also need some short training or guidance so they can link visual choices with their environmental and ethical meaning.

The framework developed in this study is meant to help with that. It is not a strict checklist but something that can be used when planning or reviewing a project to see if it stays in line with sustainable ideas. Using it could also help brands speak more honestly to audiences who now pay attention to social and ecological issues. The people leading these teams, such as creative directors or project heads, probably have the biggest influence. If they put this concern into daily practice, it becomes part of the culture, not an extra step. In the end, this is less about following a rule and more about keeping trust with the public and within the field itself.

G. Limitations of the Study

This study is subject to certain weaknesses inherent in qualitative and case-study research. Although the sample reflects diverse perspectives, it is small and may not be representative of international design practice in industries or across cultures. Thematic coding, for all its support from triangulation and participant validation, remains vulnerable to researcher bias. The study also neglected direct audience feedback, which limits insight into the perception of sustainability-focused visual content among users. Platform-specific mechanisms, such as file compression, impressions, or algorithmic boosting, were not considered but may influence visibility and interaction. Future research should utilize larger samples, mixed methods, and involve user metrics to increase relevance and usefulness.

H. Future Research Directions

Potential future work could be around similar tools – a proxy tool for designers to make a quick carbon assessment of the designs, like browser plug-ins or a content optimisation dashboard. Another potential option may involve empirically studying how viewers react and engage emotionally with sustainable visual content, in other words, implementing sentiment analysis, A/B testing, or biometric tracking. Cross-cultural comparisons would also enrich the analysis, because they could clarify whether principles of sustainable design are universal or culturally embedded. Longitudinal studies could also investigate the evolution of audience trust and engagement in response to regular use of biophilic, ethical, and low-carbon designs. These are important next steps in establishing and developing the framework outlined in this paper and increasing the presence of the sustainability message within the complex cycle of digital communication.

Future studies should also investigate how the proposed framework operates in different cultural contexts. Cultural meanings of biophilic graphics, ethical storytelling, and ecological sustainability are diverse. Nature-inspired graphics, for instance, may possess different symbolic cues in Eastern and Western cultures, while ethical principles valued in visual stories, such as individualism, collectivism, or religiosity, may be interpreted differently. Similarly, low-carbon design can also be foregrounded more or less, depending on regional digital networks or environmental awareness. And knowing these cultural sensitivities will allow us to adjust the framework, knowing that there is universal appeal with sustainability-focused visual communication.

CONCLUSION

This study set out to build a way of thinking about sustainable design that connects biophilic, ethical, and low-carbon ideas within visual communication. Through case studies and expert interviews, it became clear that while designers often manage to include nature-inspired and ethical elements, the environmental side of production still receives less attention. The framework proposed here is meant to help close that gap. It gives a simple process that teams can adapt when they need to balance creative storytelling with environmental responsibility. Rather than a final answer, it should be seen as a working guide that can grow as the field develops.

Even so, a few limits need to be mentioned. The study was qualitative and situational, which means the findings cannot automatically represent all design industries or cultural contexts. The absence of audience-based evaluation also leaves open the question of how people actually respond to sustainable visuals. These are natural boundaries for exploratory work. Future studies could include larger samples, mixed methods, or direct user feedback to see how the framework performs in practice. Doing so would help refine its use and strengthen the conversation around more ethical and environmentally aware digital design

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