

From Paper to Screen: Transitioning conventional posters to digital posters for environmental sustainability

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Abstract

The transition from print to digital media holds significant potential for reducing environmental impact. Traditional print media requires substantial natural resources and generates significant waste and greenhouse gas emissions. Digital media offers environmental benefits by eliminating the need for paper, ink, and physical printing processes, increasing energy efficiency, and reducing physical waste. Digital visual communication design can deliver dynamic and interactive messages, enhancing engagement and reaching a global audience quickly and cost-effectively. For a successful transition, designers must address challenges such as dependency on digital technology and data privacy issues.

Keywords: Digital media; environmental sustainability; visual communication design; digital posters

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1.0 Introduction

Environmental sustainability is one of the most pressing issues in today global context. With climate change, ecosystem degradation, and rising pollution becoming increasingly accurate, finding sustainable solutions is becoming more urgent. Environmental sustainability includes efforts to maintain ecological balance, reduce the negative impact of human activities on nature, and ensure that future generations can enjoy natural resources (Baldassarre et.al, 2024; Bodo et.al, 2021).

Visual communication design plays a vital role in supporting environmental sustainability. Visual communication media can convey messages about the importance of ecological preservation effectively and widely. The use of technology and digital media in visual communication design, such as digital posters, opens up significant opportunities to reduce non-renewable resources like paper and ink while increasing the efficiency and reach of information. Visual communication design can also positively influence public behaviour, encouraging people to be more environmentally conscious (Ji & Lin, 2022).

Victor Papanek (2006) stated, "...design has become the most powerful tool used by humans to shape tools and environments (and, by extension, society and themselves)".

Papanek, a pioneer in sustainable design, emphasised that designers have social and ecological responsibilities. Designers always act as agents of change in society (de Mozota, 2010). Papanek believes good design must be aesthetic, ethical, and environmentally friendly. His principles are relevant in transitioning media from conventional to digital, where innovation in visual communication design can significantly contribute to environmental sustainability.

This paper explores how the transition from paper to screen in visual communication media can support environmental sustainability, referring to Papanek's principles on sustainable design. This analysis will show how this change helps reduce environmental impact and enhances message delivery effectiveness in the increasingly digital era. Wisely applied visual communication design can be a powerful tool to educate and inspire the public about the importance of environmental sustainability, aligning with Papanek's responsible design vision (Rosario & Dias, 2022; Scarzella, 2020).

For example, conventional print media has a significant environmental impact because producing paper, ink, and printing requires substantial natural resources and generates waste and harmful emissions. Paper production often causes deforestation and high water consumption, disrupting local ecosystems. The printing process uses oil-based inks that are harmful to the environment, and print media generates a lot of paper waste that is difficult to recycle efficiently. Moreover, print media production and distribution processes produce significant carbon emissions, worsening environmental problems. Thus, transitioning to digital media can address these environmental issues, such as digital posters that can be distributed online via digital devices quickly, practically, cheaply, and environmentally friendly (FESPA, 2021; Cumming, 2021).

This paper explores how the transition from conventional print media to digital media can support environmental sustainability, particularly from the perspective of visual communication design. Referring to Victor Papanek's socially and ecologically responsible design thoughts, this paper will analyse how innovations in visual communication design can reduce the environmental impact caused by print media. This approach aims to reduce the use of natural resources and waste and improve the effectiveness of message delivery in the increasingly digital era.

This paper will demonstrate how the transition to digital media supports environmental sustainability goals and enhances the quality and reach of information delivered to the public by connecting Papanek's sustainable design principles with visual communication design practices.

2.0 Literature Review

2.1 Visual Communication Design: Definition and Role

Visual Communication Design is a field that combines visual elements such as images, typography, and colours to convey messages or information effectively through a medium. This design bridges information and the audience, making messages more easily understood and attractive. Visual communication design encompasses various media, including print, digital, and interactive media, each with its characteristics and specific techniques (Meggs, 2012).

The primary role of visual communication design is to facilitate clear and effective communication. Visual communication designers apply design principles such as balance, contrast, harmony, and hierarchy to create aesthetic and functional works. Some important roles of visual communication design for the audience include enhancing audience understanding, attracting audience attention, building brand identity, evoking audience emotions and actions, and increasing accessibility (Weber, 2024).

In environmental sustainability, visual communication design is crucial in conveying messages about environmental preservation and the importance of sustainable practices. By shifting from conventional print to digital media, visual communication design can reduce environmental impact while effectively conveying information. Visual communication designers are responsible for creating aesthetic, ethical, and environmentally friendly works in line with Victor Papanek's sustainable design principles (Silpa & Harilal, 2024).

2.2 Victor Papanek: Socially and Ecologically Responsible Design

Victor Papanek is one of the most influential thinkers in sustainable and socially responsible design. In his work *"Design for the Real World: Human Ecology and Social Change"*, Papanek articulated several principles emphasising the importance of design that is not only aesthetic but also ethical and environmentally friendly (Wilson & Bhamra, 2020).

Papanek believed that design should holistically serve human needs, not just aesthetic or commercial ones. He emphasised that designers are responsible for creating solutions that solve real problems and improve the quality of human life. Design must be inclusive and consider various societal groups, including those who are underserved or have special needs (de Mozota, 2010).

One of Papanek's main principles is that design must consider environmental impact. He strongly criticised design practices that waste resources and pollute the environment. Papanek encouraged using recyclable materials, renewable energy, and environmentally friendly production processes. Design should consider the entire lifecycle of a product, from production to disposal, to minimise its ecological footprint (Pacey, 2000).

Papanek emphasised that designers must be socially responsible. It means that design must consider the social implications of the products and services created. Designers must consider how their products affect society, culture, and the economy. Socially responsible design also includes ethical principles in business and production practices (Fallan, 2021).

According to Papanek, good design is efficient and minimalist. He argued that design should use resources efficiently, avoid waste, and focus on the primary function of the product. Minimalism in design means creating simple, intuitive, and easy-to-use solutions without unnecessary elements (Ceschin & Gaziulusoy, 2020).

Papanek encouraged designers to innovate with social good as the goal. Innovation in design should focus on creating solutions that solve social and environmental problems. He invited designers to think creatively and find new ways to tackle global challenges such as poverty, health, education, and climate change.

Papanek also highlighted the importance of learning from nature in creating sustainable designs. He believed that observing and mimicking natural processes and structures (biomimicry) would lead to many innovative design solutions. Nature-inspired design tends to be more efficient and sustainable because evolution has optimised it (Illieva, et.al, 2022; Jiang, et.al, 2024; Othmani, et.al, 2022).

Through these principles, Victor Papanek urged designers to be more responsible in their practices, creating works that are not only beautiful but also beneficial for society and the environment. His ideas have become a cornerstone of the sustainable design movement and inspire designers worldwide to create more ethical and environmentally friendly solutions.

3.0 Methodology

This research uses descriptive research methods to test the media transition model. A literature review on visual communication design, environmental sustainability, and the transition from print to digital media provides this research with the needed data. Literature sources include books, journal articles, and online sources encompass Victor Papanek's work and sustainable design principles. Subsequently, a qualitative analysis identifies the main themes and relationships between visual communication design, digital media, and environmental sustainability.

The data from literature analysis and observations are then synthesised and critiqued to develop arguments regarding the benefits of transitioning to digital media in supporting environmental sustainability. This process involves testing the findings against Victor Papanek's sustainable design principles and critically analysing their practical implementation. The analysis results are summarised in conclusions that show how the transition from print to digital media can support environmental sustainability. This study also proposes practical recommendations for visual communication designers and the media industry to apply the sustainable design principles in maximizing the environmental benefits of digital media.

4.0 Findings

The transition from conventional print media to digital media has significant potential to reduce environmental impact. Paper production requires substantial natural resources, such as wood, water, and energy, which often result in deforestation and generate significant waste and greenhouse gas emissions. Oil-based inks used in printing also contain harmful chemicals, while paper waste that is difficult to recycle often ends up in landfills, adding to the solid waste burden.

The shift to digital media offers significant environmental benefits. Digital media does not require paper, ink, or physical printing processes, thus reducing the use of natural resources. Digitisation allows for the wide distribution of information without printing physical copies and offers higher energy efficiency than print media. Digital media also produces less physical waste, and digital devices can be recycled and updated, reducing electronic waste.

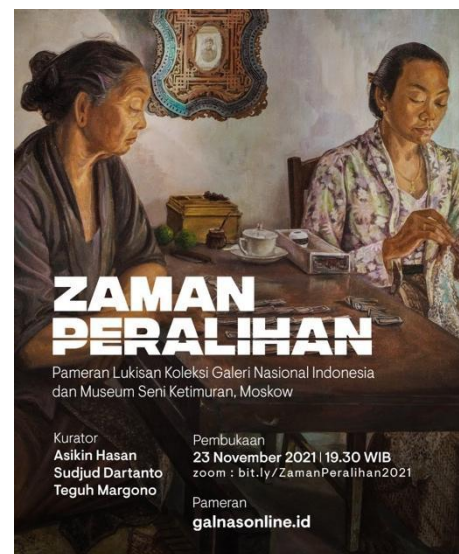
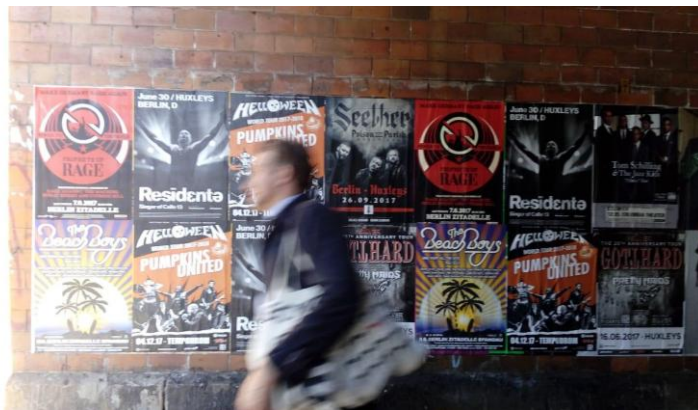


Fig. 1: Conventional posters (left); digital poster (right)
(Source:) Gogor Bangsa (left); Galeri Nasional (right)

Visual communication design in digital media has several advantages in supporting environmental sustainability. Digital media allows for more dynamic and interactive message delivery, enhancing audience engagement and communication effectiveness. The reach of information is also broader, allowing environmental sustainability campaigns to quickly and cost-effectively reach a global audience. Digital technology enables innovation in more environmentally friendly design, such as using more efficient vector-based graphics.

A real-world example of using digital posters is for publication and information purposes, such as event announcements and invitations. Digital posters can be distributed via social media, email, and websites, spreading information faster and broader without printing costs. Additionally, digital posters can be updated in real time if there is a change in information, ensuring that the audience always receives the latest information. Using digital posters in environmental campaigns, seminars, concerts, and community events has effectively increased public participation and awareness without adding to the environmental burden. The public have also been familiar with various social media for communication and accessing information, such as WhatsApp, Instagram, and Facebook. These social media platforms are the most frequently accessed by the Indonesian public.

However, the transition to digital media also faces several challenges. Dependence on digital devices and technology infrastructure can be a barrier, especially in areas with limited technology access. Data security and privacy are also important issues, and people must address the digital divide to ensure that everyone has equal access to technology. Enhancing digital literacy and technology access across various community groups must be continuously promoted.

5.0 Discussion

The transition from conventional print media to digital media in visual communication design shows excellent potential for supporting environmental sustainability. This research indicates that print media has a significant environmental impact due to its extensive use of natural resources and harmful waste production. By shifting to digital media, many of these negative impacts can be minimised or even eliminated.

For instance, the use of digital posters offers several significant advantages over printed posters. Not only do digital posters reduce paper and ink consumption, but they also allow for the broader and faster distribution of information. Information can be disseminated effectively without geographical limitations and additional production costs by leveraging digital platforms such as social media, email, and websites. Additionally, digital posters can be updated in real-time, ensuring the information conveyed is always accurate and up-to-date.

However, although digital media offers many environmental benefits, this transition also faces several challenges. Dependence on digital technology means that access to devices and the internet becomes crucial. However, limited access in some areas creates a digital divide that we should address to ensure that everyone can get the benefits from digital media. Moreover, while digital devices can be recycled, still their production and disposal have environmental impacts that we must appropriately manage.

Visual communication design in digital media also brings new data security and privacy challenges. Protecting personal data and sensitive information in the digital era is increasingly essential. Designers and users must ensure that the platforms used are secure and that collected data is not misused.

In environmental sustainability, visual communication design is vital in conveying important messages about environmental conservation. Digital technology enables designers to create aesthetic, ethical, and environmentally friendly works. Victor Papanek's sustainable design principles are highly relevant in this context. Papanek emphasised that designers have a social and ecological responsibility to create solutions that solve real problems and improve the quality of human life (de Bont, 2021).

Connecting these principles with visual communication design practices, it is evident that the transition to digital media supports environmental sustainability goals and enhances the quality and reach of information delivered to the public. Designers must continue to innovate with social and environmental good as the goal, creating inclusive, efficient, and minimalist works.

Ultimately, the success of the transition from print media to digital media in supporting environmental sustainability depends dramatically on our ability to overcome these challenges. Efforts to improve technology access, data security, and digital literacy must continue. With a wise and innovative approach, visual communication design in digital media can become a powerful tool to educate and inspire the public about the importance of environmental sustainability.

Although the transition to digital media offers many benefits, several limitations and challenges are faced. One of the main challenges is the need for significant investment in digital technology and infrastructure. Media companies must allocate substantial resources to develop effective digital platforms and train employees to master new technologies. Additionally, there are challenges in monetising digital content. Traditional business models relying on print advertising revenue must adapt to digital models that depend on online advertising, subscriptions, and digital content monetisation. It requires more complex marketing strategies and the ability to analyse user data to optimise revenue. The article *Design for the Sustainable World* by the World Design Organization also highlights the challenge of ensuring that the transition to digital media does not compromise content quality and audience engagement. They note that designers must create content that remains relevant and appealing to the audience while adhering to sustainability principles (WDO, 2020). Furthermore, there are challenges related to digital accessibility. Not all individuals have the same access to digital technology and the internet, which can create information gaps. Visual communication designers must consider inclusivity in their designs to ensure that information is accessible to everyone, including those with physical limitations or limited access to technology. While the transition to digital media presents challenges, it also offers excellent opportunities to create more sustainable and innovative solutions. By adopting Victor Papanek's sustainable design principles, the media industry can contribute to global sustainability goals while remaining relevant and competitive in the digital era.

6.0 Conclusion and Recommendations

6.1 Conclusion

The transition from conventional print media to digital media holds significant potential for reducing environmental impact. Traditional print media requires substantial natural resources such as wood, water, and energy, leading to deforestation and generating significant waste and greenhouse gas emissions. The use of oil-based inks in printing contains harmful chemicals, while paper waste, often challenging to recycle, ends up in landfills, adding to the solid waste burden.

Digital media offers considerable environmental benefits by eliminating the need for paper, ink, and physical printing and conserving natural resources. Digitisation allows for the wide distribution of information without printing physical copies and offers higher energy efficiency than print media. Digital media also produces less physical waste, and digital devices can be recycled and updated, reducing electronic waste.

Visual communication design in digital media enhances environmental sustainability by delivering dynamic and interactive messages that increase audience engagement and communication effectiveness. Digital platforms enable broader information reach, allowing environmental sustainability campaigns to quickly and cost-effectively reach a global audience. Digital design innovations like vector-based graphics offer more efficient and sustainable solutions.

Despite the benefits, the transition to digital media faces challenges such as dependency on digital devices and technology infrastructure, particularly in areas with limited access. Data security and privacy issues also arise, and addressing the digital divide is the key to ensure equitable access to technology. The designers must put efforts to enhance digital literacy and technology access across various community groups.

6.1.1 Limitations

Although the shift to digital media offers many environmental benefits, this research has several limitations that should be noted. First, energy consumption for digital infrastructure, such as data centers and servers, requires a significant amount of energy. Depending on the energy source, this can still contribute to environmental degradation, especially when relying on non-renewable energy sources. In addition, the rapid advancement of digital devices leads to an increase in electronic waste (e-waste). The management and recycling of digital devices are still not optimal, posing significant environmental and health risks. The digital divide also remains a challenge, as the benefits of digital media are not yet equally accessible to everyone. Many regions, especially in rural or economically disadvantaged areas, still face limited access to the internet and digital literacy, which hinders their participation in digital advancements. Furthermore, the increasing use of digital platforms also raises concerns about data privacy and security. Mismanagement of personal data and cyber security threats can undermine trust and hinder the widespread adoption of digital media. Dependence on technology is another concern, as a heavy reliance on digital infrastructure can create vulnerabilities, particularly in regions where technological infrastructure is fragile or frequently disrupted.

6.2 Recommendations

Governments and organisations should invest in improving access to digital technology and internet connectivity, particularly in underserved areas. This step is crucial to bridge the digital divide and ensure equitable access to the benefits of digital media. Additionally, designers and media platforms should prioritise data security and privacy, ensuring user data is protected and not misused. Implementing strong security measures and educating users about data privacy is essential.

Designers should also adopt the sustainable design principles advocated by Victor Papanek. The primary focus should be creating efficient, minimalist, and environmentally friendly solutions. Using recyclable materials, renewable energy, and sustainable production processes should become standard practice in design. Moreover, leveraging the advantages of digital media, such as real-time updates and interactivity, can enhance the effectiveness and engagement of communication. Designers should create interactive and easy-to-update digital posters and other media to guarantee the audiences well-informed and engaged.

Developing inclusive digital content is also very important. Digital content must be accessible to everyone, including individuals with physical limitations or limited access to technology. Inclusive design practices should be adopted to ensure that information is accessible to everyone. Continuous innovation in digital design should be encouraged to create more sustainable and impactful communication tools. Designers should explore new technologies and creative solutions to address global environmental challenges.

Addressing these recommendations can effectively support environmental sustainability from print to digital media. This step will enhance the quality and reach of information while promoting responsible and ethical design practices.

Paper Contribution to Related Field of Study

This paper relates to visual communication design by demonstrating how the transition from conventional to digital posters can significantly reduce environmental impact while enhancing the effectiveness of visual communication through sustainable design practices.

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