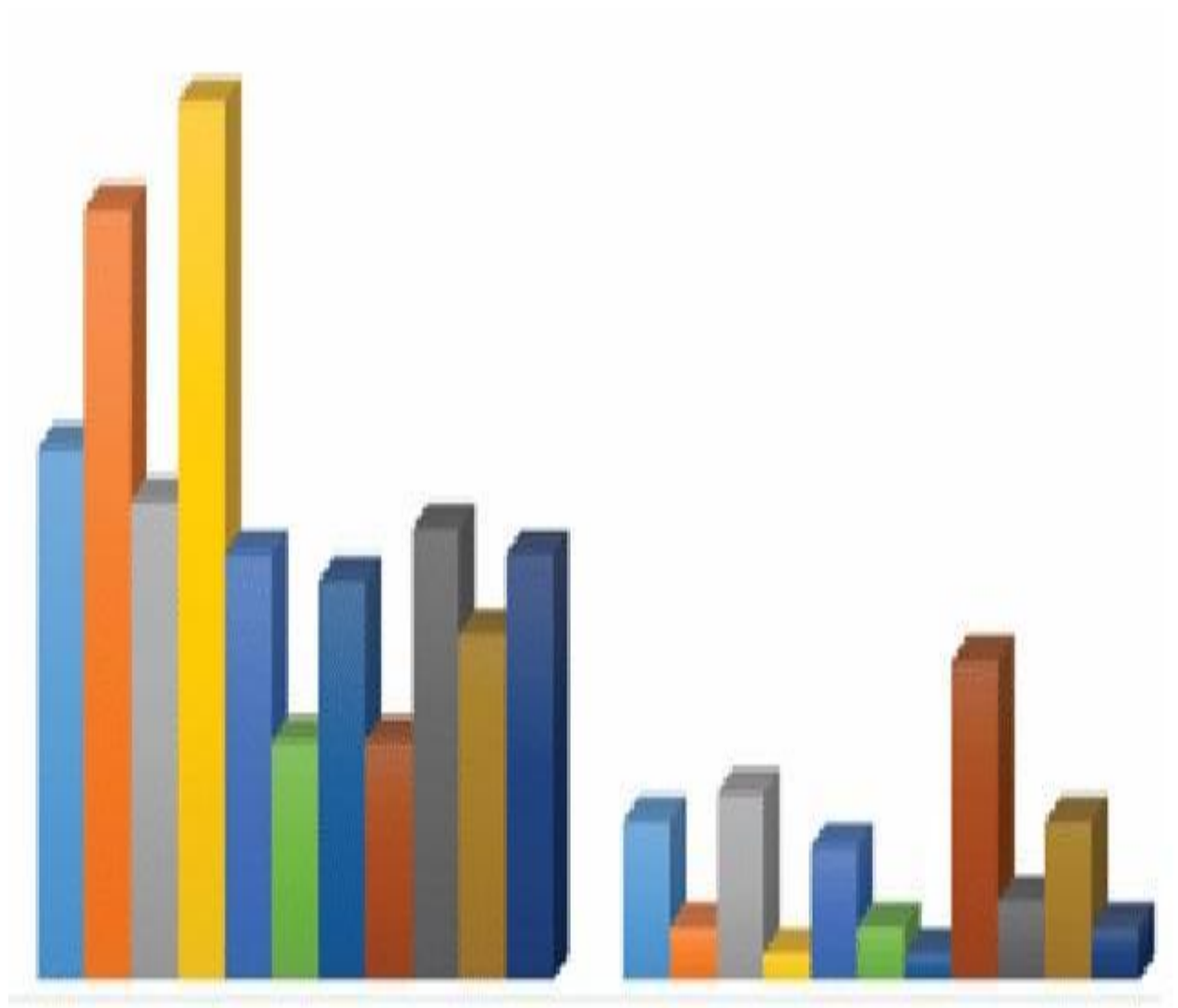


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Research Article

Qualitative Narratives of Sustainability Messaging in AI-Generated Graphic Design Campaigns

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ABSTRACT

The integration of artificial intelligence (AI) into graphic design has significantly transformed sustainability communication, enabling the creation of data-driven, scalable, and visually compelling campaigns. This study explores the qualitative narratives embedded in AI-generated graphic design campaigns that promote sustainability. Adopting a qualitative research design based on secondary data, the study synthesises academic literature, case studies, and industry reports to identify dominant narrative patterns and interpret their symbolic meanings. The analysis reveals key themes, including eco-modernism, data-driven persuasion, visual minimalism, and emotional framing, which collectively shape how sustainability is communicated to diverse audiences. Drawing on the Theory of Planned Behaviour (TPB), Diffusion of Innovations (DOI), and semiotic theory, the study examines both the behavioural and symbolic dimensions of AI-generated design. The findings highlight that while AI enhances personalisation and engagement in sustainability messaging, it also raises critical concerns regarding greenwashing, authenticity, and the environmental impact of AI systems. The study contributes to interdisciplinary scholarship by offering a nuanced understanding of how AI mediates sustainability narratives and underscores the need for ethical and responsible design practices.

Keywords: artificial intelligence, sustainability communication, graphic design, visual narratives, green marketing, generative ai, qualitative research

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1. Introduction

Sustainability has become a defining paradigm of the 21st century, shaping policy frameworks, corporate strategies, and public consciousness worldwide. The urgency of addressing environmental degradation, climate change, and resource depletion has intensified the need for effective communication strategies that can influence individual and collective behaviour. Within this context, graphic design plays a crucial role as a medium for translating complex sustainability concepts into accessible and persuasive visual narratives. Simultaneously, the rapid advancement of artificial intelligence (AI) technologies has transformed the landscape of creative production, introducing new possibilities and challenges for sustainability communication.

AI-generated graphic design, powered by machine learning algorithms and generative models, is increasingly being used in sustainability campaigns across sectors. These tools enable designers and organisations to produce high-quality visual content efficiently, personalise messaging for diverse audiences, and experiment with innovative aesthetic forms. As noted by Mei et al. (2025), AI-driven marketing strategies have significantly enhanced the effectiveness of sustainability communication by enabling data-informed decision-making and targeted engagement. This convergence of AI and sustainability communication has given rise to a new domain of inquiry that examines how technological mediation influences the construction and dissemination of sustainability narratives.

The integration of AI into graphic design is not merely a technical shift but a paradigmatic transformation in how meaning is produced and communicated. Traditional design processes rely heavily on human creativity, intuition, and cultural knowledge. In contrast, AI-generated design involves algorithmic interpretation of data, patterns, and prompts, raising questions about authorship, authenticity, and intentionality. As Van Wynsberghe (2021) argues, the ethical implications of AI extend beyond its functional capabilities to encompass its role in shaping societal values and discourses, including those related to sustainability.

Sustainability messaging itself is inherently complex and multidimensional, encompassing environmental, social, and economic dimensions. Effective communication in this domain requires not only the transmission of information but also the creation of compelling narratives that resonate with audiences on cognitive and emotional levels. Visual narratives, in particular, have been shown to play a significant role in influencing perceptions and behaviours related to sustainability (Nisbet, 2009). Through the use of imagery, symbolism, colour, and composition, graphic design campaigns can evoke emotions, convey urgency, and inspire action.

The emergence of AI-generated visuals introduces new dynamics into this narrative process. On one hand, AI enables the rapid generation of diverse visual content, allowing for greater experimentation and customisation. On the other hand, it raises concerns about the potential homogenization of design aesthetics, the reproduction of

existing biases, and the risk of superficial or misleading representations of sustainability. Sharma et al. (2022) highlight that while AI offers significant opportunities for advancing sustainability goals, it also poses challenges related to energy consumption, ethical governance, and transparency.

In the context of green marketing, AI has been increasingly used to design campaigns that promote environmentally friendly products, behaviours, and policies. These campaigns often rely on visual storytelling to communicate sustainability values and persuade audiences to adopt sustainable practices. However, the use of AI in this domain raises critical questions about the authenticity and credibility of sustainability messaging. The phenomenon of “greenwashing,” where organisations make exaggerated or false claims about their environmental performance, is a growing concern in the age of automated content generation (Delmas & Burbano, 2011). AI-generated designs may inadvertently amplify such practices by producing visually appealing but substantively shallow narratives.

Despite the growing prevalence of AI-generated graphic design in sustainability campaigns, there is a notable gap in the literature regarding the qualitative analysis of the narratives embedded in these designs. Existing research has primarily focused on the technological capabilities of AI, its applications in marketing, and its environmental impact. However, there is limited understanding of how AI-mediated design processes shape the meanings,

symbols, and discourses associated with sustainability.

This study seeks to address this gap by exploring the qualitative narratives of sustainability messaging in AI-generated graphic design campaigns. By analysing secondary data from academic literature, industry reports, and case studies, the research aims to identify key narrative patterns, interpret their symbolic meanings, and examine their implications for sustainability communication. The study adopts an interdisciplinary approach, drawing on theories from social psychology, communication studies, and design research to provide a comprehensive analysis.

Specifically, the research is guided by the following objectives:

- To identify the dominant narrative themes in AI-generated sustainability campaigns.
- To examine how AI influences the construction and dissemination of sustainability messages.
- To analyse the ethical and communicative implications of AI-generated design in sustainability contexts.

In doing so, the study contributes to the emerging field of AI and sustainability communication by providing a qualitative perspective that complements existing quantitative and technical research. It also offers practical insights for designers, marketers, and policymakers seeking to leverage AI for effective and responsible sustainability messaging.

2. Literature Review

The intersection of artificial intelligence and sustainability has gained significant scholarly attention in recent years, reflecting the growing recognition of AI as both a tool and a challenge for sustainable development. AI technologies have been applied across various domains to optimise resource use, enhance efficiency, and support decision-making processes. For instance, AI-driven systems are used in energy management, smart agriculture, and waste reduction, contributing to environmental sustainability goals (Sharma et al., 2022).

However, the relationship between AI and sustainability is inherently paradoxical. While AI can facilitate sustainable practices, it also has its own environmental footprint, particularly in terms of energy consumption and carbon emissions associated with data centres and large-scale machine learning models. Van Wynsberghe (2021) conceptualises this duality through the distinction between “AI for sustainability” and the “sustainability of AI,” emphasising the need for a holistic approach that considers both dimensions.

Scholars have also highlighted the role of AI in supporting the United Nations Sustainable Development Goals (SDGs). AI applications can contribute to goals related to climate action, sustainable cities, and responsible consumption. However, achieving these benefits requires careful consideration of ethical, social, and environmental implications, including issues of bias, accountability, and transparency.

2.1 AI in Marketing and Sustainability Communication

The integration of AI into marketing has transformed how organisations communicate with consumers, particularly in the context of sustainability. AI-driven marketing strategies leverage data analytics, machine learning, and automation to create personalised and targeted messages. These capabilities are especially relevant for sustainability campaigns, which often require tailored communication to address diverse audience segments.

Mei et al. (2025) demonstrate that AI enhances green marketing by enabling real-time analysis of consumer behaviour and preferences, allowing organisations to design more effective campaigns. Similarly, Zhang et al. (2025) find that AI-generated recommendations can positively influence consumer attitudes toward sustainable products, increasing the likelihood of pro-environmental behaviour.

Despite these advantages, the use of AI in sustainability communication raises important ethical concerns. One of the most significant issues is the potential for greenwashing. Delmas and Burbano (2011) define greenwashing as the practice of misleading consumers regarding the environmental practices of a company or the environmental benefits of a product. AI-generated content, with its ability to produce persuasive visuals and narratives at scale, may exacerbate this problem by making it easier to create convincing but misleading messages.

Moreover, AI-driven personalisation can lead to the fragmentation of sustainability narratives, where different audiences receive different messages based on their preferences and behaviours. While this can enhance engagement, it may also undermine the consistency and credibility of sustainability communication.

2.2 AI in Graphic Design and Visual Communication

The application of AI in graphic design represents a significant shift in creative practices. Generative AI tools, such as text-to-image models, enable the automated creation of visual content based on textual prompts. These tools have been widely adopted in advertising, branding, and digital media, including sustainability campaigns.

AI-generated design offers several advantages, including efficiency, scalability, and the ability to explore diverse design options. Designers can use AI to generate multiple variations of a visual concept, experiment with different styles, and refine their ideas. This process enhances creativity and innovation, allowing for more dynamic and engaging visual communication.

However, the use of AI in design also raises questions about authorship and originality. Unlike traditional design, where the creator's intent and cultural context play a central role, AI-generated design is influenced by training data and algorithmic processes. This can result in the reproduction of existing patterns and biases, potentially limiting the diversity and authenticity of visual narratives.

In the context of sustainability, AI-generated visuals often incorporate common symbols

such as nature imagery, green colour palettes, and minimalist aesthetics. While these elements are effective in conveying sustainability themes, their overuse may lead to visual clichés and reduce the impact of campaigns.

2.3 Visual Narratives and Sustainability Messaging

Visual narratives are a key component of sustainability communication, enabling the translation of abstract concepts into tangible and relatable forms. Graphic design campaigns use visual elements to construct narratives that convey messages about environmental responsibility, social equity, and economic sustainability.

Nisbet (2009) emphasises the importance of framing in sustainability communication, arguing that the way issues are presented can significantly influence public understanding and engagement. Visual framing involves the use of imagery, symbols, and design elements to highlight certain aspects of a message while downplaying others.

Common narrative strategies in sustainability campaigns include:

- **Apocalyptic framing**, which emphasises the consequences of inaction
- **Solution-oriented framing**, which highlights practical steps for change
- **Moral framing**, which appeals to ethical values and responsibilities

AI-generated design has the potential to enhance these narrative strategies by enabling the rapid generation of visuals tailored to specific frames. However, it also

introduces challenges related to the coherence and authenticity of narratives.

2.4 Ethical Considerations and Critical Perspectives

The use of AI in sustainability communication raises several ethical issues that warrant critical examination. These include concerns about transparency, accountability, and the potential misuse of technology.

One of the key ethical challenges is the lack of transparency in AI-generated content. Audiences may not be aware that a design has been generated by AI, raising questions about authenticity and trust. Additionally, the use of AI in sustainability campaigns may create a disconnect between the message and the actual practices of organisations, contributing to greenwashing.

Another important issue is the environmental impact of AI itself. As noted by Sharma et al. (2022), the energy consumption associated with AI systems can be substantial, potentially undermining the sustainability goals they aim to promote. This highlights the need for responsible AI practices that consider both the benefits and costs of technology.

Critical scholars also argue that AI-generated narratives may reinforce dominant ideologies and power structures. By relying on existing data and patterns, AI systems may reproduce biases and limit the diversity of perspectives in sustainability communication.

2.5 Research Gap and Contribution

While existing literature provides valuable insights into AI, sustainability, and visual

communication, there is a lack of research that integrates these domains to examine the qualitative narratives of AI-generated design. Most studies focus on quantitative analysis, technological capabilities, or consumer behaviour, leaving a gap in understanding the symbolic and communicative dimensions of AI-generated sustainability messaging.

This study addresses this gap by adopting a qualitative approach that explores how narratives are constructed, interpreted, and communicated through AI-generated graphic design. By integrating theoretical frameworks and empirical analysis, the research contributes to a more nuanced understanding of the role of AI in sustainability communication.

3. Theoretical Framework

This study adopts an interdisciplinary theoretical framework to examine how sustainability narratives are constructed and communicated within AI-generated graphic design campaigns. Given the complexity of sustainability messaging and the technological mediation of AI, a single theoretical lens is insufficient. Therefore, this research integrates the Theory of Planned Behaviour (TPB), Diffusion of Innovations (DOI), and semiotic theory to provide a comprehensive analytical perspective that encompasses behavioural, communicative, and symbolic dimensions.

3.1 Theory of Planned Behaviour (TPB)

The Theory of Planned Behaviour, developed by Ajzen (1991), is a widely used framework for understanding how attitudes, subjective

norms, and perceived behavioural control influence individual behaviour. In the context of sustainability communication, TPB provides a valuable lens for analysing how graphic design campaigns, particularly those generated by AI, shape audience perceptions and behavioural intentions.

AI-generated sustainability campaigns often aim to influence pro-environmental behaviour by presenting eco-friendly choices as desirable, socially accepted, and feasible. Through personalised messaging and data-driven insights, AI systems can tailor visual content to align with users' existing attitudes and beliefs, thereby strengthening positive attitudes toward sustainable practices (Zhang et al., 2025). For example, a campaign promoting renewable energy might use visually appealing imagery and persuasive narratives to reinforce the perceived benefits of adopting sustainable technologies.

Subjective norms, another key component of TPB, are also influenced by AI-generated design. Visual campaigns can depict sustainability as a socially endorsed behaviour, using imagery that reflects collective action, community engagement, or institutional support. AI's ability to analyse social trends and cultural patterns enables the creation of visuals that resonate with prevailing norms and values.

Perceived behavioural control refers to individuals' beliefs about their ability to perform a behaviour. AI-generated campaigns can enhance this perception by providing clear, actionable information and visually demonstrating achievable steps toward sustainability. For instance, infographics generated by AI may simplify

complex environmental data, making sustainable actions appear more accessible and manageable.

Thus, TPB helps explain how AI-generated graphic design campaigns influence behavioural intentions by shaping attitudes, norms, and perceptions of control.

3.2 Diffusion of Innovations (DOI)

The Diffusion of Innovations theory, proposed by Rogers (2003), examines how new ideas, technologies, and practices spread within a social system. This framework is particularly relevant for understanding the role of AI in transforming sustainability communication.

AI-generated graphic design represents an innovation in both technology and communication practice. Its adoption in sustainability campaigns can be analysed through the key attributes of innovation identified by Rogers (2003): relative advantage, compatibility, complexity, trialability, and observability.

- **Relative advantage:** AI-generated design offers efficiency, scalability, and personalisation, making it attractive to organisations seeking to enhance their sustainability communication.
- **Compatibility:** AI tools can be integrated into existing design workflows, aligning with organisational goals related to sustainability and digital transformation.
- **Complexity:** While AI systems can be complex, user-friendly interfaces

and automation reduce barriers to adoption.

- **Trialability:** Designers can experiment with AI-generated visuals, testing different narratives and styles before implementation.
- **Observability:** The outcomes of AI-generated campaigns, such as engagement metrics and behavioural changes, are measurable and visible.

In terms of sustainability messaging, DOI helps explain how AI-generated narratives are disseminated and adopted by audiences. AI enables the rapid distribution of visual content across digital platforms, facilitating the spread of sustainability messages. Moreover, the personalisation capabilities of AI allow for targeted communication, increasing the likelihood of adoption among different audience segments (Mei et al., 2025).

However, DOI also highlights potential challenges, such as unequal access to technology and varying levels of digital literacy, which may affect the reach and impact of AI-generated campaigns.

3.3 Semiotic Theory

Semiotic theory provides a framework for analysing the meaning-making processes involved in visual communication. Rooted in the work of Saussure (1916/1983) and Peirce (1931–1958), semiotics examines how signs and symbols convey meaning through their relationships with cultural and social contexts.

In graphic design, visual elements such as colour, imagery, typography, and composition function as signs that

communicate specific messages. In sustainability campaigns, these signs often include natural imagery (e.g., forests, oceans), green colour schemes, and minimalist aesthetics, which are culturally associated with environmental responsibility.

AI-generated design introduces a new dimension to semiotic analysis. Unlike human designers, AI systems generate visuals based on patterns in training data, which may include a vast array of existing images and cultural references. As a result, AI-generated visuals can reproduce dominant symbols and narratives while potentially overlooking alternative or marginalised perspectives.

Semiotic analysis allows this study to interpret how sustainability is represented in AI-generated campaigns, examining both denotative (literal) and connotative (symbolic) meanings. For example, an AI-generated image of a green cityscape may denote urban sustainability while connoting progress, innovation, and harmony with nature.

Furthermore, semiotics helps identify the ideological dimensions of sustainability messaging. AI-generated visuals may reinforce certain narratives, such as techno-optimism or consumer responsibility, while neglecting structural or systemic issues.

3.4 Integrated Theoretical Model

By integrating TPB, DOI, and semiotic theory, this study develops a multidimensional framework for analysing AI-generated sustainability campaigns. TPB focuses on behavioural outcomes, DOI

examines the diffusion of innovation, and semiotics explores symbolic meaning.

This integrated approach enables a comprehensive understanding of how AI-generated graphic design:

- Influences individual behaviour and decision-making
- Facilitates the dissemination of sustainability messages
- Constructs and communicates visual narratives

The framework also highlights the interplay between technology, communication, and society, emphasising the need for critical and ethical engagement with AI in sustainability contexts.

4. Methodology

This study adopts a qualitative research design to explore the narratives embedded in AI-generated graphic design campaigns related to sustainability. Qualitative research is particularly suited for examining meanings, interpretations, and social phenomena that cannot be easily quantified (Creswell & Poth, 2018). Given the study's focus on visual narratives and symbolic communication, a qualitative approach allows for an in-depth analysis of how sustainability messages are constructed and conveyed.

The research is based on secondary data analysis, which involves the systematic examination of existing data sources, including academic literature, case studies, and industry reports. Secondary data analysis is appropriate for this study as it enables the

synthesis of diverse perspectives and provides a comprehensive understanding of the research topic without the need for primary data collection.

4.1 Data Sources and Selection Criteria

The study draws on a wide range of secondary data sources, including:

- Peer-reviewed journal articles
- Conference proceedings
- Industry reports and white papers
- Case studies of AI-generated sustainability campaigns
- Design portfolios and digital media content

Data were collected from academic databases such as Scopus, Web of Science, and Google Scholar. The selection of sources was guided by specific inclusion criteria:

- Relevance to AI, sustainability, or graphic design
- Focus on communication, marketing, or visual narratives
- Publication in reputable academic or professional outlets
- Availability of full-text access

A systematic search strategy was employed using keywords such as “AI-generated design,” “sustainability campaigns,” “green marketing,” and “visual communication.”

4.2 Data Collection Procedure

The data collection process followed a structured approach inspired by systematic literature review (SLR) methodologies (Kitchenham, 2004). The steps included:

- **Identification:** Initial search of databases using predefined keywords
- **Screening:** Removal of duplicates and irrelevant sources
- **Eligibility:** Assessment of full-text articles based on inclusion criteria
- **Inclusion:** Final selection of sources for analysis

This process ensured the reliability and validity of the data used in the study.

4.3 Data Analysis Techniques

The study employs thematic analysis and qualitative content analysis to examine the data. These methods are widely used in qualitative research to identify patterns, themes, and meanings within textual and visual data (Braun & Clarke, 2006).

Thematic Analysis: Thematic analysis involves identifying recurring themes and patterns across the data. The process includes:

- Familiarisation with the data
- Generation of initial codes
- Identification of themes
- Review and refinement of themes
- Interpretation and reporting

In this study, themes related to sustainability narratives, AI influence, and ethical considerations were identified and analysed.

Qualitative Content Analysis: Qualitative content analysis focuses on the systematic coding and categorisation of data to identify meaningful patterns (Schreier, 2012). This method was used to analyse both textual and visual content, examining how sustainability messages are represented and communicated.

Semiotic Analysis: In addition to thematic and content analysis, the study employs semiotic analysis to interpret visual elements. This involves examining signs, symbols, and their meanings within cultural and social contexts.

4.4 Validity and Reliability

To ensure the rigour of the study, several strategies were employed:

- **Triangulation:** Use of multiple data sources and analytical methods
- **Transparency:** Clear documentation of data collection and analysis procedures
- **Reflexivity:** Acknowledgement of the researcher's interpretive role

These measures enhance the credibility and trustworthiness of the findings (Lincoln & Guba, 1985).

4.5 Ethical Considerations

As the study relies on secondary data, it does not involve direct interaction with human participants. However, ethical considerations remain important, including:

- Proper citation and acknowledgement of sources
- Avoidance of plagiarism
- Respect for intellectual property

The study adheres to academic standards and ethical guidelines for research (Mannan & Farhana, 2026).

4.6 Limitations of the Methodology

While secondary data analysis offers several advantages, it also has limitations. The study is dependent on the availability and quality of

existing data, which may not fully capture the diversity of AI-generated sustainability campaigns. Additionally, the interpretation of visual narratives is inherently subjective, which may influence the findings.

Despite these limitations, the methodology provides a robust framework for exploring the research questions and contributes valuable insights into the field.

5. Findings and Analysis

This section presents the findings derived from the thematic, qualitative content, and semiotic analyses of secondary data related to AI-generated graphic design campaigns focused on sustainability. The analysis reveals a set of dominant narrative patterns, communicative strategies, and underlying ideological constructs that characterise AI-mediated sustainability messaging. These findings are organised into key thematic categories, followed by interpretive analysis grounded in the theoretical framework.

5.1 Dominant Narrative Themes in AI-Generated Sustainability Campaigns

One of the most prominent narratives identified in AI-generated sustainability campaigns is eco-modernism, which frames sustainability as a technologically driven solution to environmental challenges. Visuals frequently depict futuristic urban landscapes, renewable energy infrastructures, and digitally integrated ecosystems. These representations align with what scholars describe as “technological optimism,” where innovation is positioned as the primary

pathway to sustainability (Van Wynsberghe, 2021).

AI-generated visuals reinforce this narrative through sleek, high-resolution imagery that emphasises efficiency, cleanliness, and progress. For example, images of solar-powered cities or autonomous electric vehicles are often rendered with a polished aesthetic that conveys a sense of inevitability and desirability. Semiotically, these visuals combine signs of nature (e.g., greenery, sunlight) with symbols of advanced technology (e.g., smart grids, digital interfaces), creating a hybrid narrative of harmony between nature and innovation.

From a TPB perspective, this narrative enhances positive attitudes toward sustainable technologies by presenting them as both beneficial and aspirational (Ajzen, 1991). However, it may also obscure structural and socio-political dimensions of sustainability by focusing narrowly on technological solutions.

Another significant theme is the use of data-driven persuasion in AI-generated campaigns. AI systems enable the integration of environmental data, such as carbon emissions, energy consumption, and waste reduction, into visual narratives. Infographics, dashboards, and dynamic visualisations are commonly used to communicate these metrics.

This approach reflects a broader trend toward the quantification of sustainability, where numerical indicators are used to convey credibility and authority. As Mei et al. (2025) note, AI enhances the ability to process and present complex data in accessible formats,

thereby increasing the persuasive power of sustainability campaigns.

Semiotically, numbers and data visualisations function as signs of objectivity and scientific legitimacy. They signal that the message is grounded in empirical evidence, which can strengthen audience trust. However, qualitative analysis reveals that these data-driven narratives often prioritise measurable aspects of sustainability while neglecting qualitative dimensions such as social justice and cultural values.

From a DOI perspective, the visibility and measurability of outcomes (observability) facilitate the adoption of sustainability practices (Rogers, 2003). Yet, there is also a risk of oversimplification, where complex environmental issues are reduced to easily digestible metrics.

AI-generated sustainability campaigns frequently employ minimalist design principles, characterised by clean layouts, limited colour palettes (often dominated by green and blue tones), and simple typography. This aesthetic aligns with contemporary design trends and is widely associated with environmental consciousness.

Thematic analysis indicates that minimalism serves both functional and symbolic purposes. Functionally, it enhances clarity and readability, making messages more accessible. Symbolically, it conveys values such as simplicity, efficiency, and purity, which are culturally linked to sustainability.

However, the widespread use of AI tools has led to a degree of aesthetic standardisation. Because AI models are trained on large

datasets of existing designs, they tend to reproduce dominant styles and visual conventions. This can result in homogenised outputs that lack originality and cultural specificity.

From a semiotic perspective, the repetition of certain visual motifs, such as leaves, water droplets, and recycling symbols, creates a shared visual language of sustainability. While this facilitates recognition, it may also lead to “visual fatigue,” reducing the impact of campaigns over time.

Emotional engagement is a key strategy in AI-generated sustainability campaigns. Visual narratives often evoke emotions such as hope, urgency, fear, or guilt to influence audience behaviour. For example, images of polluted environments may be used to evoke concern, while images of thriving ecosystems may inspire optimism.

AI enhances emotional framing by enabling the generation of highly detailed and evocative imagery. Through machine learning, AI systems can identify visual elements that are most likely to elicit emotional responses and incorporate them into design outputs.

This finding aligns with TPB, as emotions play a significant role in shaping attitudes and behavioural intentions (Ajzen, 1991). Emotional narratives can make sustainability issues more relatable and compelling, increasing the likelihood of pro-environmental behaviour.

However, qualitative analysis also reveals potential drawbacks. Overreliance on emotional appeals may lead to desensitisation or scepticism, particularly if audiences

perceive the content as manipulative or exaggerated.

5.2 Role of AI in Narrative Construction

AI fundamentally alters the process of narrative construction by automating aspects of design and content generation. Instead of manually crafting visuals, designers can input prompts and receive multiple design outputs, which can then be refined or curated.

This shift represents a form of “creative mediation,” where the role of the designer transitions from creator to curator. While this enhances efficiency and experimentation, it also raises questions about authorship and intentionality.

From a semiotic perspective, the meaning of AI-generated visuals is shaped not only by the designer’s intent but also by the underlying algorithms and training data. This introduces a layer of complexity in interpreting narratives, as the origins of visual elements may be diffuse and opaque.

AI enables the personalisation of sustainability messaging by tailoring visuals to specific audience segments. This is achieved through data analysis and predictive modelling, which identify user preferences and behaviours.

Personalised narratives can enhance relevance and engagement, as they align with individual values and contexts. For example, a campaign targeting urban consumers may emphasise sustainable transportation, while one targeting rural audiences may focus on agriculture.

From a DOI perspective, personalisation increases compatibility and relevance, facilitating the adoption of sustainability practices (Rogers, 2003). However, it may also fragment sustainability discourse, creating multiple, potentially conflicting narratives.

5.3 Ethical and Critical Issues

One of the most critical issues identified is the potential for greenwashing. AI-generated campaigns can produce visually compelling narratives that exaggerate or misrepresent environmental benefits. As Delmas and Burbano (2011) argue, greenwashing undermines trust and can have negative consequences for both consumers and organisations. AI’s ability to generate content at scale increases the risk of such practices, particularly when there is limited oversight or accountability.

The use of AI raises questions about the authenticity of sustainability messaging. Audiences may question whether AI-generated visuals genuinely reflect organisational values or are merely marketing tools. Transparency is therefore essential in maintaining trust. Clearly indicating the use of AI and providing accurate information can help mitigate concerns.

Ironically, the use of AI in sustainability campaigns may contribute to environmental degradation through energy consumption. Sharma et al. (2022) highlight the significant carbon footprint associated with AI systems, raising concerns about the sustainability of AI itself. This paradox underscores the need for responsible AI practices that balance

technological innovation with environmental considerations.

6. Discussion

The findings of this study provide a nuanced understanding of how AI-generated graphic design campaigns construct and communicate sustainability narratives. This section interprets these findings in relation to the theoretical framework and broader scholarly debates, highlighting implications for theory, practice, and future research.

6.1 Interpreting Findings Through TPB

The application of TPB reveals that AI-generated campaigns are highly effective in shaping behavioural intentions by influencing attitudes, subjective norms, and perceived behavioural control. The use of visually appealing and emotionally engaging content enhances positive attitudes toward sustainability, while the depiction of collective action reinforces social norms.

Moreover, data-driven visuals and actionable information increase perceived behavioural control by making sustainable practices appear achievable. This aligns with previous research indicating that clear and accessible information is critical for promoting pro-environmental behaviour (Ajzen, 1991).

However, the effectiveness of these strategies depends on the credibility and authenticity of the message. If audiences perceive AI-generated content as manipulative or misleading, it may undermine trust and reduce behavioural impact.

6.2 Diffusion of AI-Generated Sustainability Narratives

From a DOI perspective, AI-generated design represents a significant innovation in sustainability communication. Its relative advantage in terms of efficiency and personalisation facilitates rapid adoption among organisations and audiences.

The observability of campaign outcomes, such as engagement metrics and behavioural changes, further supports diffusion. However, the findings also highlight potential barriers, including technological complexity and ethical concerns.

Importantly, the diffusion of AI-generated narratives may contribute to the standardisation of sustainability messaging, as similar design patterns and themes are replicated across campaigns. This raises questions about the diversity and inclusivity of sustainability discourse.

6.3 Semiotic Implications and Ideological Dimensions

Semiotic analysis reveals that AI-generated visuals often rely on familiar symbols and narratives, reinforcing dominant ideologies such as techno-optimism and individual responsibility. While these narratives are effective in promoting certain behaviours, they may also obscure structural issues such as inequality and systemic environmental challenges.

For example, the emphasis on consumer choices in sustainability campaigns may shift responsibility away from corporations and governments. This reflects a broader trend in

sustainability discourse, where individual actions are prioritised over systemic change.

AI's reliance on existing data further reinforces these patterns, as it reproduces dominant cultural narratives and visual conventions. This highlights the need for critical engagement with AI-generated content to ensure that diverse perspectives are represented.

6.4 Ethical Considerations and Responsible AI

The ethical issues identified in the findings underscore the importance of responsible AI practices. Transparency, accountability, and ethical governance are essential for ensuring that AI-generated sustainability campaigns are credible and trustworthy.

Organisations must be vigilant in avoiding greenwashing and ensuring that their messaging accurately reflects their environmental practices. Additionally, efforts should be made to reduce the environmental impact of AI systems, such as optimising energy efficiency and using sustainable infrastructure.

6.5 Implications for Practice

For designers and marketers, the findings highlight the potential of AI as a powerful tool for sustainability communication. However, its use must be guided by ethical principles and critical awareness. Designers should strive to balance efficiency with creativity, avoiding overreliance on standardised templates and exploring diverse visual narratives. Marketers should ensure that AI-generated content aligns with

organisational values and sustainability goals.

6.6 Future Research Directions

This study opens several avenues for future research. Empirical studies could examine audience perceptions of AI-generated sustainability campaigns, exploring how different narratives influence behaviour. Cross-cultural research could investigate how sustainability messaging varies across contexts. Additionally, interdisciplinary research is needed to develop ethical frameworks and guidelines for the use of AI in sustainability communication.

7. Conclusion

This study has examined the qualitative narratives of sustainability messaging in AI-generated graphic design campaigns, offering a comprehensive analysis of how artificial intelligence reshapes contemporary visual communication. By integrating insights from the Theory of Planned Behaviour (Ajzen, 1991), Diffusion of Innovations (Rogers, 2003), and semiotic theory, the research demonstrates that AI-generated design operates simultaneously at behavioural, communicative, and symbolic levels.

The findings reveal that AI-generated sustainability campaigns are characterised by recurring narrative patterns, including eco-modernism, data-driven persuasion, visual minimalism, and emotional engagement. These narratives are highly effective in shaping audience attitudes, reinforcing social norms, and enhancing perceived behavioural control, thereby promoting pro-environmental behaviour. At the same time,

AI facilitates the rapid diffusion of sustainability messages through personalised and scalable communication strategies, increasing their reach and impact.

However, the study also highlights critical challenges associated with the use of AI in sustainability communication. The potential for greenwashing, as identified by Delmas and Burbano (2011), raises concerns about the authenticity and credibility of AI-generated messages. Additionally, the environmental cost of AI technologies themselves presents a paradox, as the tools used to promote sustainability may contribute to ecological degradation (Sharma et al., 2022). These issues underscore the importance of transparency, accountability, and ethical governance in the use of AI.

From a theoretical perspective, the study contributes to the growing body of literature on AI and sustainability by providing a qualitative and interpretive analysis of visual narratives. It extends existing research by highlighting the role of AI not only as a technological tool but also as a mediator of meaning and ideology. The semiotic analysis, in particular, reveals how AI-generated visuals reproduce dominant cultural symbols and narratives, potentially limiting the diversity of sustainability discourse.

In practical terms, the findings suggest that designers, marketers, and policymakers must adopt a critical and reflective approach to the use of AI in sustainability campaigns. While AI offers significant opportunities for innovation and engagement, its application must be guided by ethical principles and a commitment to genuine sustainability.

Future research should explore audience reception of AI-generated sustainability campaigns, investigate cross-cultural variations in visual narratives, and develop frameworks for responsible AI use in design. By addressing these areas, scholars and practitioners can better harness the potential of AI to support meaningful and effective sustainability communication.

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